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# West Burton C Power Station

The West Burton C (Generating Station) – Land to the north of the West Burton B Power Station, Nottinghamshire

Stage 1 Pre-Application Consultation

Preliminary Environmental Information Report – Volume I

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**Applicant: EDF Energy (West Burton Power) Limited**  
**Date: September 2017**



## DOCUMENT HISTORY

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## GLOSSARY OF ABBREVIATIONS AND DEFINITIONS

<b>Abbreviation</b>	<b>Description</b>
AADT	Annual Average Daily Traffic Flow – a measure of the total volume of vehicle traffic of a highway or road for a year divided by 365 days.
ADMS	Atmospheric Dispersion Monitoring System – a proprietary model for the assessment of effect of emissions to air from point sources and road sources.
AGI	Above Ground Installation – installations used to support the safe and efficient operation of the pipeline; above ground installations are needed at the start and end of a cross-country pipeline and at intervals along the route.
ALC	Agricultural Land Classification – part of the planning system in England and Wales which classifies agricultural land in five categories according to versatility and suitability for growing crops.
AND	Atmospheric Nitrogen Deposition – the input of reactive nitrogen from the atmosphere to the biosphere both as gases, dry deposition and in precipitation as wet deposition.
AOD	Above Ordnance Datum – a spot height (an exact point on a map) with an elevation recorded beside it that represents its height above a given datum.
AQAP	Air Quality Action Plan – a comprehensive series of measures that will help improve air quality and work towards achieving the national objectives for nitrogen dioxide and particles.
AQMA	Air Quality Management Area – an area designated by the local authority to be managed, through the implementation of a Local Air Quality Management Area, to ensure that it meets national air quality objectives.
APIS	Air Pollution Information System - provides a comprehensive source of information on air pollution and the effects on habitats and species. It supports the assessment of potential effects of air pollutants on habitats and species.
Applicant	EDF Energy (West Burton Power) Limited, part of EDF Energy.
Application	The application for a development consent, made to the Secretary of State under Section 37 of the Planning Act 2008 in respect of the Proposed Development, required pursuant to Section 31 of the Planning Act 2008 because the Proposed Development is a Nationally Significant Infrastructure Project under Section 14(1)(a) and Section 15 of the Planning Act 2008 by virtue of being an onshore generating station in England or Wales of 50 Megawatts electrical capacity or more.

Abbreviation	Description
Application Site	The land corresponding to the Order Limits that is required for the construction, operation (including maintenance) and decommissioning of the Proposed Development.
ATC	Automatic Traffic Count – a count of vehicular or pedestrian traffic conducted along a particular road, path or intersection.
BAP	Biodiversity Action Plan – an internationally recognised program addressing threatened species and habitats, designed to protect and restore biological systems.
BAT	Best Available Techniques – available techniques which are the best for preventing or minimising emissions and impacts on the environment. BAT is required for operations involving the installation of a facility that carries out industrial processes.
BAT-AELs	BAT-Achievable Emission Values – achievable emissions values following the implementation of the best available techniques for preventing or minimising emissions and impacts on the environment.
BDC	Bassetlaw District Council – the local planning authority with jurisdiction over the area within which the West Burton Power Station Site and Proposed Development Site (the Site) are situated.
BEIS	BEIS – The Department for Business, Energy and Industrial Strategy.
BGL	Below Ground Level
BGS	British Geological Survey – provider of objective and authoritative geoscientific data, information and knowledge for the UK.
BMV	Best and most versatile agricultural land – the most flexible land in terms of the range of crops that can be grown, the level and consistency of yield and the cost of obtaining it.
BREFs	Best Available Techniques (BAT) reference documents (BREFs) - a series of reference documents covering industrial processes, their respective operating conditions and emission rates.
BRES	Business Register and Employment Survey – the official source of employee and employment estimates by detailed geography and industry.
BRP	Bat Roost Potential – an assessment to determine to potential for a bat roost at a site.
BS	British Standard – business standards based upon the principles of standardisation recognised inter alia in European Policy.
BTEX	An acronym that stands for benzene, toluene, ethylbenzene and xylenes. These compounds are some of the volatile organic compounds found in petroleum derivatives such as petrol.
CAA	Civil Aviation Authority – the UK's specialist aviation regulator.
CABE	The Chartered Association of Building Engineers – professional body for building engineers in the United Kingdom and overseas.
CC	Climate Change
CCGT	Combined Cycle Gas Turbine – a highly efficient form of energy generation technology. An assembly of heat engines work in tandem using the same source of heat to convert it into mechanical energy which drives electrical generators

Abbreviation	Description
	and consequently generates electricity.
CCR	Carbon Capture Ready – a power station is Carbon Capture Ready where it has been demonstrated that: sufficient space is available on or near the site to accommodate carbon capture equipment in the future; retrofitting carbon capture technology is technically feasible; that a suitable area of deep geological storage exists for the storage of captured CO <sub>2</sub> ; transporting CO <sub>2</sub> to the storage location is technically feasible and CCS is likely to be economically feasible.
CCS	The Considerate Construction Scheme – a non-profit making, independent organisation founded in 1997 by the construction industry to improve its image.
CDM	Construction (Design and Management) Regulations 2007 – legal duties for safe operation of UK construction sites, including health and safety plans.
CEMP	Construction Environmental Management Plan – a plan to outline how a construction project will avoid, minimise or mitigate effects on the environment and surrounding area.
CEMS	Continuous Emission Monitoring System – a tool to monitor flue gas for oxygen, carbon monoxide and carbon dioxide to provide information for combustion control in industrial settings.
CHP	Combined Heat and Power – a technology that puts to use the residual heat of the combustion process after generation of electricity that would otherwise be lost to the environment.
CIEEM	Institute of Ecology and Environmental Management – professional body for ecologists and environmental managers in the United Kingdom.
Cifa	Chartered Institute for Archaeologists – a professional organisation for archaeologists working in the United Kingdom.
CIRIA	Construction Industry Research and Information Association – a member-based research and information organisation dedicated to improvement in all aspects of the construction industry.
CL	Critical Levels – the atmospheric concentrations of pollutants in the atmosphere above which adverse effects on receptors, such as human beings, plants, ecosystems or materials, may occur according to present knowledge.
CLEA	Contaminated Land Exposure Assessment – a computer based application that combines information on the toxicity of soil contaminants with estimates of potential exposure by adults and children living, working and/or playing on land affected by contamination over long periods of time.
CLR	Contaminated Land Research – research surrounding contaminated land and its impacts.
CO	Carbon Monoxide – a colourless, odourless and tasteless gas slightly less dense than air.
CO <sub>2</sub>	Carbon Dioxide – an inorganic chemical compound with a wide range of commercial uses.
COMAH	Control of Major Accident Hazards – regulations to ensure that businesses take all necessary measures to prevent major accidents involving dangerous substances.
COPA	Control of Pollution Act 1974 – an act to deal with a variety of environmental issues including waste on land, water pollution, abandoned mines, noise

Abbreviation	Description
	pollution and the prevention of atmospheric pollution.
COSHH	Control of Substances Hazardous to Health – a United Kingdom Statutory Instrument stating general requirements on employers to protect employees and other persons from the hazards of substances used at work by risk assessment.
CRCE	Centre for Radiation, Chemicals and Environmental Hazards – provider of radiological protection advice, services and training.
CRoW	Countryside and Rights of Way Act – a United Kingdom Act of Parliament in England and Wales regarding public access to land.
CRT	Canals and River Trust
CRTN	Calculation of Road Traffic Noise – the statutory method for determining entitlement to sound insulation. Eligible schemes are put forward for consideration in accordance with set criteria.
DCLG	Department of Communities and Local Government – the UK department for communities and local government in England.
DCO	A Development Consent Order made by the relevant Secretary of State pursuant to The Planning Act 2008 to authorise a Nationally Significant Infrastructure Project. A DCO can incorporate or remove the need for a range of consents which would otherwise be required for a development. A DCO can also include rights of compulsory acquisition.
DECC	Department for Energy and Climate Change – the UK government department responsible for issues regarding energy supply and climate change. This was replaced by the Department for Business, Energy and Industrial Strategy in July 2016.
DEFRA	Department of Food and Rural Affairs – the UK government department responsible for environmental protection, food production and standards, agriculture, fisheries and rural communities in the United Kingdom.
DMRB	Design Manual for Roads and Bridges - a series of 15 volumes that provide standards, advice notes and other documents relating to the design, assessment and operation of trunk roads in the United Kingdom.
DO	Dissolved Oxygen – the amount of gaseous oxygen dissolved in an aqueous solution.
DTM	Digital Terrain Model - a topographic model of the bare Earth – terrain relief that can be manipulated by computer programs.
EA	Environment Agency – a non-departmental public body sponsored by the United Kingdom government’s Department for Environment, Food and Rural Affairs (DEFRA), with responsibilities relating to the protection and enhancement of the environment in England.
EAL	Environmental Assessment Levels
EFT	Emissions Factor Toolkit – published by Defra and the Devolved Administrations to assist local authorities in carrying out Review and Assessment of local air quality.
EH	English Heritage (now Historic England) – a non-departmental public body of the British Government responsible for heritage protection and management of a range of historic properties.
EHO	Environmental Health Officer – practitioners responsible for carrying out

Abbreviation	Description
	measures for protecting public health, including administering and enforcing legislation related to environmental health.
EIA	Environmental Impact Assessment – a term used for the assessment of environmental consequences (positive or negative) of a plan, policy, program or project prior to the decision to move forward with the proposed action.
ELVs	Emission Limit Values – emission limit values based on the Best Available Techniques.
EMF	Electromagnetic fields – a physical field produced by electrically charged objects.
EMR	Electricity Market Reform - a government policy to incentivise investment in secure, low-carbon electricity. It aims to improve the security of Great Britain's electricity supply and improve affordability of this supply for consumers.
EMS	Environmental Management System – the management of an organisation's environmental programs in a comprehensive, systematic, planned and documented manner.
EDF Energy	EDF Energy (West Burton Power) Limited (The Applicant).
EPR	Environmental Permitting Regulations (EPR) – Regulations that came into force in 2008 combining Pollution Prevention and Control and Waste Management Licensing regulations.
EPS	Emissions Performance Standard – a way of setting a benchmark for the maximum amount of greenhouse gas emissions that can be emitted for a certain amount of electricity generated.
EPSM	European Protected Species Mitigation – in instances where projects are likely to have an impact on European Protected Species, mitigation must be undertaken and a licence granted by Natural England to provide a derogation to the law.
ES	Environmental Statement – a report in which the process and results of an Environment Impact Assessment are documented.
ESA	Environmental Site Assessment - a report identifying potential or existing environmental contamination liabilities.
Flood Zone 1	Land with an Annual Exceedance Probability of less than 0.1% risk from fluvial flooding.
Flood Zone 2	Land with an Annual Exceedance Probability of between 0.1% and 1% risk from fluvial flooding.
Flood Zone 3b	An area defined as the functional floodplain, that the area where water has to flow or be stored in the event of a flood. Land which would flood with a 1 in 20 (5%) annual probability or greater in any year, or is designed to flood in a 0.1% event should provide the starting point for designation of Flood Zone 3b.
FRA	Flood Risk Assessment – the formal assessment of flood risk issues relating to the Proposed Development. The findings are presented in an appendix to the Environmental Statement.
FWMA	The Flood and Water Management Act 2010 – guidance and information on flood risk management and surface water management.
GPA	Good Practice Advice – provision of information on good practice to assist local authorities, planning and other consultants, owners, applicants and other interest parties in implementing historic environmental policy in the National Planning Policy Framework (NPPF) and the related guidance given in the National

Abbreviation	Description
	Planning Policy Guidance (PPG).
GT	Gas Turbines – a type of internal combustion engine, featuring an upstream rotating compressor coupled to a downstream turbine, and a combustion chamber in between.
GW	Gigawatts – unit of power.
ha	Hectare – unit of measurement
HA	Highways Agency (now known as Highways England) – government owned company responsible for managing the road network in England.
HC	Hydrocarbons – an organic compound consisting entirely of hydrogen and carbon.
HE	Historic England – an executive non-departmental body of the British Government tasked with protecting the historical environment of England.
HER	Historic Environment Record – information services that provide access to comprehensive and dynamic resources relating to the archaeology and historic built environment of a defined geographic area.
HGV	Heavy Goods Vehicle – vehicles with a gross weight in excess of 3.5 tonnes.
HHRA	Human Health Risk Assessment – process to estimate the nature and probability of adverse health effects in humans who may be exposed to chemicals.
HIA	Health Impact Assessment – a process to evaluate the potential health effects of a plan, project or policy before its built or implemented.
HMSO	Her Majesty's Stationary Office – publisher of official documents and legislation.
HRA	Habitats Regulations Assessment – the assessment of the impacts of implementing a plan or policy on a Natura 2000 site.
HRSG	Heat Recovery Steam Generator – an energy recovery heat exchanger that recovers heat from a hot gas stream. It produces steam that can be used in a process (cogeneration) or used to drive a steam turbine (combined cycle).
HSI	Habitat Suitability Index – a scoring system developed as a means of evaluating habitat quality and quantity. It is a numerical index between 0 and 1 with 0 indicating an unsuitable habitat and 1 representing optimal habitat.
IAQM	Institute of Air Quality Management – the professional body for air quality experts in the UK.
ICNIRP	International Commission on Non-Ionizing Radiation Protection.
IDBs	Internal Drainage Boards – a type of operating authority with permissive powers to undertake work to secure clean water drainage and water level management within drainage districts.
IED	Industrial Emissions Directive, EU Directive 2010/75/EU – European Union Directive committing member states to control and reduce the impact of industrial emissions on the environment.
IEMA	Institute of Environmental Management and Assessment – professional body for environmental practitioners in the United Kingdom.
IMD	Index of Multiple Deprivation – UK government qualitative study of deprived areas in English local councils.
IPC	Infrastructure Planning Commission – a former non-departmental public body

Abbreviation	Description
	responsible for the examining and in certain circumstances the decision making body for proposed nationally significant infrastructure projects (NSIPs) in England and Wales (relevant activities for NSIPs now undertaken by the Planning Inspectorate).
ISO	International Organisation for Standardisation – an international standard setting body composed of representatives for various national standards organisations.
JSNA	Joint Strategic Needs Assessment – produced by the health and well-being board for the local authority area to determine the health and well-being needs of the local population.
km	Kilometre – unit of distance.
LAQM	Local Air Quality Management – the review and assessment of air quality by local authorities in the UK.
LCA	Landscape Character Area - Areas of homogenous landscape or townscape character. Typical components defining character include landform, land cover, settlement pattern, form and enclosure.
LCC	Lincolnshire County Council.
LCP	Large Combustion Plant – a combustion plant with a thermal capacity of 50MW or greater.
LCT	Landscape Character Type – a form of landscape classification based on characteristics of the land.
LE	Life Expectancy – a statistical measure of the average time an organism is expected to live.
Limits of deviation	The lateral limits shown on the Works Plan(s) and the vertical limits (upwards and downwards) determined by reference to the section plan(s) submitted as part of the Application and within which the Proposed Development may occur.
LLFA	Lead Local Flood Authorities – authorities responsible for maintaining a register of structures and features likely to have a significant effect on flood risk in their area.
Local Nature Reserve (LNR)	A non-statutory site of local importance for wildlife, geology, education or public enjoyment.
LRF	Local Resilience Forum
LSOA	Lower Super Output Area – part of a set of geographies designed specifically for statistical purposes. They set boundaries to allow data monitoring over time. LSOAs have a smaller population than Middle Super Output Areas.
LTP	Local Transport Plan – a statutory transport plan for a local area covering a number of years (typically 5 years).
m	Metres – unit of distance.
MCZ	Marine Conservation Zone – A type of marine nature reserve in UK waters. They are areas designated with the aim to protect nationally important, rare or threatened habitats and species.
MW	Megawatts – unit of energy.
NATA	New Approach to Appraisal
NAQS	National Air Quality Strategy Objectives – national air quality objectives and

Abbreviation	Description
	policy options to further improve air quality in the UK.
NCA	National Character Area – a natural subdivision of England based on a combination of landscape, biodiversity, geodiversity and economic activity.
NCC	Nottinghamshire County Council – the county council with jurisdiction over the area within which the West Burton Power Station Site and Proposed Development Site (the Site) are situated.
NERC	Natural Environment and Rural Communities Act – act designed to help achieve a rich and diverse natural environment.
NHLE	National Heritage List for England – official and up-to-date database of all listed and designated heritage sites.
NO <sub>2</sub>	Nitrogen Dioxide – one of several nitrogen oxides.
NPPF	The National Planning Policy Framework – Policy Framework which came into effect on 27 March 2012 (with some transitional arrangements) replacing the majority of national planning policy other than NPSs. The NPPF is part of the Government's reform of the planning system intended to make it less complex, to protect the environment and to promote sustainable growth. It does not contain any specific policies on Nationally Significant Infrastructure Projects but its policies may be taken into account in decisions on DCOs if the Secretary of State considers them to be both important and relevant.
NPPF-TG	The National Planning Policy Framework – Technical Guidance
NPPG	National Planning Policy Guidance – guidance designed to supplement the NPPF. It includes statements of policy on nationally important land use and other planning matters and is thus a material consideration in planning decisions.
NPSs	National Policy Statements – Statements produced by Government under the Planning Act 2008 providing the policy framework for Nationally Significant Infrastructure Projects. They include the Government's view of the need for and objectives for the development of Nationally Significant Infrastructure Projects in a particular sector such as energy and are used to determine applications for such development.
NRMM	Non-Road Mobile Machinery - machinery typically used off the road, such as construction machinery.
NSIP	Nationally Significant Infrastructure Projects - Defined by the Planning Act 2008 and cover projects relating to energy (including generating stations, electric lines and pipelines); transport (including trunk roads and motorways, airports, harbour facilities, railways and rail freight interchanges); water (dams and reservoirs, and the transfer of water resources); waste water treatment plants and hazardous waste facilities.  These projects are only defined as nationally significant if they satisfy a statutory threshold in terms of their scale or effect.
NTS	Non-Technical Summary – a summary of the Environmental Statement written in non-technical language for ease of understanding.
OCGT	Open Cycle Gas Turbine – a combustion turbine plant fired by liquid fuel to turn a generator rotor that produces electricity.
ONS	Office for National Statistics – UK's largest independent producer of official statistics.
OS	Ordnance Survey – the national mapping agency for Great Britain.

Abbreviation	Description
PAH	Polycyclic aromatic hydrocarbons – hydrocarbons that are organic compounds containing only carbon and hydrogen.
PC	Process Contribution – represents the change caused by the Proposed Development.
PCBs	Polychlorinated Biphenyls – an organic chlorine compound.
PEA	Preliminary Ecological Appraisal (PEA) Report – report establishing baseline conditions and evaluating the importance of any ecological features present.
PEC	Predicted Environmental Concentration – PC plus background concentration.
PEI	Preliminary Environmental Information – an initial statement of the main environmental information available for a study area.
PEI Report	Preliminary Environmental Information Report – a report outlining the preliminary environmental information.
PFA	Pulverised Fuel Ash – a by-product of pulverised fuel fired power stations.
PFRA	Preliminary Flood Risk Assessment – a high level screening exercise to identify potential flood risk locations.
PHE	Public Health England – an executive agency, sponsored by the Department of Health, to protect and improve the nation's health and wellbeing and reduce health inequalities.
PIA	Personal Injury Accident – an incident to the body, mind or emotions.
PIG	Pipe Inline Gauging
PINS	Planning Inspectorate – executive agency of the Department for Communities and Local Government of the United Kingdom Government.
PLU	Primary Landscape Unit
PM2.5	Fine particulate matter.
PM10	Particulate matter.
Power Station Site	The existing West Burton Power Station site, comprising the land owned by EDF Energy.
PPE	Personal Protective Equipment
PPG	Planning Practice Guidance – guidance expanding upon and supporting the NPPF.
PPGN	Pollution Prevention Guidance Notes
PRoW	Public Right of Way
RFC	Ratio of flow to capacity.
RSS	Regional Spatial Strategy – provides regional level planning frameworks for the regions of England outside London.
SAC	Special Area of Conservation – High quality conservation sites that are protected under the European Union Habitats Directive, due to their contribution to conserving those habitat types that are considered to be most in need of conservation.
SCR	Selective Catalytic Reduction – a means of converting nitrogen oxides with the aid of a catalyst into diatomic nitrogen and water.

Abbreviation	Description
SFRA	Strategic Flood Risk Assessment
SGVs	Soil guideline values – developed by DEFRA and the Environment Agency as indicators of potential unacceptable risk.
SINCs	Sites of Nature Conservation Interest
SO <sub>2</sub>	Sulphur Dioxide
SoCC	Statement of Community Consultation
SoS	The Secretary of State – the decision maker for DCO applications and head of Government department. In this case the SoS for the Department for Business, Energy and Industrial Strategy (formerly the Department for Energy and Climate Change).
SPA	Special Protection Area – strictly protected sites classified in accordance with Article 4 of the EC Birds Directive. Special Protection Areas are Natura sites which are internationally important sites for the protection of threatened habitats and species.
SPZ	Source Protection Zone – a protected area, usually in relation to groundwater abstraction.
SSSI	Site of Special Scientific Interest - nationally designated Sites of Special Scientific Interest, an area designated for protection under the Wildlife and Countryside Act 1981 (as amended), due to its value as a wildlife and/or geological site.
SVOCs	Semi Volatile Organic Compounds – a subgroup of volatile organic compounds.
SWMP	Site Waste Management Plan (SWMP)
TA	Transport Assessment
TEMPRO	Trip End Model Presentation Program
TPH	Total Petroleum Hydrocarbons – a term used to describe hydrocarbon compounds derived from Petroleum Sources.
TS	Transport Statement – comprehensive review of all the potential transport impacts of a proposed development.
TTRO	Temporary Traffic Regulation Order – legal documents to allow the police or local authorities to temporarily enforce road restrictions to help traffic flow.
TTWA	Travel to Work Area – statistical tool used by UK Government agencies and local authorities to indicate an area where the population would generally commute to a larger town or city for employment purposes.
VOCs	Volatile Organic Compounds – chemicals that have a high vapour pressure at ordinary room temperature.
WBA	West Burton A - the existing coal-fired power station within the West Burton Power Station Site, owned and operated by EDF Energy (West Burton Power) Limited.
WBB	West Burton B - the existing gas-fired power station, using Combined Cycle Gas Turbine (CCGT) technology, owned and operated by EDF Energy (West Burton Power) Limited.
WCA	Wildlife Countryside Act – legislation for the protection of animals, plants and certain habitats in the UK.

Abbreviation	Description
WEEE	Waste Electrical and Electronic Equipment - a complex mixture of materials and components that because of their hazardous content, and if not properly managed, can cause major environmental and health problems.
WFD	Water Framework Directive – European Union directive which commits member states to achieve good qualitative and quantitative status of all water bodies.
WLDC	West Lindsey District Council – the adjoining local planning authority to where the West Burton Power Station Site and Proposed Development Site (the Site) are situated.
WRAP	Waste and Resources Action Programme – a registered charity working with businesses, individuals and communities to help them reduce waste, develop sustainable products and use resources in an efficient way.
ZTV	Zone of Theoretical Visibility - a computer generated tool to identify the likely (or theoretical) extent of visibility of a development.



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## 1. Introduction

### 1.1 Background

- 1.1.1 This Preliminary Environmental Information (PEI) Report has been prepared on behalf of EDF Energy (West Burton Power) Limited (hereafter referred to as the Applicant) in relation to a application for development consent (the Application) for the construction, operation and decommissioning of a gas-fired generating station (the Proposed Development), near Gainsborough, Nottinghamshire. The Application will be submitted to the Planning Inspectorate, with the decision whether to grant a Development Consent Order (DCO) being made by the Secretary of State pursuant to the Planning Act 2008 (2008 Act) (Ref 1-1). The PEI Report presents the preliminary findings of the Environmental Impact Assessment (EIA) undertaken in connection with the Proposed Development.
- 1.1.2 A DCO would provide the necessary authorisations and consents for the construction, operation (including maintenance) and decommissioning of a new gas-fired power station of up to 299 megawatts (MW) of electrical generation capacity, for export onto the UK national transmission system. The Proposed Development Site (the 'Site') is located within the boundary of the existing West Burton Power Station Site (and associated land within the ownership of the Applicant). All elements of the Proposed Development are entirely within the administrative boundary of Bassetlaw District Council (BDC), within Nottinghamshire, albeit adjacent to the administrative boundary of West Lindsey District Council (WLDC) within Lincolnshire.
- 1.1.3 This chapter is supported by **Figure 1.1**, provided in PEI Report Volume III, which illustrates the Site location. Figure 3.1 (PEI Report Volume III) illustrates the indicative Site boundary.

### 1.2 The Applicant

- 1.2.1 The Applicant owns and operates the two existing power stations at the West Burton Power Station Site, West Burton A (WBA) and West Burton B (WBB), as well as the nearby Cottam Power Station.
- 1.2.2 EDF Energy is the UK's largest producer of low-carbon electricity, meeting around one-fifth of the country's demand and supplying millions of customers and businesses with electricity and gas. The company provides gas and electricity for more than 5 million customer accounts and is the biggest supplier of electricity by volume in Great Britain and the largest supplier to British businesses.

### 1.3 Proposed Development

- 1.3.1 The Proposed Development comprises the construction, operation (including maintenance) and decommissioning of a gas-fired generating station with a gross electrical output of 299MW; comprising one or more Open Cycle Gas Turbine (OCGT) units depending on the technology to be selected (refer to **Section 4.7** for details of potential technology options). Subject to obtaining the necessary consents, construction is anticipated to commence around the second quarter (Q2) of 2020 and could be undertaken in up to three phases, over a period of up to six years.
- 1.3.2 The Site is located within the wider West Burton Power Station Site, to the north of WBB. The Site encompasses an area of approximately 38.3 hectares (ha) of which approximately 21.8ha comprises the built development and construction laydown area, with a further approximately 16.5ha of land proposed for ecology and landscaping works. However, the Site area allows for several potential gas and grid connection options that are still under technical evaluation. The proposed generating station itself would occupy an area of approximately 3.4ha (as shown on **Figure 3.2** and **Figure 3.3** in PEI Report Volume III). Part of the Site is currently occupied by

grassland and young planted scrub. A new grid and gas connection would link the Proposed Development with the existing WBB site; therefore part of the Site falls within the WBB site.

- 1.3.3 The location of the Site is shown on **Figure 1.1** (PEI Report Volume III). The Site and its surroundings are described in **Chapter 3: Description of the Site and its Surroundings**. A detailed description of the Proposed Development is provided in **Chapter 4: The Proposed Development**.
- 1.3.4 The Proposed Development would provide vital new energy infrastructure required to ensure security of supply to the UK, operating on standby and running during periods of low electricity supply or high demand on the transmission network.
- 1.3.5 Environmental impacts arising from the Proposed Development have been studied systematically as part of the EIA process, and the initial results are presented within this PEI Report. The baseline for the assessment has been derived from measurements and studies in and around the Site. This is explained further in **Chapter 2: Assessment Methodology**, and in the methodology section of each technical assessment chapter.
- 1.3.6 The ongoing Environmental Impact Assessment (EIA) process is considering impacts resulting from the construction, operation and decommissioning periods of the Proposed Development, and considers measures to avoid, reduce or mitigate any significant adverse effects on the environment and where possible, enhance the environment. It also identifies '*residual*' impacts, defined as impacts remaining following the implementation of mitigation measures.
- 1.3.7 The EIA is also considering the potential cumulative impacts of the Proposed Development with other relevant known proposed or consented schemes, as outlined in **Chapter 16: Cumulative and Combined Effects**. In particular, the Applicant is exploring the potential to develop a separate peaking plant of up to 50MW output capacity adjacent to the West Burton B (WBB) Power Station Site. This would be subject to its own EIA and a planning application is likely to be submitted to Bassetlaw District Council (BDC) in late 2017/early 2018. The cumulative effects of the two schemes will be appropriately assessed as part of any applications.

## 1.4 Consenting Process

- 1.4.1 The Proposed Development falls within the definition of a '*Nationally Significant Infrastructure Project*' (NSIP) under Section 14(1)(a) and Sections 15(1) and (2) of the 2008 Act, as it is an onshore generating station in England that would have a generating capacity greater than 50MWe output. As such, a DCO is required to authorise the Proposed Development in accordance with Section 31 of the 2008 Act (Ref 1-1).
- 1.4.2 An application for consent for the Proposed Development will be submitted to the Planning Inspectorate, who act on behalf of the Secretary of State. Subject to the Application being accepted, which will be notified within a period of 28 days following receipt of the Application, the Planning Inspectorate will then examine the Application and make a recommendation to the relevant Secretary of State, who then decides whether to grant a DCO.
- 1.4.3 A DCO, if granted, has the effect of providing consent for a development, in addition to a range of other consents and authorisations, where specified, as well as removing the need for some consents (such as planning permission). Section 115 of the 2008 Act (Ref 1-1) also provides that a DCO can include consent for '*associated development*', which is development that is not part of but associated with the NSIP. This may be development that supports the construction or operation of the NSIP, which helps to address the impacts of the NSIP or is of a type normally brought forward with the particular type of NSIP (here the generating station). Refer to **Chapter 4: The Proposed Development** for details.

## 1.5 EIA Regulations

- 1.5.1 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the 2017 EIA Regulations) came into force on 16 May 2017 (Ref 1-2), replacing the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (the 2009 EIA Regulations) (Ref 1-3). The 2009 Regulations however continue to apply to certain projects, pursuant to the transitional arrangements set out in Regulation 37 of the 2017 EIA Regulations. This provides that (amongst other circumstances) where a request has been made to the Secretary of State for a scoping opinion, prior to the date of the commencement of the 2017 EIA Regulations, then the 2009 EIA Regulations ‘*continue to apply to any application for an order granting development consent*’. The Applicant submitted a request for a Scoping Opinion (Ref 1-4) and it was received by the Secretary of State on 28 April 2017 (i.e. before commencement of the 2017 EIA Regulations on 16 May 2017). Therefore, the 2009 EIA Regulations are those that apply to this Application.
- 1.5.2 The Proposed Development falls within Schedule 1 of the 2009 EIA Regulations; as such, it constitutes ‘*EIA development*’ and this PEI Report summarises the EIA work completed to date.
- 1.5.3 Notwithstanding the position of the 2009 Regulations applying and primarily for the sake of completeness, the Applicant has taken into account additional requirements associated with the 2017 EIA Regulations. This includes consideration of likely effects associated with the vulnerability of the Proposed Development to risks of major accidents and/or disasters relevant to the Project (including for example those caused by climate change), human health and monitoring strategies to track the delivery and success of design elements and mitigation that aims to avoid or reduce significant adverse effects on the environment. The inclusion of these matters seeks to acknowledge the 2017 EIA Regulations within the context of an application which is primarily aligned, and submitted in accordance, with the 2009 EIA Regulations.
- 1.5.4 The Secretary of State has agreed, via the Scoping Opinion (Ref 1-5), that a standalone chapter on the vulnerability of the Project to risks of major accidents and/or disasters relevant to the Proposed Development can be scoped out (see **Chapter 2**: Assessment Methodology). Instead, potential risks such as fuel spillages, fires and abnormal issues are addressed under topic specific **Chapters 5 – 15**.
- 1.5.5 Potential effects of the Proposed Development on human health are specifically dealt with in topic specific chapters and reported within **Appendix 13A**: Human Health (PEI Report Volume II). Monitoring strategies proposed to track the delivery and success of design elements and mitigation that aims to avoid or reduce significant adverse effects on the environment are reported in each relevant topic specific chapter.

## 1.6 PEI Report

- 1.6.1 This PEI Report has been prepared to satisfy the requirement of the 2009 EIA Regulations. ‘*Preliminary environmental information*’ is defined in the 2009 EIA Regulations as:
- “information referred to in Part 1 of Schedule 4 (information for inclusion in environmental statements) which (a) has been compiled by the applicant; and (b) is reasonably required to assess the environmental effects of the development (and of any associated development).”*
- 1.6.2 Planning Inspectorate Advice Note Seven (Environmental Impact Assessment: Preliminary Environmental Information, Screening and Scoping) (Planning Inspectorate, March 2015) (Ref 1-6) states:
- “a good PEI document is one that enables consultees (both specialist and non-specialist) to understand the likely environmental effects of the proposed development and helps to inform their consultation responses on the proposed development.”* (paragraph 2.4)

- 1.6.3 In order to enable consultees to understand the likely environmental effects of the Proposed Development, this PEI Report presents preliminary findings of the environmental assessments undertaken to date. This allows consultees the opportunity to provide informed comment on the Proposed Development, the assessment process and preliminary findings, prior to the finalisation of the Application, which will include an Environmental Statement (ES). The Applicant is seeking the views of consultees on the information contained within this PEI Report; and there is opportunity within the process up to submission of the Application for both the EIA and the Proposed Development design to consider comments received.
- 1.6.4 It should be noted that this PEI Report does not constitute a full ES, but rather presents the assessments completed as part of the EIA process to date. Consequently, the various assessments are at differing stages of completion; however, it is considered that the information provides sufficient PEI to enable consultees to develop an informed view of the Proposed Development. Following this statutory (Stage 1) consultation and once the Proposed Development design is further developed, this PEI Report will be developed into an ES, taking into consideration comments raised during the consultation. The ES will be submitted as part of the suite of documents accompanying the application for development consent.
- 1.6.5 This PEI Report adopts a robust worst-case assessment basis, based on the current form of the Proposed Development design.
- 1.6.6 **Table 1-1** summarises where the requirements of Part 1 of Schedule 4 of the 2009 EIA Regulations have been addressed in the PEI Report. It should be noted that relevant information may be found both in **Volume I** (the PEI Report), **Volume II** (the supporting technical appendices accompanying the PEI Report) and **Volume III** (the figure accompanying the PEI Report).

**Table 1-1: Requirements of Part 1 of Schedule 4 of the 2009 EIA Regulations**

Requirement	Where information is provided
A description of the physical characteristics of the whole development and the land-use requirements during the construction and operational phases.	<b>Chapter 3:</b> Description of the Site <b>Chapter 4:</b> The Proposed Development
A description of the main characteristics of the production processes, for instance, nature and quantity of the materials used.	<b>Chapter 4:</b> The Proposed Development
An estimate, by type and quantity, of expected residues and emissions (water, air and soil pollution, noise, vibration, light, heat, radiation, etc.) resulting from the operation of the Proposed Development.	<b>Chapter 2:</b> Assessment Methodology <b>Chapter 4:</b> The Proposed Development <b>Chapter 6:</b> Air Quality <b>Chapter 8:</b> Noise and Vibration <b>Chapter 11:</b> Ground Conditions and Hydrogeology <b>Chapter 12:</b> Flood Risk, Hydrology and Water Resources <b>Chapter 13:</b> Socio-Economics
An outline of the main alternatives studied by the Applicant and an indication of the main reasons for the Applicant's choice, taking into account the environmental effects.	<b>Chapter 4:</b> The Proposed Development
A description of the aspects of the environment likely to be significantly affected by the development, including, in particular,	<b>Chapters 6 – 16</b> (topic specific chapters) Baseline Conditions sections

Requirement	Where information is provided
population, fauna, flora, soil, water, air, climatic factors, material assets, including the architectural and archaeological heritage, landscape and the inter-relationship between the above factors.	
A description of the likely significant effects of the development on the environment, which should cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the development, resulting from: (a) the existence of the development; (b) the use of natural resources; (c) the emission of pollutants, the creation of nuisances and the elimination of waste, and the description by the applicant of the forecasting methods used to assess the effects on the environment.	<b>Chapters 6 – 16</b> (topic specific chapters) Likely Impacts and Effects sections
A description of the measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment.	<b>Chapters 6 – 16</b> (topic specific chapters) Development Design and Impact Avoidance and Mitigation and Enhancement Measures sections
A non-technical summary of the information provided under paragraphs 1 to 5 of this Part.	<b>Non-Technical Summary</b>
An indication of any difficulties (technical deficiencies or lack of know-how) encountered by the applicant in compiling the required information.	<b>Chapters 6 – 16</b> (topic specific chapters) Limitations or Difficulties sections

## 1.7 The EIA Scoping Exercise

- 1.7.1 The issues that the Applicant considered the EIA needs to address were identified in the EIA Scoping Report submitted to the Planning Inspectorate in April 2017 (**Appendix 1A** (PEI Report Volume II)). The EIA Scoping Report was developed following initial consultation with a number of statutory consultees and was informed by the EIA team’s experience working on a number of other power station projects. The Scoping Opinion was received on 7 June 2017, including the formal responses received by the Planning Inspectorate from consultees (**Appendix 1B** (PEI Report Volume II)). Key issues raised in the Scoping Opinion are summarised at the beginning of each topic specific chapter of the PEI Report and in **Appendix 1C** (PEI Report Volume II). All matters are being considered during the EIA process.

## 1.8 Consultation

- 1.8.1 Consultation is integral to developing the proposals and related assessments that underpin an application for development consent, particularly the EIA process. The views of all stakeholders serve to focus the environmental studies and to identify specific matters that require further investigation, as well as to inform aspects of the design of the Proposed Development. Consultation is an on-going process and the publication of this PEI Report forms an important part of that process.

- 1.8.2 The 2008 Act requires applicants for development consent to carry out formal (statutory) pre-application consultation on their proposals. There are a number of requirements as to how this consultation must be undertaken that are set out in the 2008 Act and related regulations:
- Section 42 of the 2008 Act requires the Applicant to consult with ‘*prescribed persons*’, which includes certain consultation bodies such as the Environment Agency and Natural England, relevant statutory undertakers, relevant local authorities, those with an interest in the land, as well as those who may be affected by the development.
  - Section 47 of the 2008 Act requires the Applicant to consult with the local community on the development. Prior to this, the Applicant must agree a Statement of Community Consultation (SoCC) with the relevant local authorities. The SoCC must set out the proposed community consultation and, once agreed with the relevant local authorities, a SoCC Notice must be published in local newspapers circulating within the vicinity of the land in question. The consultation must then be carried out in accordance with the final SoCC.
  - Section 48 of the 2008 Act places a duty on the Applicant to publicise the proposed application in the ‘*prescribed manner*’ in a national newspaper, The London Gazette, local newspapers circulating within the vicinity of the land and certain marine publications.
  - Section 49 of the Act places a duty on the Applicant to take account of any relevant responses received to the consultation and publicity that is required by Sections 42, 47 and 48.
- 1.8.3 EDF Energy is adopting a two part approach to pre-application consultation on the Proposed Development. An informal, non-statutory consultation was carried out between 5 July to 2 August 2017, as well as this Stage 1 (statutory) consultation, which runs between 7 September 2017 and 16 October 2017.
- 1.8.4 The issues raised through consultation and how these are considered and addressed within the design evolution of the Proposed Development and the EIA and will be set out in the ES submitted in support of the Application.
- 1.8.5 The pre-application consultation undertaken by the Applicant will also be documented within the Consultation Report submitted in support of the Application. This will include a separate section on EIA related consultation, as recommended within the PINS Advice Note (Advice Note 14) (Ref 1-7) on the preparation of consultation reports.

## 1.9 References

- Ref 1-1 HM Government (2008) The Planning Act 2008.
- Ref 1-2 HM Government (2017) Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.
- Ref 1-3 HM Government (2009) Infrastructure Planning (Environmental Impact Assessment) Regulations 2009.
- Ref 1-4 AECOM (2017) *West Burton C Environmental Impact Assessment Scoping Report*, April 2017.
- Ref 1-5 Planning Inspectorate (2017) *Scoping Opinion Proposed West Burton C Power Station, Planning Inspectorate Reference: EN010088*, June 2017.
- Ref 1-6 Planning Inspectorate (2015) *Planning Inspectorate Advice Note Seven (Environmental Impact Assessment: Preliminary Environmental Information, Screening and Scoping)*. Version 5, March 2015.

Ref 1-7      Planning Inspectorate (2012) Advice Note 14 *Compiling the Consultation Report*,  
April 2012.

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## 2. Assessment Methodology

### 2.1 General Assessment Approach

- 2.1.1 This Preliminary Environmental Information (PEI) Report has been prepared to satisfy the requirements of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (as amended) (the EIA Regulations) (see **Chapter 1**: Introduction, **Table 1.1**) (Ref 2-1).
- 2.1.2 In preparing this PEI Report (in line with the 2009 EIA Regulations as it forms part of the EIA process), reference has been made to the following guidance:
- Planning Inspectorate Advice Note 3: EIA Consultation and Notification (Planning Inspectorate, 2015a) (Ref 2-2);
  - Planning Inspectorate Advice Note 7: Environmental Impact Assessment: Preliminary Environmental Information, Screening and Scoping (Planning Inspectorate, 2015b) (Ref 2-3);
  - Planning Inspectorate Advice Note 9: Rochdale Envelope (Planning Inspectorate, 2012) (Ref 2-4); and
  - Planning Inspectorate Advice Note 17: Cumulative Effects Assessment (Planning Inspectorate, 2015c) (Ref 2-5).
- 2.1.3 Reference has also been made to the Scoping Opinion received from the Secretary of State on 7 June 2017 (**Appendix 1B** (PEI Report Volume III)) (Ref 2-6) and the advice contained within it regarding assessment methodology, topics and presentation of the PEI Report, together with responses received through consultation.
- 2.1.4 In response to the Scoping Opinion, the EIA and this PEI Report include assessments of the following environmental topics:
- **Chapter 6**: Air Quality;
  - **Chapter 7**: Traffic and Transportation;
  - **Chapter 8**: Noise and Vibration;
  - **Chapter 9**: Ecology and Nature Conservation;
  - **Chapter 10**: Landscape and Visual Amenity;
  - **Chapter 11**: Ground Conditions and Hydrogeology;
  - **Chapter 12**: Flood risk, Hydrology and Water Resources;
  - **Chapter 13**: Socio-Economics;
  - **Chapter 14**: Cultural Heritage;
  - **Chapter 15**: Sustainability and Climate Change; and
  - **Chapter 16**: Cumulative and Combined Effects.
- 2.1.5 The EIA Scoping Report (**Appendix 1A** (PEI Report Volume III)) concluded that a number of topics did not need to be considered as part of the EIA for the Proposed Development and could be scoped out. These topics and, where relevant, the response in the Scoping Opinion are described in this chapter.

## Aviation

- 2.1.6 The Civil Aviation Association (CAA) charts all known structures of 91.4m (300 feet) or more above ground level. The two chimney stacks of West Burton A (WBA) Power Station are each circa 200m in height, and the eight natural draught cooling towers are each circa 110m in height. The stack has lighting at the top for aviation purposes. The three stacks of West Burton B (WBB) Power Station are each 80m in height and, therefore, below the CAA threshold.
- 2.1.7 Given the Site's distance from the nearest airfield (Sturgate Airfield), approximately 7km to the east, and as none of the proposed buildings or structures would be 91.4m or more above ground level, the potential for impacts on aviation have been scoped out of this assessment. The height of the tallest structure proposed (up to 45m) precludes risk of obstruction/obstacle, given the distance from airfields. Relevant details on the height of the structures proposed and lighting is detailed within **Chapter 4: The Proposed Development**.
- 2.1.8 Notwithstanding, the Applicant is consulting with the organisations listed in the Scoping Opinion as part of this consultation. Such organisations include: the CAA (the aviation regulator); NATS (responsible for managing civilian air traffic being routed through the en-route Controlled Airspace (CAS) above the UK); MOD Defence Infrastructure Organisation (DIO) (responsible for safeguarding the interests of the MoD); and Sturgate and Retford Gamston Aerodromes.
- 2.1.9 The CAA is being formally consulted on the Proposed Development to review any requirements for aviation lighting on the stack(s) and to enable the Proposed Development to be charted in future, if required.
- 2.1.10 The likely effect on military and civil aviation radar will be addressed through the above consultation. In addition, the Meteorological Office is being consulted to ensure that the Proposed Development would not present a risk of compromising the use of Ingham Meteorological Radar, some 15km south-east of the Site.

## Electronic Interference

- 2.1.11 The EIA Scoping Report noted that the proposed maximum building heights and expected temporary construction cranes would be no higher than the existing cooling water and stacks associated with WBA and the stacks of WBB. Therefore, an assessment of the Proposed Development's effect on electronic interference was not considered to be required.
- 2.1.12 Further to this, most analogue signals have ceased to be transmitted and have been replaced by digital signals. As such, the Proposed Development's potential to interfere with television, radio (both analogue and digital) and mobile phone reception is considered negligible.
- 2.1.13 As requested in the EIA Scoping Opinion (**Appendix 1B** (PEI Report Volume III)), further technical consideration has been given, since the publication of the EIA Scoping Report, to the potential for electronic interference. Ofcom guidance '*Tall structures and their impact on broadcast and other wireless services*' (Ofcom, 2009) (Ref 2-7) states that '*Problems are more likely to occur if a building or structure is constructed which is significantly taller than those around it, or is on high ground*' and that the '*shadow*' (interference) caused by a tall structure between a transmitter and receiver disappears 1-5km away from the tall structure.
- 2.1.14 There are a number of telecommunications transmitters within 5km of the Site, as follows ([www.mastdata.com](http://www.mastdata.com)):
- Vodafone and CTIL transmitters on Carr Lane in Gainsborough, approximately 2km north of the Site;
  - Orange, EE and O2 transmitters south of Wintern Court in Gainsborough, approximately 2.2km north-west of the Site;

- Three and EE transmitter on Bridge Street in Gainsborough, approximately 3.1km north-west of the Site;
- T-Mobile transmitter on Bridge Street in Gainsborough, approximately 3.2km north-west of the Site;
- CTIL transmitter south of Heaton Street in Gainsborough, approximately 3.4km north-west of the Site;
- BT transmitter on Albert Terrace, approximately 3.4km north-west of the Site; and
- O2, EE, T-Mobile, CTIL, Vodafone, Orange and Three transmitters on Ash Grove, approximately 4.5km north-west of the Site.

- 2.1.15 The Proposed Development would not introduce new buildings or structures that are significantly taller than those around it. The tallest structures associated with the existing WBA Power Station are the cooling towers at 112m high and the existing stacks at 198m high, whilst those associated with WBB Power Station are the three existing stacks at 80m high.
- 2.1.16 Relevant telecommunications companies have been formally consulted and any concerns raised regarding electronic interference will be dealt with in the Environmental Statement (ES), where necessary.
- 2.1.17 On the basis of the above, at this stage it is concluded that there is no potential for significant electronic interference effects as a result of the Proposed Development.

### Accidental Events/Health and Safety

- 2.1.18 The majority of emergency response plans and contingency measures will be dealt with in the Environmental Permit, which is required for the operation of the Proposed Development and determined and regulated by the Environment Agency. Prevention of any accidents associated with hazardous materials storage and use will be addressed under the Environmental Permit. At this stage, based on the proposed volumes of hazardous materials to be stored at the Proposed Development, the site would not require a Hazardous Substances Consent or a lower tier Control of Major Accident Hazards (COMAH) licence. Comments made by National Grid relating to appropriate safety clearances have been noted and are being considered in the design of the Proposed Development.
- 2.1.19 Comments specifically raised by Public Health England (PHE) and the Health and Safety Executive (HSE) at scoping stage in relation to public health are addressed in **Chapter 13: Socio-Economics**, which effectively acts as a 'signposting' document to those chapters which include assessment of effects on human health. In the Scoping Opinion (Ref 2-6) PHE expressed a wish to see the summation of relevant issues into a specific section to provide a focus which ensures that public health is given adequate consideration. As such, **Appendix 13A: Human Health** summarises key information, risk assessments, proposed mitigation measures, conclusions and residual impacts, relating to human health.
- 2.1.20 The HSE provided advice about relevant consents that may be required relating to hazardous substances and noted consultation distances in relation to apparatus, including the gas pipeline supplying the WBB gas reception facility. These are being taken into account in the ongoing design of the Proposed Development and are noted in the Schedule of Other Consents and Licences, which will be provided to the Planning Inspectorate and other bodies being consulted on the draft DCO, describing other consents and licences that are, or may be, required under other legislation for the Proposed Development.

## Waste Management

2.1.21 The EIA Scoping Report considered that, due to the size of the Proposed Development, waste arisings would be very minor in nature from the operational power plant and would be managed by the procedures already in place from WBA and WBB power stations. As such, it was proposed that waste management should be scoped out of the EIA. However, the Scoping Opinion states:

*“in light of NPS-EN1 requirements regarding Site Waste Management Plan and waste management, it is not considered appropriate to scope out waste management as an issue, however the SoS considers that provision of relevant information as part of the Sustainability and Climate Change Chapter would be acceptable.”* (paragraph 3.18)

2.1.22 Given the above, waste management has been considered within **Chapter 15: Sustainability and Climate Change**.

## PEI Report

2.1.23 The PEI Report summarises the outcomes to date of the following ongoing EIA activities:

- establishing baseline conditions;
- consultation with statutory and non-statutory consultees;
- consideration of relevant local, regional and national planning policies, guidelines and legislation relevant to the EIA;
- consideration of technical standards for the development of significance criteria and specialist assessment methodologies;
- design review;
- review of secondary information, previous environmental studies, publicly available information and databases;
- expert opinion;
- physical surveys and monitoring;
- desk-top studies;
- modelling and calculations; and
- reference to current guidance.

2.1.24 Each technical chapter follows the same structure for ease of reference, as follows, with information on these provided below, where appropriate:

- Introduction;
- Legislation, Planning Policy and Guidance;
- Assessment Methodology and Significance Criteria;
- Rochdale Envelope;
- Baseline Conditions;
- Development Design and Impact Avoidance;
- Likely Impacts and Effects;
- Mitigation and Enhancement Measures;
- Limitations or Difficulties (including where any information is still pending at this stage);

- Residual Effects and Conclusions; and
- References.

## 2.2 Rochdale Envelope

- 2.2.1 As discussed in **Chapter 4: The Proposed Development**, a number of technical parameters have yet to be finalised for the Proposed Development, in order to maintain flexibility as the Proposed Development design progresses. This is important as the technology for gas-fired power stations continues to advance, and also to maintain commercial flexibility to meet the changing demands of the UK market, prior to plant construction. Therefore, the Rochdale Envelope approach has been applied within the EIA to ensure a robust assessment is presented of the likely significant environmental effects of the Proposed Development, in accordance with the Planning Inspectorate's Advice Note 9: The Rochdale Envelope (Planning Inspectorate, 2012) (Ref 2-4). This involves assessing the maximum (and where relevant, minimum) parameters for the elements where flexibility needs to be retained, recognising that the worst-case parameter for one technical assessment may differ from another. Where this approach is applied, this has been confirmed within the relevant chapters of this PEI Report.
- 2.2.2 As is relevant for each technical discipline, alternative designs under the Rochdale Envelope approach have been assessed, in order to predict worst-case overall impacts. These have been used in the assessment of effects significance. Each of the **Chapters 6 – 16** describe the parameters applied in relation to the particular discipline. As the Proposed Development design evolves, key elements of the design may be fixed (e.g. choice of technology, stack heights or use of buildings/enclosures). However, it is likely that flexibility will need to be maintained for some aspects of the Proposed Development into the Application. Where flexibility is to be retained in the Application, any changes to design parameters will remain within the worst-case envelope assessed in this assessment. Justification for the need to retain flexibility in certain parameters will be outlined in **Chapter 4: The Proposed Development of the ES**.

## 2.3 Spatial Scope: Geographical Area

- 2.3.1 The assessment chapters of this PEI Report (**Chapters 6 to 16**) describe their spatial scope, including their rationale for determining the specific area within which the assessment is focussed. The study areas are a function of the nature of the impacts and the locations of potentially affected environmental resources or receptors. The widest spatial scope considered is 5km, which relates to the appraisal of potential landscape and visual effects and effects on the setting of cultural heritage receptors as a result of the Proposed Development. Justification for the spatial scope considered appropriate is documented in each topic chapter (**Chapters 6-16**).

## 2.4 Temporal Scope: Assessment Years

- 2.4.1 The approach has been to assess the environmental impacts of the Proposed Development at key stages in its construction and operation and, as far as practicable, its final decommissioning.
- 2.4.2 The 'existing baseline' date is 2017 since this is the period in which the baseline studies for the EIA are being undertaken. 'Future baseline' conditions are also predicted for each assessment scenario, whereby the conditions anticipated to prevail at a certain point in the future (assuming the Proposed Development does not progress) are identified for comparison with the predicted conditions with the Proposed Development. This can include the introduction of new receptors and resources into an area, or new development schemes that have the potential to change the baseline, where these form committed developments.
- 2.4.3 The assessment scenarios that are being considered for the purposes of the EIA (and considered in this PEI Report) are as follows:

- Existing Baseline (2017);
- Future Baseline (No Development) (2019/ Q1 2020);
- Construction (Q2 2020 – 2026 With Development – with specific assessment years chosen by specialists as the 'peak of construction' for each topic);
- Opening (2026) and/or Operation (With Development – assessment years chosen by specialists as the worst-case for each topic); and
- Decommissioning (2066) (With Development).

2.4.4 In the majority of cases these are 'self-selecting', as they simply reflect the anticipated dates on or periods within which certain activities are predicted to take place.

## 2.5 Definition of Existing and Future Baseline

2.5.1 Existing baseline conditions have been defined for each technical assessment topic in **Chapters 6 - 16**, based on desk-based studies and site surveys, where necessary. As described above, it is also important to consider future baseline conditions (in the absence of the Proposed Development) against which the effects of the Proposed Development can be assessed.

## 2.6 Development Design, Impact Avoidance and Mitigation

2.6.1 The design process for the Proposed Development has been heavily influenced by the findings of early environmental appraisals and the EIA process. Therefore, the Proposed Development has been sited, and has had a number of measures incorporated into the concept design, to avoid or minimise environmental impacts. The key aspects where the design has evolved are described in **Chapter 4: The Proposed Development**. These include measures needed for legal compliance, as well as measures that implement the requirements of best practice guidance documents (e.g. Environment Agency pollution prevention guidelines). The initial assessment has been undertaken on the basis of these measures being implemented (i.e. they are 'embedded mitigation').

2.6.2 Implementation of the impact avoidance and minimisation measures relied on in the assessment will be secured in the DCO, either through the setting of limits of deviation (e.g. specific maximum Above Ordnance Datum (AOD) heights and fixed grid references for emission points) or specifying mitigation measures via a Requirement.

2.6.3 Once the likely effects were identified and quantified, consideration has been given to any further mitigation (over and above anything identified within the Development Design and Impact Avoidance sections of each topic chapter) that may be required to mitigate any significant adverse effects identified. The residual effects (after the implementation of mitigation) have then been assessed and presented in each topic chapter. Significant residual effects will also be summarised in **Chapter 17: Summary of Significant Residual Effects of the ES** accompanying the application for development consent.

## 2.7 Impact Assessment Methodology and Significance Criteria

2.7.1 Impacts are defined as changes arising from the Proposed Development, and consideration of the result of these impacts on environmental receptors enables the identification of associated effects, and their classification (major, moderate, minor and negligible, and adverse, neutral or beneficial). Each effect has been classified both before and after mitigation measures have been applied. Effects after mitigation are referred to as 'residual effects'.

2.7.2 The classification of effects is undertaken with due regard to the following:

- extent (local, regional or national) and magnitude of the impact;

- effect duration (whether short, medium or long-term);
- effect nature (whether direct or indirect, reversible or irreversible);
- whether the effects occur in isolation are cumulative or interactive;
- performance against environmental quality standards and in the context of relevant legislation, standards and accepted criteria;
- number of receptors affected;
- sensitivity of receptors;
- compatibility with environmental policies; and
- professional experience and judgement of the assessor.

2.7.3 Further details are provided in each topic chapter.

2.7.4 Where it has not been possible to quantify effects, qualitative assessments have been carried out, based on available knowledge and professional judgment. Where any uncertainty exists, this has been noted in the relevant topic chapter in the Limitations or Difficulties section.

2.7.5 To enable comparison between technical topics and aid understanding of the EIA findings, standard terms are used wherever possible to classify effects throughout the PEI Report (major, moderate, minor and negligible), whilst effects are also described as being adverse, neutral or beneficial. Where the quality standards for each technical discipline result in deviations in the standard assessment methodology, these are described in the relevant technical chapters, as applicable.

2.7.6 Definitions of the standard terms are provided below:

- negligible – imperceptible effects to an environmental resource or receptor;
- minor – slight, very short or highly localised effect;
- moderate – limited effect (by extent, duration or magnitude);
- major – considerable effect (by extent, duration or magnitude) of more than local scale or in breach of recognised acceptability, legislation, policy or standards;
- adverse – detrimental or negative effects to an environmental resource or receptor;
- neutral – effects to an environmental resource or receptor that are neither advantageous or detrimental; and
- beneficial – advantageous or positive effect to an environmental resource or receptor.

2.7.7 Moderate and major effects are generally considered to be 'significant' for the purposes of the 2009 EIA Regulations, in accordance with standard EIA practice.

2.7.8 Each technical chapter provides further description and definition of the assessment criteria relevant to each topic. Where possible, this has been based upon quantitative and accepted criteria (for example noise assessment guidelines), together with the use of value judgement and professional interpretation to classify effects.

2.7.9 In general, the classification of an effect is based on the magnitude of the impact and sensitivity or importance of the receptor, using the matrix shown at **Table 2-1**. **Table 2-1** Where there are deviations away from this matrix (due to the technical guidance for a specific assessment topic), this is highlighted within the relevant topic chapter and the reason for the variation explained.

**Table 2-1: Classification of effects**

Magnitude of impact	Sensitivity/importance of receptor			
	High	Medium	Low	Very low
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Very low	Minor	Negligible	Negligible	Negligible

- 2.7.10 In the context of the Proposed Development, short-term effects are considered to be those associated with the construction and/or decommissioning phases, which cease when those works are completed. Long-term effects are those associated with the completed, operational Proposed Development, which last for the duration of the operational phase. Effects may also be permanent (irreversible) or temporary (reversible) and direct or indirect.
- 2.7.11 Effects on areas on the scale of the Nottinghamshire or Lincolnshire County, or Bassetlaw or West Lindsey Districts (or similar scale across local authority boundaries) are considered to be at a regional level, whilst effects that cover different parts of the country, or England as a whole, are considered to be of a national level. Smaller scale effects are considered to be at a local level.

## 2.8 Cumulative and Combined Effects

- 2.8.1 As required by the 2009 EIA Regulations, when considering the potential environmental effects of the Proposed Development, there is a need to consider the potential for cumulative and combined effects. Cumulative effects are those that may arise where the impacts associated with the Proposed Development have the potential to interact with those associated with one or more other schemes located in proximity to the Proposed Development (e.g. interaction of impacts which leads to effects of the same type (e.g. air quality) on the same receptor). Combined effects are those that may arise when several different impacts resulting from the Proposed Development (e.g. decrease in air quality, increase in noise disturbance) have the potential to affect a single receptor.
- 2.8.2 These issues are further discussed in **Chapter 16: Cumulative and Combined Effects**, which details the impact assessment methodology being applied, together with a short list of other schemes in the vicinity of the Proposed Development that have been scoped into the cumulative assessment.
- 2.8.3 Results of the cumulative and combined impact assessment will be reported in the ES.

## 2.9 Inter-related Effects and Interdependencies

- 2.9.1 It is recognised that different consultees have interests in different aspects of the environment. For ease of reference, the ES will contain a table to illustrate where inter-related effects arise.

## 2.10 Transboundary Effects

- 2.10.1 The Scoping Opinion recommended consideration be given to discharges to the air and water, potential impacts on migratory species and to impacts on shipping and fishing areas, when considering transboundary effects. For the purposes of identifying any cumulative effects with other developments in the area, the Scoping Opinion also noted that applicants should consult consenting bodies in other EU states to assist in identifying those developments.

- 2.10.2 Subsequently, the Secretary of State undertook an initial transboundary screening exercise for the Proposed Development under Regulation 24 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (as amended). The screening exercise concluded, on the basis of the current information available from the Applicant, that the Proposed Development is not likely to have a significant effect on the environment in another European Economic Area State (EEA).
- 2.10.3 Initial consideration has been given to the Planning Inspectorate Advice Note 12: Transboundary Impacts (Planning Inspectorate, 2015) (Ref 2-8) and specifically (Annex A), which sets out the criteria and relevant considerations taken into account by the Planning Inspectorate when screening Nationally Significant Infrastructure Projects (NSIPs) for likely significant effects on the environment in another EEA state.
- 2.10.4 Taking into account the impacts predicted to arise from the Proposed Development, set out in **Chapter 6: Air Quality**, **Chapter 9: Ecology and Nature Conservation** and **Chapter 12: Flood Risk, Hydrology and Water Resources** within their respective spatial scopes, and given the distance to the nearest EEA state (Republic of Ireland at over 350km west and the Netherlands at over 375km east) the likelihood of significant effects on the environment of another EEA state are considered negligible. Refer to the screening matrix which details the consideration of potential transboundary effects provided in Appendix 2A (PEI Report Volume II). Therefore, significant transboundary effects associated with the Proposed Development are not anticipated.

## 2.11 References

- Ref 2-1 HM Government (2009) Infrastructure Planning (Environmental Impact Assessment) Regulations 2009.
- Ref 2-2 Planning Inspectorate (2015a) *Advice Note 3: EIA Consultation and Notification*. Version 6, published June 2015.
- Ref 2-3 Planning Inspectorate (2015b) *Advice Note 7: Environmental Impact Assessment: Preliminary Environmental Information, Screening and Scoping*. Version 5, published March 2015.
- Ref 2-4 Planning Inspectorate (2012) *Advice Note 9: Rochdale Envelope*. Version 2, republished April 2012.
- Ref 2-5 Planning Inspectorate (2015c) *Advice Note 17: Cumulative Effects Assessment*. Version 1, published December 2015.
- Ref 2-6 Planning Inspectorate (2017) *Scoping Opinion Proposed West Burton C Power Station, Planning Inspectorate Reference: EN010088*, June 2017.
- Ref 2-7 Ofcom (2009) *Tall structures and their impact on broadcast and other wireless services*.
- Ref 2-8 Planning Inspectorate (2015b) *Advice Note 12: Regulation 24 of the EIA Regulations: Transboundary Impacts*. Version 4, published December 2015.

<b>3.</b>	<b>Description of the Site and its Surroundings .....</b>	<b>1</b>
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## 3. Description of the Site and its Surroundings

### 3.1 Introduction

- 3.1.1 The Proposed Development site (the 'Site') comprises land within the boundary of the existing West Burton Power Station Site near Gainsborough, Nottinghamshire. The land is within the ownership of EDF Energy (West Burton Power) Limited (the Applicant). The Site is centred on national grid reference 480275, 386241 (the middle of the Proposed Power Plant Site – see **Section 3.3**). The location of the Site is shown in **Figure 1.1** (Preliminary Environmental Information (PEI) Report Volume III).
- 3.1.2 This chapter is supported by **Figures 3.1 - 3.5** (PEI Report Volume III), which identifies the Site boundary and areas within the Site.

### 3.2 The Existing West Burton Power Station Site

- 3.2.1 The part of the West Burton Power Station Site where the power plant would be sited (refer to **Figure 3.3**. (PEI Report Volume III)) is located approximately 3.5km to the south-west of the town of Gainsborough and 1km to the north-east of Sturton-le-Steeple (see **Figure 1.1** (PEI Report Volume III)). The nearest settlement is the village of Bole, located approximately 1km to the north-west of the area for the power plant.
- 3.2.2 The West Burton Power Station Site lies close to the junction of the A631/A620 and is accessed by a C-class road (the C2), which joins the A620 at Bole Corner. A plan showing the highway network in the vicinity of the Site is presented in the **Appendix 7A** (Transport Assessment - PEI Report Volume II).
- 3.2.3 The West Burton Power Station Site is located in Nottinghamshire, close to the border with Lincolnshire (defined by the River Trent which forms part of the eastern boundary of the West Burton Power Station Site), and falls within the administrative area of Bassetlaw District Council (BDC), close to the border with West Lindsey District Council (WLDC), Lincolnshire (defined by the River Trent to the east). The West Burton Power Station Site currently encompasses two power stations, owned and operated by the Applicant, known as West Burton A (WBA) and West Burton B (WBB) power stations.
- 3.2.4 The West Burton Power Station Site covers in excess of 200ha. WBA is a coal-fired power station, which was commissioned in 1968. It comprises four coal-fired units with two chimney stacks (each circa 200m high) and eight natural draught cooling towers (each circa 110m high), with cooling water sourced from the River Trent. It supplies up to 2,000MW of electricity to the National Grid. Flue gas desulphurisation (FGD) equipment was installed between 2000 and 2003 and separate over-fire air burners were installed in 2007, in order to meet Emission Limit Values specified in the EU Large Combustion Plant Directive (2001/80/EC) (Ref 3-1).
- 3.2.5 Pulverised Fuel Ash (PFA) is produced as a by-product of electricity generation at WBA. The Bole Ings Ash Disposal Site, to the north of the West Burton Power Station Site, is used for the disposal of PFA produced from WBA. It forms an extensive area of approximately 83ha and has been operational since 1993.
- 3.2.6 Materials including coal and limestone are currently delivered by rail to WBA from a variety of UK and international sources. The West Burton Power Station Site includes extensive areas for the storage of coal and its conveyance to the boilers, and also for storage and handling of other materials.
- 3.2.7 Adjacent to the east of WBA Power Station is the WBB Power Station, a combined cycle gas turbine (CCGT) power station, which was commissioned in 2013. It comprises three units, each

having a gas turbine, a heat recovery steam generator (HRSG) and an associated steam turbine, with a combined output capacity of 1,332MW. The WBB Power Station connects to the National Grid Transmission System approximately 0.7km to the south of the WBB Power Station Site via the existing WBA 400kV substation, located within the confines of the overall West Burton Power Station Site. The WBB Power Station is also served by a gas pipeline connection entering the WBB Power Station Site at its north-eastern boundary.

3.2.8 Together, WBA and WBB Power Stations provide approximately 270 jobs and support a number of additional contractor jobs on a full-time and part-time basis.

### 3.3 The Proposed Development Site

3.3.1 The Site is located within the wider West Burton Power Station Site, to the north of WBB. The Site encompasses an area of approximately 38.3 hectares (ha) of which approximately 21.8ha comprises the built development and construction laydown area, with a further approximately 16.5ha of land proposed for ecology and landscaping works. However, the Site area allows for several potential gas and grid connection options that are still under technical evaluation. The proposed generating station itself would occupy an area of approximately 3.4ha (as shown on **Figure 3.2** and **Figure 3.3** in PEI Report Volume III).

3.3.2 Multiple components together make up the Site, with the different areas of the Site described in turn (as illustrated in **Figure 3.3** in PEI Report Volume III):

- proposed power plant site;
- construction laydown area;
- northern outfall option;
- southern outfall option;
- rail offloading laydown area;
- gas reception facility (at the gas reception facility for WBB);
- electricity connection route and tie-in to existing 400kV substation; and
- landscaping and ecological area.

3.3.3 Access to the Site would be via the main entrance to the West Burton Power Station Site, off Gainsborough Road to the south-west. Bus stops for routes 595 and 95A (Retford – Gainsborough) are located adjacent to the Gainsborough Road/Station Road junction, to the south of the West Burton Power Station Site.

#### Proposed Power Plant Site

3.3.4 The Proposed Power Plant Site was formerly used to deposit PFA from WBA and more recently as a construction laydown area for WBB. The area currently comprises areas of recently seeded and planted grassland, scrub and immature trees, created following the construction of WBB. The Proposed Power Plant Site is bounded:

- to the north by an access road serving Bole Ings Ash Disposal Site and beyond this, by the proposed construction laydown area;
- to the north-east by the northern outfall option corridor;
- to the east by an area of dense woodland and ponds, which forms part of the West Burton Power Station Local Wildlife Site (LWS) (Ref. 5/2217), comprising an area of mature gravel pits within the power station of zoological interest;
- to the south by WBB power station; and

- to the west by an area used for the storage of furnace bottom ash (FBA) and subject to proposals for ash processing (planning application 16/01441/CDM (see **Chapter 16: Cumulative and Combined effects** for further details)).

3.3.5 Vegetation within the footprint of the Proposed Power Plant Site would be removed prior to construction. An landscape and ecological habitat would be created on suitable land within the Site boundary (see Landscape and Ecological Area section).

### Construction Laydown Area

3.3.6 The construction laydown area, including contractors' compounds, would be located to the north of the proposed power plant site. This is in addition to the siting of compounds and related equipment within the power plant site, where necessary. This land currently comprises areas of grassland and scrub, formerly used to deposit PFA from WBA. The area also includes an approximately square area that was formerly used as a compound for co-ordinating ash disposal activities by WBA and is currently used for overnight parking of excavator that is used at Bole Ings Ash Disposal Site. A sewage treatment plant owned and operated by Severn Trent Water lies approximately 60m to the east of the construction laydown area. Immediately west of the Site is land that has formerly been used to stockpile PFA and is now proposed as an ash processing plant (planning application 16/01441/CDM (see **Chapter 16: Cumulative and Combined effects** for further details)).

### Northern Outfall Option

3.3.7 If utilised, the northern outfall option would require a surface water drainage pipeline connecting the Proposed Power Plant Site's north-eastern extent with the River Trent. The pipeline route (approximately 200m in length) would largely follow an existing access road that is used for access to the Severn Trent Water sewage treatment plant, before discharging into the River Trent. The route would cross a designated Public Right of Way (PRoW) (Ref. FP4), which follows the western flood embankment of the River Trent. The PRoW may need to be temporarily closed or diverted whilst the outfall is constructed, but would be reinstated thereafter.

### Southern Outfall Option

3.3.8 If utilised, the southern outfall option would require a surface water drainage pipeline connecting the Proposed Power Plant Site's south-eastern extent with the River Trent. This pipeline route (approximately 200m in length) would connect into the Site, to the south-east of the gas reception facility for WBB and pass through an area of semi-improved grassland, scrub, wet ditch and broad-leaved semi natural woodland which forms part of the LWS. From here, the proposed outfall corridor would cross River Road and outfall into the River Trent, immediately north of the abstraction pumping station and associated infrastructure associated with WBA. Like the northern outfall, the route would cross the FP4 PRoW, which may need to be temporarily closed or diverted whilst the outfall is constructed.

### Rail Offloading Laydown Area

3.3.9 The rail offloading laydown area is located to the west of the Site, forming part of the rail loop for WBA.

### Connection to Gas Reception Facility within WBB

3.3.10 This is the existing gas reception facility used by and located within WBB Power Station and lies to the south of the Site. The Site comprises hardstanding, with associated above and below ground pipework. A gas pipeline connection and associated metering infrastructure would be required to supply gas from the WBB gas reception facility to the Proposed Development. The exact point of connection is not yet determined.

## Electricity Connection Route and tie-in to 400kV Substation

- 3.3.11 A new electrical connection route is proposed, linking the Proposed Development with the existing 400kV substation within the WBB Power Station Site. The 400kV substation is covered largely by hardstanding, including roads and concrete pads, with some gravelled areas also present. The proposed connection would either pass above or below ground (or a combination of both), before tying into the substation. The exact location of the tie-in is subject to ongoing feasibility assessment.
- 3.3.12 The WBB substation connects to a National Grid 400kV substation located on the WBA Site. No changes to that National Grid substation, or the connection between the two substations, are proposed.

## Landscaping and Ecological Area

- 3.3.13 Existing vegetation along the eastern Site boundary will be incorporated, as far as practicable, into a landscaping strategy, which will be included as part of the Application for development consent.
- 3.3.14 As part of the development of WBB Power Station, an area (referred to as 'Area 2' within the WBB Section 36 Consent under the Electricity Act 1989) was allocated for landscaping and creative conservation post construction of WBB, which now comprises the footprint for the Proposed Power Plant Site (Ref 3-2). Commitments in the WBB Section 36 Consent included restoration of the site to grassland and woodland habitats and planting of a species-rich hedgerow, in order to provide restored habitats that would contain a greater variety of species than the original habitats.
- 3.3.15 Given that the Proposed Development would result in the permanent loss of the newly created habitats, and in order to provide for biodiversity offsetting, enhancement and mitigation for the both the permanent and temporary loss of habitat used by protected species is proposed as an area for ecological mitigation and enhancement (see **Figure 9.1** in PEI Report Volume III). This includes the following types of provision:
- Area 1: Management of existing areas of scrub to maintain a mosaic of scrub and wetland habitats and the creation of habitat piles.
  - Area 2: Re-instatement following construction with a mosaic of scrub and grassland habitats, as well as the creation of habitat piles.
  - Area 3: Management of existing areas of scrub to maintain a mosaic of scrub and grassland habitats.
  - Area 4: Scrub thinning, management and diversification. Creation of glades with species-rich grassland and habitat piles.
  - Area 5: Botanical enhancement of grassland areas. Scarification of soil comprising disturbance of top layer to create bare patches, followed by seeding and wildflower meadow management.
- 3.3.16 These areas are shown on **Figure 3.3** (PEI Report Volume III) labelled as 'Areas Under Consideration for Ecological Mitigation'. These areas have been included in the Site boundary as the selected areas will form part of the Application Site. Distances to/from the Site as detailed throughout this PEI Report are quoted as the closest distance to the Site areas as shown on **Figure 3.3**, excluding the 'Areas Under Consideration for Ecological Mitigation'. This is because such areas are subject to confirmation. Further information is provided in **Chapter 9: Ecology and Nature Conservation**. A Landscaping and Biodiversity Strategy will be included as part of the documents accompanying the application for development consent. The Strategy will detail the measures to be implemented by Requirement of the Development Consent Order (DCO).

### 3.4 Site Topography

- 3.4.1 According to a recent topographical survey of Site (Ref 3-3), the ground level varies from a low point of 2.6m Above Ordinance Datum (AOD) within the southern outfall option area, to a high point of 16.2m AOD on a raised mound at the northern end of the proposed power plant site. The majority of the Site lies between 10 and 14m AOD, including the proposed power plant site, the electricity connection route, and the western two-thirds of the construction laydown area. The lowest areas of the Site include: the northern and southern outfall corridors, which lie between 3.5 and 7.0m AOD; the eastern extent of the construction laydown area, which lies between 7.0 and 8.0m AOD; and the rail offloading area, which lies between 8.0 and 9.0m AOD.
- 3.4.2 A notable steep ridge is present immediately to the east of the proposed power plant site and the electricity connection route, where ground descends from a plateau at approximately 12m AOD to approximately 3m AOD, over a short distance.
- 3.4.3 Levels across the landscaping and ecological area range from approximately 8m AOD at the base of the mound to 13m AOD on the plateau.

### 3.5 Site History

- 3.5.1 Available historic Ordnance Survey (OS) maps (Ref 3-9) have been studied to determine the previous land uses within the existing coal fired power station site and surrounding land as detailed in **Table 3.1**.

**Table 3-1 - Review of historical maps relating to the Site within the West Burton Power Station Site**

Date	Onsite Land Use	Offsite Land Use
1885 - 1886	<ul style="list-style-type: none"> <li>• Agricultural land (fields);</li> <li>• Two former river channel features (oxbow lakes, approx. 50 - 80m channel width) are denoted. One passes through the north of the Site beneath the centre of the Proposed Power Plant Site and the Proposed Northern Outfall. The second passes beneath the eastern extent of the Proposed Southern Outfall connection corridor;</li> <li>• Building of unknown purpose and small watercourse shown in to pass through Site and Proposed Southern Outfall corridor;</li> <li>• The River Trent follows its present course, adjoining the Site to the east.</li> </ul>	<ul style="list-style-type: none"> <li>• Agricultural land (fields), field drains and minor watercourses.</li> </ul>
1899-1900	<ul style="list-style-type: none"> <li>• Building of unknown use inferred as 'Cheese House'.</li> </ul>	<ul style="list-style-type: none"> <li>• Pumping House shown 150m north-west.</li> </ul>
1904	<ul style="list-style-type: none"> <li>• No significant change.</li> </ul>	<ul style="list-style-type: none"> <li>• No significant change.</li> </ul>
1916 -1921	<ul style="list-style-type: none"> <li>• Two footpaths cross the north of the Site.</li> </ul>	<ul style="list-style-type: none"> <li>• No significant change.</li> </ul>

Date	Onsite Land Use	Offsite Land Use
1947-1948	<ul style="list-style-type: none"> <li>No significant change.</li> </ul>	<ul style="list-style-type: none"> <li>No significant change.</li> </ul>
1951	<ul style="list-style-type: none"> <li>Pumping House no longer inferred.</li> </ul>	<ul style="list-style-type: none"> <li>No significant change.</li> </ul>
1969-1974	<ul style="list-style-type: none"> <li>Rail infrastructure is present in the north west of the Site, adjacent to the coal stockyard. Site drainage is denoted around the stockyard;</li> <li>Field drains shown across the site;</li> <li>Pumping Station shown in southern water connections corridor;</li> <li>Inferred landfill in the north of the Site, assumed to be PFA disposal.</li> </ul>	<ul style="list-style-type: none"> <li>WBA and supporting infrastructure shown immediately west and south-west of Site.</li> <li>Area approx. 150m north-west of Site inferred as 'Emergency dust disposal area' (assumed to be purposed for PFA disposal).</li> <li>Wheatley Beck and the Catchwater Drain are named on mapping.</li> <li>Sewage works shown immediately north-east of Site.</li> <li>Ground workings shown immediately north-west of Site.</li> </ul>
1977-1980	<ul style="list-style-type: none"> <li>The former river channels are no longer denoted.</li> </ul>	<ul style="list-style-type: none"> <li>Surface water ponds shown immediately east of Site, between considered outfall connections.</li> <li>Former site of medieval village and church shown 100m south of Site.</li> <li>'Emergency dust disposal area' still inferred north-east of Site.</li> </ul>
1989-1994	<ul style="list-style-type: none"> <li>No significant change.</li> </ul>	<ul style="list-style-type: none"> <li>No significant change.</li> </ul>
2002	<ul style="list-style-type: none"> <li>Works compound shown in the north of the Site;</li> <li>Track shown through south of Site.</li> </ul>	<ul style="list-style-type: none"> <li>No significant change.</li> </ul>
2010	<ul style="list-style-type: none"> <li>North of Site shown as 'Emergency Dust Disposal Area'.</li> </ul>	<ul style="list-style-type: none"> <li>Expansion of WBA supporting operations west of Site (possible flue-gas desulphurisation plant).</li> <li>Excavations of unknown purpose north-east of the Site are shown to be flooded.</li> </ul>
2014	<ul style="list-style-type: none"> <li>Construction of WBB. Supporting infrastructure is shown to extend around the Site and along the northern outfall connection corridor.</li> </ul>	<ul style="list-style-type: none"> <li>No significant change.</li> </ul>

3.5.2 As can be seen from **Table 3-1**, there is a history of power generation at the Site that extends back approximately 50 years. Electricity generation at the coal-fired power station (WBA) to the west of the Site commenced in 1966 and was officially opened on 25 April 1969.

3.5.3 Deemed planning permission was granted for a Combined Cycle Gas Turbine (CCGT) Generating station at West Burton B (WBB) in October 2007, under the provisions of Section 36 of the

Electricity Act 1989. Construction of WBB commenced on 2nd September 2008, immediately to the east of WBA. Electricity generation from WBB began in 2013.

- 3.5.4 The approach to the consideration of current planning applications both within the West Burton Power Station Site and the local area are considered in **Chapter 16: Cumulative and Combined Effects**.

## 3.6 Potential Environmental Receptors within the Surrounding Area

When undertaking an Environmental Impact Assessment (EIA), it is important to understand which receptors will be considered as part of the assessment. A number of environmental receptors have been identified within the vicinity of the Site, as shown on **Figures 3.4 - 3.5** (PEI Report Volume III). Each of these is detailed in the relevant topic chapter of this PEI Report, and as such, this list is not exhaustive. Where distances are quoted in this PEI Report, the distance is defined (unless otherwise stated) as the shortest distance between the proposed power plant site and the receptor.

### Residential Receptors

- 3.6.1 West of the River Trent, within the administrative area of Bassetlaw District, are the villages of Bole (approximately 1km north-west), Sturton-le-Steeple (approximately 1km south-west), Saundby (approximately 2.3km north-west), South Wheatley (approximately 3.5km west), North Leverton with Habbleshthorpe (approximately 3.9km south-west) and South Leverton (approximately 5km south-west). The town of Retford is located approximately (9.5km south-west).
- 3.6.2 In addition, there are a small number of individual residential properties in close proximity to the Site, including:
- Mill House, approximately 1km west of the rail offloading area; and
  - Middle Farm, approximately 1.2km west of the rail offloading area.
- 3.6.3 East of the River Trent, within the administrative area of West Lindsey District, the nearest villages are Lea (approximately 2.5km to the east), Knaith (approximately 2.8km to the south-east), Knaith Park (approximately 3.5km to the east) and hamlets of Gate Burton and Marton (approximately 4.1km and 5.1km south-east respectively). The larger town of Gainsborough is approximately 3.5km to the north-east.

### Transport Network

- 3.6.4 The site lies close to the junction of the A631/A620. A631 runs east-west from the Sheffield/Rotherham area, crossing the A1(M) at Tickhill and providing one of the few crossings of the River Trent at Gainsborough. The A620 follows a more south-west/north-east orientation between Ranby and its junction with the A631 at Beckingham, en-route passing through the market town of Retford and the villages of Claborough and Welham. These two routes provide direct links to the A1 and the areas to the west of the A1. The A631 Gainsborough river crossing provides a link with areas to the east of the River Trent.
- 3.6.5 The Lincoln to Sheffield Railway Line runs north-east/south-west along the western boundary of the West Burton Power Station Site. This line also provides the route for the delivery of coal to WBA.
- 3.6.6 There are a number of PRow, including footpaths and bridleways, in the vicinity of the Site on both sides of the River Trent. The FP4 public footpath traverses the western bank of the River Trent and would be intersected by the northern and southern outfall options, if one of these were to be taken forward. This PRow connects with a second PRow (Ref. FP9), which branches off the River Trent immediately north of the sewage works and leads in a north-westerly direction, passing around Bole Ings. Available data (Ref 3-4) indicates that there are several other PRow within the

surrounding area (refer to **Figure 3.4** (PEI Report Volume III)) along with **Figure 10.7** (PEI Report Volume III) which identifies the footpaths in the wider area.

### Hydrological Receptors

- 3.6.7 As shown on **Figure 3.4** (PEI Report Volume III) the West Burton Power Station is located on the western bank of the River Trent, which flows from its source in Staffordshire through most of the metropolitan central and northern Midlands before joining the River Ouse at Trent Falls to form the Humber Estuary. Thereafter, the river discharges into the North Sea between Hull in Yorkshire and Immingham in Lincolnshire.
- 3.6.8 Whilst flowing north, in the vicinity of the Site, the stretch of the River Trent is tidally influenced and navigable (under the jurisdiction of the Canal and River Trust who, as Navigation Authority, manage the River Trent from Shardlow, where it becomes navigable, to Gainsborough Bridge). According to the Canal and Rivers Trust (Ref 3-5), freight traffic regularly uses the section of the River Trent, continuing past Gainsborough, where the Trent is managed by Associated British Ports. The nearest identified local boating club to the Site is Torksey Yacht Club, located at the junction of the Fossdyke Navigation and the River Trent, south-east of Cottam Power Station, which arranges cruises in the summer. According to the Canal and Rivers Trust information, there is a fishery located to the north-east of Cottam Power Station, upstream of the Site on the River Trent, on the right bank, at Marton (approximately 365m upstream of the pumping station).
- 3.6.9 The stretch of the River Trent nearest to the Site (defined in the Water Framework Directive (WFD) as River Trent from Carlton on Trent to Laughton Drain) is classified as an artificial waterbody, due to land drainage and navigation modifications (Ref 3-6). Water quality within this stretch of the river has been generally improving, reaching 'moderate' overall status and moderate ecological potential and 'good' chemical status in the 2015 cycle of the Humber River Basin Management Plan (RBMP) process. 'Good' ecological potential is expected to be met in 2027 and is based on the following quality elements: biological quality, general chemical and physio-chemical quality, water quality with respect to specific pollutants (synthetic and non-synthetic) and hydromorphological quality.
- 3.6.10 The River Trent, where it is adjacent to the Site, is flanked on either side by networks of land drainage ditches and dykes to enable arable agriculture. A number of these are maintained by Trent Valley Internal Drainage Board (IDB), including the Catchwater Drain and pumping station, located approximately 100m to the south of the southern outfall (Ref 3-7). This discharges into the River Trent, immediately upstream of the Site. Wheatley Beck, a primary watercourse, passes 150m north of the Site, flowing to the east and discharging into the River Trent (defined in the WFD as River Trent from Carlton on Trent to Laughton Drain). This is classified as an artificial waterbody due to land drainage and navigation modifications (Ref 3-6).
- 3.6.11 There are tidal flood defences in place adjacent to the West Burton Power Station Site, comprising raised earth embankments along the west bank of the River Trent. However, the Site is not located in an area shown on Environment Agency's flood maps to benefit from flood defences (Ref 3-8).
- 3.6.12 The Environment Agency's flood maps identify that the Proposed Development lies almost entirely within Flood Zone 1. There are small areas of the Site along the eastern boundary that lie within Flood Zone 2, and the two outfall route options to the River Trent lie within Flood Zone 3 (as shown on **Figure 3.5** in PEI Report Volume III).

### Hydrogeological Receptors

- 3.6.13 According to the Phase 1 Geo-Environmental Site Assessment (see **Appendix 11A** of PEIR Volume II), made ground deposits are anticipated to be present across much of the Site as this location is indicated to lie within the footprint of an Environment Agency recorded historic landfill. It is considered that this is associated with the historic disposal of PFA generated in WBA.

- 3.6.14 The Groundsure Enviro Insight Report (Ref 3-9) presented within **Appendix 11A** (PEI Report Volume II) indicates that the superficial deposits within the Site are classified as Secondary A Aquifers, defined by the Environment Agency as *'permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers'*.
- 3.6.15 The underlying bedrock is Mercia Mudstone deposits (Secondary B Aquifer), defined by the Environment Agency as *'predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers'*.
- 3.6.16 A review of a groundwater monitoring programme undertaken by EDF Energy (Ref 3-10) indicates that groundwater levels vary from 12m AOD to a more typically 2–6m AOD across the majority of the West Burton Power Station Site. This compares to the majority of the Site that lies between 10–14m AOD, approximately 4–8m above typical groundwater levels.
- 3.6.17 Soils at the site are classified as being of a high leaching potential, meaning that they readily transmit liquid discharges and pollutants. Exception is given to soils within an area to the north of the Site and those associated with glacial till superficial deposits to the south-east, which have no designation.
- 3.6.18 The Groundsure Enviro Insight Report revealed no groundwater abstraction licenses within 2km of the Site and that the Site is not located within a groundwater Source Protection Zone (SPZ) defined by the Environment Agency.

### Ecological Receptors

- 3.6.19 Published data on nature conservation designations (Ref 3-11) indicates that the nearest international ecological designation is Hatfield Moor Special Area of Conservation (SAC), approximately 19.5km to the north-west of the Site, designated as a result of its lowland raised peat bog habitat. Beyond this a number of internationally designated sites are present including: the Special Protection Area (SPA) of Thorne Moor (approximately 25km); Birklands and Bilhaugh SAC (approximately 25km); and the Humber Estuary SAC (approximately 30–40km).
- 3.6.20 Lea Marsh Site of Special Scientific Interest (SSSI) is located approximately 1km north-east of the Site, designated for its lowland grassland habitat. Claborough Tunnel SSSI lies approximately 6km south-west of the Site, designated due to its calcareous grassland and mix of grassland and scrub habitat providing suitable conditions for breeding birds and insect fauna. Treswell Wood SSSI and Castle Hill Wood SSSI are approximately 8km south-west of the Site. Two former Gravel Pits (Sutton and Lound Gravel Pits) are located approximately 9km west of the Site. They are designated for their habitat of standing open water, which supports an exceptionally rich assemblage of breeding wetland birds. Chesterfield Canal SSSI is also located within 10km of the Site and comprises a 20km stretch of canal designated because it supports a nationally scarce aquatic plant community.
- 3.6.21 A number of named ancient woodland sites are located within 2–5km of the Site. The Preliminary Ecological Appraisal (PEA) Report presented as **Appendix 9C** (Volume II of the PEIR) describes Eleven Local Wildlife Sites (LWSs), including West Burton LWS, West Burton Reedbed LWS and Burton Round Ditch LWS are located within or adjacent to the Site. Bole Ings LWS and Bole Ings Drains LWS are also in close vicinity to the northern boundary of the Site at Bole. Non-statutory sites include Royal Society for the Protection of Birds (RSPB) Beckingham Marshes reserve, located approximately 4km north of the Site, which comprises a local wetland habitat managed for birds and other wildlife.

## Landscape and Visual Receptors

- 3.6.22 The Site lies within National Landscape Character Area (NCA) 48: Trent and Belvoir Vales (Ref 3-12), which is characterised by undulating, strongly rural and predominantly arable farmland centred on the River Trent. At a regional level the Site lies within the Trent Washlands Regional Character Area (RCA), as defined by the Bassetlaw Landscape Character Assessment (LCA) (Ref 3-13). The landscape surrounding the Site is relatively flat and largely used for arable agriculture, interspersed with areas of woodland.
- 3.6.23 The West Burton and Cottam power stations and their associated power lines are considered by the LCA to be the most dominant and visually intrusive landscape features within this area. The Site also lies within the Mid Nottinghamshire Farmlands RCA which is considered to be an undulating landscape of predominantly rural, agricultural character.
- 3.6.24 The Lincolnshire Wolds Area of Outstanding Natural Beauty (AONB) lies approximately 35km east of the Site.
- 3.6.25 Sensitive visual receptors, including residents, road users and users of PRoW, are located around the Site, as described above.

## Cultural Heritage Receptors

- 3.6.26 The Site is located on the floodplain of the Trent, which previous archaeological evidence suggests formed an important cultural boundary. The floodplain may contain palaeo-environmental resources (both organic and mineral deposits), which may provide a valuable record of past climate and land-use.
- 3.6.27 According to a search of National Heritage List for England (Ref 13-14) archaeological remains within 2km of Site are sparse. However, it does include remains associated with the West Burton scheduled Deserted Medieval Village (DMV) (SM 1017741), a Scheduled Monument, located approximately 75m south of the Site. It is listed by Historic England as a 13.4ha *'Medieval settlement and open field system immediately south east of Low Farm'* and a fish pond associated with the listed manor and church at Bole and isolated find spots.
- 3.6.28 It is also noted that a Roman road may run from North Wheatley to the west of the Site in a south-east direction to the River Trent and that a second Roman road is identified between the villages of North Wheatley, Sturton le Steeple and Marton, south of the Site, running in a south-east direction to the River Trent and further on to Sturton by Stow and beyond. This runs adjacent to Segelocum Roman town (SM 1003669), located approximately 3.1km south-east of the Site.
- 3.6.29 There are notable clusters of listed buildings (Grade I and Grade II\* Listed) in the nearby villages of Bole, Saundby, North Wheatley, Sturton-le-Steeple, Littleborough, Knaith and Lea. The nearest are in Bole, where the Grade II listed Church of St Martin and the Grade II Bole Manor House and attached outbuilding are located (approximately 1km north-west of the construction laydown area).
- 3.6.30 Three Conservation Areas are identified within the following settlements within 5km of the Site: Saundby village (approximately 2km north-west); Wheatley (approximately 3.5km west); and Gainsborough (approximately 4.2km north-east).
- 3.6.31 No sites listed on the English Heritage Register of Parks and Gardens of Special Historic Interest (Ref 13-14) are within 5km of the Site, nor any statutory or non-statutory battlefield sites.

## 3.7 References

- Ref 3-1 European Commission (2001) Directive 2001/80/EC of the European Parliament and the Council of 23 October 2001 on the limitation of emissions of certain

- pollutants into the air from large combustion plants. *Official Journal of the European Communities*, L309/1.
- Ref 3-2 West Burton CCGT Power Station licence application EPSM2009-5-6.
- Ref 3-3 Site Surveying Services Ltd drawing No. sss-7478-West Burton Power Station, dated 6<sup>th</sup> June 2017.
- Ref 3-4 <https://data.gov.uk/data/> [accessed 19.6.17] and  
<http://row.lincolnshire.gov.uk/map.aspx?act=Riding> [accessed 20.6.17]
- Ref 3-5 <https://canalrivertrust.org.uk/> [accessed 20.6.17]
- Ref 3-6 <http://environment.data.gov.uk/catchment-planning/> [accessed 20.6.17]
- Ref 3-7 [http://www.wmc-idbs.org.uk/Library/TVIDB/about/TVIDB\\_Area\\_Map.jpg](http://www.wmc-idbs.org.uk/Library/TVIDB/about/TVIDB_Area_Map.jpg) [accessed 20.6.17]
- Ref 3-8 <http://maps.environment-agency.gov.uk/> [accessed 10th May 2017]
- Ref 3-9 Groundsure® Reports; Envirolnsight (ref. GS-3864429), GeoInsight (ref. GS-3864430) and MapInsight (ref. GS-3864431), dated 9th May 2017.
- Ref 3-10 West Burton Power Station, Annual Groundwater Report 2013, EDF (2013).
- Ref 3-11 <http://www.magic.gov.uk/> [accessed 20.6.17]
- Ref 3-12 Natural England (2013) *National Character Area profile 48: Trent and Belvoir Vales*.
- Ref 3-13 Bassetlaw District Council (2009) *Landscape Character Assessment, Bassetlaw, Nottinghamshire*.
- Ref 3-14 <https://www.historicengland.org.uk/listing/the-list/> [accessed 21.6.17]

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## 4. The Proposed Development

### 4.1 Introduction

- 4.1.1 The Proposed Development comprises a gas-fired generating station that would generate up to 299MW gross electrical output.
- 4.1.2 Peaking plants, such as that proposed, are used to rapidly supply electricity to the network when required by the National Grid. These plants can be fired up at short notice to help cope with periods of high demand or low electricity supply nationally (for example when the wind is not blowing to enable sufficient output to be achieved from the increasing number of wind farms in the UK), 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 currently anticipated to be 1,500 hours per year.
- 4.1.3 Open cycle gas turbines (OCGTs) are one of the gas-fired peaking plant technologies that could be used. For the Proposed Development, OCGTs have been selected instead of gas engines (which were previously under consideration at the Environmental Impact Assessment Scoping stage, as well as part of the informal consultation stage). Both technologies are fast response units but each has its own advantages. At this stage in the Project, the final OCGT technology 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 OCGT technology, and plant dimensions and configuration of any enclosures or buildings, if installed to allow for the future selection of the preferred technology and construction contractor. The peaking plant may be located within a dedicated building or alternatively each unit could have its own enclosure. Each unit is expected to have its own stack. For the purposes of the various environmental assessments, primarily for air quality, noise and visual impact, both single frame gas turbine and multiple aero-derivative unit technologies have been evaluated and the worst-case potential environmental effects are reported in this Preliminary Environmental Information (PEI) Report.
- 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 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 PEI Report. Justification for the need to retain flexibility in certain parameters is also outlined.
- 4.1.5 **Figures 4.1a and 4.1b** (PEI Report Volume III) shows the areas within which each element of the Proposed Development is anticipated to be used. Depending on whether a single frame gas turbine or multiple aero-derivative units are chosen, the stacks could be located anywhere within a defined area within the Site and at this stage the stack locations cannot be fixed. Therefore, the air impact and visual impact assessments have been undertaken considering the stacks in different locations within the defined area of the Site, with the worst-case impacts reported in the respective technical chapters (i.e. **Chapters 6 - 16**).
- 4.1.6 Indicative timescales for the construction and operation of the Proposed Development that have been assumed for the purposes of the assessments as follows:
- it is currently anticipated that (subject to the necessary consents being granted and an investment decision being made) construction work would commence around Q2 2020, potentially in up to three phases over a period of up to six years. The shortest construction

programme could be circa. two to three years from commencement. Therefore, wherever a potential impact is considered likely to be worse through a shorter construction programme (for example thereby increasing the traffic volume on the roads during that period), that has been assessed and presented in the relevant technical chapter in this PEI Report; and

- it is currently anticipated that the Proposed Development would commence commercial operation from as early as 2023.

4.1.7 Construction of the Proposed Development is detailed in **Section 4.4** of this chapter.

4.1.8 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 2066.

4.1.9 This chapter is supported by **Appendix 4A** (Volume II of this PEI Report) and **Figures 4.1a** and **4.1b** (Volume III of this PEI Report). These figures show indicative layouts of the single OCGT or up to five aero-derivative gas turbines on the Site.

## 4.2 Components of the Proposed Development

4.2.1 This section provides further detail on the components of the Proposed Development within the application site boundary, referred to in this PEI Report as 'the Site'.

4.2.2 The Proposed Development would comprise a gas fired power station with electrical output capacity of up to 299MW and associated buildings, structures and plant, including:

- one or more OCGT units with stack(s), transformer(s), air inlet filter house, exhaust gas diffuser and generator;
- associated switch gear and ancillary equipment;
- a switchgear building;
- gas receiving area, gas treatment and control facilities, compression station, and gas pipeline to the West Burton B (WBB) Gas Reception Facility;
- electrical connection to an existing 400kV switchyard within WBB, with an extension to the existing switchyard;
- diesel generator and associated diesel fuel tank;
- workshop, store, control, electrical, administration and welfare buildings ;
- above ground water storage tanks and associated infrastructure;
- storm water attenuation system or similar;
- internal access roads and car parking;
- landscaping, fencing and security provisions;
- construction laydown areas and a rail offloading area from the existing rail loop that is present on the West Burton Power Station Site;
- auxiliary cooling equipment/systems; and
- other minor infrastructure and auxiliaries/services.

### OCGT Power Generation Plant and associated Stacks

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 GTs are widely used in the power industry as a result of their multiple advantages, when compared to other power plants. Those advantages include flexibility of operation, ease of use, relatively low weight and compactness. Two types of OCGT are under consideration for the Proposed Development – industrial gas turbines and aero-derivative gas turbines. Industrial gas turbines are typically sized between 100MW and 470MW output. Aero-derivative gas turbines were originally designed for aircraft propulsion and have been adapted for power generation and typically have outputs up to 100MW.
- 4.2.5 OCGTs are ideally suited to peaking plant operation, as they can be started and shutdown quickly and operate flexibly across a range of loads. An OCGT power plant of this scale could comprise a single large industrial gas turbine, or multiple gas turbines, either industrial or aero-derivative, potentially within a building or enclosure, each with their own stack.
- 4.2.6 If a single large OCGT was selected for the Proposed Development, it would typically have dimensions of 50m in length x 27m in width (excluding gas turbine auxiliaries and associated plant and equipment) with a typical stack height in the range of up to 45m.
- 4.2.7 If multiple aero-derivative gas turbines were selected for the Proposed Development, each unit would have typical dimensions of 30m in length x 10m in width, with a typical stack height in the range of 25-35m. The development would comprise up to six units, although the most likely option based on current technology would be five aero derivative units. For the purposes of this PEI Report, the five unit option has been assessed. The Applicant will ensure that the impacts associated with installing six units would be no worse than the five unit option assessed throughout the PEI Report, through management of stack heights, noise attenuation etc.; sensitivity analysis of the difference between a five and a six unit option will be presented in the ES as appropriate.
- 4.2.8 For a single OCGT a transformer would be installed on the Proposed Power Plant Site, circa. 15m in length x 10m in width x less than 10m in height. For multiple aero-derivative gas turbines each unit could have a smaller transformer which may be housed in a compound, which could be up to 52m in length x 50m in width.
- 4.2.9 The plant would be supported by suitably rated switchgear and ancillary electrical equipment to allow operation of the power plant and export of electricity to the switchyard.

### Black-start Capability

- 4.2.10 The Proposed Development may also provide a 'black-start' capability which would provide the capability to start the selected technology without any assistance from the National Grid electricity transmission system, in the event of a total or partial shutdown of the UK transmission system (so called 'black-start' capability). The Proposed Development could then be used to help restart the national transmission system, whereas power stations without black-start capability need to draw power from the transmission system to start operation. It is not possible to accurately predict the likely frequency or duration of black-start events. However, historically black-start events have been very infrequent in the UK.
- 4.2.11 The inclusion of black start capability and the provision of emergency back-up supplies might require the use and storage of diesel or distillate fuel in above ground tank(s) within the Site; although natural gas would continue to be the fuel used during normal plant operation. The diesel would only be used to support black-start operations or to provide emergency supplies if connection to the grid system was lost.
- 4.2.12 Distillate fuel or diesel would be stored in above ground storage tanks (AST) of less than 30m<sup>3</sup> capacity, adjacent to the black-start building/area, with an associated unloading area.

### Diesel Generator

- 4.2.13 A diesel generator would be required for the safe shut-down of the plant in the event of emergency shutdown or loss of power. Diesel fuel would be stored in above ground storage tanks (AST) of less than 30m<sup>3</sup> capacity.

### Gas Supply and Treatment Infrastructure

- 4.2.14 A new gas connection pipeline would link into WBB's existing gas supply infrastructure which is located immediately south of the proposed development. The new gas connection route would run within the Applicant's land ownership within the West Burton Power Station Site. A connection would be made between the existing WBB gas reception facility and the new gas reception facility on the Site where the gas would be metered and conditioned to that required for the selected technology for the Proposed Development.
- 4.2.15 Gas treatment could include filtering, pressure and temperature regulation and metering of the natural gas. A 'pigging' facility could also be included, which allows a 'Pipeline Inline Gauge' (PIG) to be passed along the pipeline for periodic cleaning and maintenance checks.

### Electricity Switchyard Station and Grid Connection

- 4.2.16 The Proposed Development would connect to the existing 400kV switchyard within the WBB power station. The connection between the Proposed Development and 400kV switchyard would comprise either overhead or below ground cables, or a combination of both. The route of the electrical connection would broadly follow the eastern boundary of WBB, as shown on **Figure 3.3** (PEI Report Volume III).
- 4.2.17 Depending upon the final choice of technology, upgrades to existing switchgear or other existing equipment may be required.

### Fire Fighting Equipment and Fire/ Raw Water Storage Tanks

- 4.2.18 The fire protection strategy for the Proposed Development would be developed to comply with the requirements of the Building Regulations 2010 (Ref 4-2) and the Building Regulations and Fire Safety Procedural Guidelines (Ref 4-3). Appropriate standards would also be referenced to provide the necessary fire safety design. Additional fire protection would be provided with reference to British Standards.
- 4.2.19 In case of a fire, the outlet connection from the surface water attenuation system would be closed and surface run-off (i.e. fire-fighting and rain water) would be contained within the Site.

### Sewerage and Drains

- 4.2.20 Foul drainage from the welfare facilities would be directed to an on-site septic tank for treatment prior to discharge.

### Surface Water Drainage and Stormwater Attenuation

- 4.2.21 An Outline Drainage Strategy (Ref 4-4) is included as Annex C of the Flood Risk Assessment (**Appendix 12A** in PEI Report Volume II).
- 4.2.22 Two options are currently subject to ongoing feasibility design in order to develop a preferred drainage solution for the Proposed Development. The preferred option is to tie-in the drainage design into the combined West Burton A (WBA)/WBB Power Station drainage system at a point which connects onto an existing purge main, travelling parallel to the River Road. Following attenuation, site drainage would then discharge to the River Trent. Technical exploratory work is

underway in order to determine the feasibility of this option. A second option, which remains under consideration if the preferred option is not technically feasible, is to allow discharge into a new outfall point on the western side of the River Trent. New pipework and associated infrastructure would be provided for the new outfall as part of the Proposed Development. Under this option a temporary coffer dam may need to be installed to enable construction works to take place in the River (refer to Section 4.4).

### Fuel Storage

- 4.2.23 The inclusion of black-start and emergency shut down capability for the Proposed Development requires the use and storage of a small amount of diesel fuel, which would be stored in above ground bunded tanks of less than 30m<sup>3</sup> capacity, and with an associated contained road tanker unloading area.

### Electrical/ Administration/ Control/ Welfare Building(s)

- 4.2.24 The administration/control building(s) would contain the main reception, offices, control room, electrical equipment and staff welfare facilities.

### Workshop and Stores Building(s)

- 4.2.25 Workshop and stores building(s) would be required for operation and maintenance activities and storage of materials.

### Security Fencing

- 4.2.26 Security systems would be provided in respect of the Site. This could include paladin (or similar) fencing and intruder alarms.

### Landscaping

- 4.2.27 A Biodiversity and Landscape Strategy will accompany the application for development consent. This document will set out the principles of habitat creation, management and enhancement and landscape design that would be adopted in the detailed design process, as well as the areas of the Site retained for landscaping purposes.

### Construction Laydown Area and Contractors' Compound

- 4.2.28 **Figures 4.1a and 4.1b** (PEI Report Volume III) show the area of land to be used for construction laydown and the contractors' compound. This area 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.
- 4.2.29 The area would be underlain by semi-permeable surfacing such that it is a level surface that allows surface water and rainwater to percolate through it. No hazardous materials would be stored unbunded within the laydown area.

### Rail Off-Loading Area

- 4.2.30 The existing West Burton Power Station is connected directly to the Retford-Gainsborough railway line, principally to allow for coal deliveries to the WBA Power Station. The rail loop allows trains to turn around on-site, as required.

- 4.2.31 Transport of construction plant and equipment by the existing rail facility is being considered. Therefore, provision is currently included in the Site boundary for works to allow offloading of construction materials from trains. However, for the purposes of providing a worst-case assessment of potential road traffic impacts in **Chapter 7: Traffic and Transportation**, no allowance has been made for the delivery of construction materials by rail. The contractor would review options for the use of rail when sourcing construction materials.

### Water Supply and Treatment Infrastructure

- 4.2.32 The small amount of cooling water needed for auxiliary systems is maintained in a closed loop system and would be topped up using water from the existing Water Treatment Plant on WBB or from a towns water supply. This would be delivered either by pipeline or via road tanker.

### Car Parking and Cycle Storage

- 4.2.33 There would be provision for several car parking spaces on Site; additional car parking spaces would be provided on the site of WBB, if required.

### Permanent Plant Laydown

- 4.2.34 An area of the Site may be retained for use by contractors during periods of planned maintenance. This area would be gravelled and have electrical, water and drainage connections for temporary cabins when they are brought on to Site.

### Rights of Way and Access

- 4.2.35 It is anticipated at this stage that there would be up to two access points for vehicles during construction and operation.
- 4.2.36 The primary access to the Site would be via the main entrance to the West Burton Power Station site, off Gainsborough Road to the south-west. Gainsborough Road links to the A620 and then the A631 near Beckingham to the north. This access would be utilised by all road users, including cyclists.
- 4.2.37 Bus stops for routes 595 and 95A (Retford–Gainsborough) are located adjacent to the Gainsborough Road junction with Station Road to the south of the West Burton Power Station Site.

### Carbon Capture Readiness (CCR)

- 4.2.38 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 (Electricity Generating Stations) Regulations 2013 (the CCR Regulations), which transposed Article 36 of the Industrial Emissions Directive (IED) into UK legislation.
- 4.2.39 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 300MW<sub>e</sub> unless the relevant authority has determined (on the basis of an assessment carried out on 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.
- 4.2.40 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.

## External Lighting and CCTV

- 4.2.41 Lighting would be required for the safe construction and operation of the Proposed Development, during the hours of darkness.
- 4.2.42 At the time of submission of the application for development consent, a contractor would not have been appointed, therefore, detailed design work on lighting for the Proposed Development would not have been completed. Therefore, an indicative Lighting Strategy will be included in the application for development consent, providing 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 WBB.
- 4.2.43 CCTV and other security measures are anticipated to be required for security purposes at the Site.

## 4.3 Design Parameters

- 4.3.1 The design of the Proposed Development is following an iterative process, based on preliminary environmental assessments and consultation with statutory and non-statutory consultees. **Section 4.7: Alternatives and Design Evolution** 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. Focussed use of the Rochdale Envelope approach is, therefore, being 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 locations of emission points within the proposed power station site, the number of units to be installed and the massings of structures and buildings, to allow flexibility in selection of preferred technology, and the final stack heights. Wherever an element of flexibility is maintained, alternatives have been assessed and the worst case impacts have been reported in the PEI. Feasibility work will continue to further refine the proposed options prior to submission of the DCO application where possible.
- 4.3.3 **Table 4-1** and set out the maximum building and fixed designed parameters that have been assessed within this PEI Report. Maximum building heights are given in mAOD, based on the upper limit finished ground level.

**Table 4-1: Main Structure Dimensions**

Component	Maximum length (m)	Maximum width (m)	Maximum height (m)	Maximum footprint (m <sup>2</sup> )
Single Gas Turbine and Generator	50	20	27	1,000
Gas Turbine building (if required)	36	12	17	432
Aero derivative Gas Turbines (each)	24	10	15	240
Aero derivative Generators (each)	6	5	8	30
Stack(s)	Up to 12m in diameter		Up to 45m	113

Component	Maximum length (m)	Maximum width (m)	Maximum height (m)	Maximum footprint (m <sup>2</sup> )
Generator Transformer	10	15	8	150
Transformer compound (if required for aero derivatives)	52	50	8	2600
Fin-fan cooler	30	15	10	450
Control room, workshops, stores	35	30	8	1,050
Demin tank, firewater tank	15m (i.e. diameter)		6	177 each

## 4.4 Proposed Development Construction

### Construction Programme and Methods

- 4.4.1 The Applicant would appoint a contractor for the main works phase. That contractor is likely to appoint sub-contractors to undertake all of the associated civil works. EDF Energy is committed to ensuring a safe working environment for all employees and contractors.
- 4.4.2 A Construction Environmental Management Plan (CEMP) would be prepared by the contractor, with a framework CEMP submitted in support of the application for development consent. The framework CEMP will set out the key measures to be employed during the main works phase to control and minimise the impacts on the environment. It will describe 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 is due to start in Q2 2020, in up to three phases over a period of up to 6 years ending 2026. As outlined previously, the shortest construction programme would be circa. 2 to 3 years if the plant were built in a single phase. **Table 4-2** gives an indication of the construction programme if that were to be the case.

**Table 4-2: Indicative construction programme**

	2020				2021				2022				2023				2024			
	1	2	3	4	1	2	3	4	1	2	3	4	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 Proposed Development, excavate foundations and/or remove surplus material or remediate contaminated soils.

## Construction Laydown Area

- 4.4.5 The contractor would provide temporary site facilities within the designated part of the Site (the proposed Construction Laydown Area) as shown on **Figures 4.1a** and **4.1b** (see PEIR Volume III). It is envisaged that the laydown area would be cleared, levelled and covered with hardstanding; it is likely that a permeable surfacing would be used 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 4-5).

## 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 in accordance with best practice.
- 4.4.7 Soils would be managed in accordance with the Defra Construction Code of Practice for the Sustainable Use of Soil on Development Sites (Defra, 2009) (Ref 4-6) to minimise impacts on soil structure and quality. Appropriate measures to minimise short-term and long-term impacts on land drainage would be included in the framework CEMP.
- 4.4.8 The framework CEMP will incorporate 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 proposed power plant area, 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(s)) on a phased programme of approximately 18 months.

## Construction of Gas Connection Pipeline

- 4.4.11 A new gas connection pipeline would link into WBB's existing gas supply infrastructure.
- 4.4.12 A tee-connection would be made within the WBB gas reception facility and a section of pipe would extend north into the Site,
- 4.4.13 The pipeline would either be installed at ground level or be constructed using an 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. 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.

## Construction of Water Connections

- 4.4.14 The Proposed Water Connections are located within the existing WBB site.

## Construction of Drainage Systems

- 4.4.15 Two options are currently under consideration. The preference would be to make a connection into the existing WBA/WBB drainage system, which is subject to an ongoing feasibility assessment.

Existing pipework and associated infrastructure may need to be upgraded as part of the Proposed Development.

- 4.4.15.1 An alternative solution would be for site drainage to be discharged at a new outfall point on the west side of the River Trent. New pipework and associated infrastructure would be provided for the new outfall as part of the Proposed Development. A temporary coffer dam may need to be installed to enable construction works to take place in the river. As a 'worst-case' in terms of potential environmental impacts, the EIA reported in this PEI Report has assumed that a temporary coffer dam may need to be installed to enable construction works to take place in the river. Pipelines would be constructed using open cut methods where possible, although directional drilling may be used to cross the river flood defences if that connection option is required. If required, measures to minimise environmental effects will be described in the framework CEMP. This would include the installation during lower flow periods (as required for flood risk and hydrodynamic/erosion/scour purposes), pre-construction sediment contamination testing and silt curtains (to minimise impacts on water quality) as required will be used.

### Construction Staff

- 4.4.16 On average, it is estimated that there would be around 95 construction personnel on the Site in any one day. It is estimated that there would be up to 200 personnel contracted to work on the Site at the peak of construction. This estimate is slightly higher than the estimate presented in the Stage 1 consultation material in July 2017 (which indicated around 150 construction staff at the peak of construction). It has been revised upwards based on experience of other similar developments and to ensure the transport assessment (see **Chapter 7: Traffic and Transport**) is robust. The peak of construction activity is anticipated between months 25 to 27.
- 4.4.17 Construction staff are anticipated to travel to the Site via the existing trunk road and local networks. EDF Energy would seek to maximise sustainable transport options, such as public transport, cycling and car share, in accordance with its current practice and policy. This will be outlined in the Framework Construction Travel Plan that will accompany the application for development consent and secured through a Requirement imposed on the DCO. A copy of the Construction Traffic Management Plan will also accompany the application for development consent.

### Construction Hours of Work

- 4.4.18 Construction working hours would generally be Monday to Friday 07:00 to 19:00 and Saturday 08:00 to 18:00. However, it is likely that some construction activities would be required 24-hours at certain times. This is because certain construction activities cannot be stopped, such as concrete slip forming. Where on-site works are to be conducted outside the core hours, they would comply with any restrictions agreed with the local planning authorities, in particular regarding control of noise and traffic. 24-hour working for certain activities has, therefore, been assessed in **Chapter 8: Noise and Vibration**. It is also proposed that some work may be carried out through the night, so long as it does not cause existing ambient noise or vibration levels at sensitive receptors to be exceeded. **Chapter 8: Noise and Vibration** sets out specific mitigation and control measures required to prevent disturbance from night time construction activities.
- 4.4.19 Given the above, activities that could generate a noise nuisance would not be carried out at night, including but not limited to certain piling methods, use of impact wrenches, concrete scabbling, use of reversing sirens, and concrete jack hammering, subject to the outcome of a construction noise assessment in accordance with British Standard BS5228. A noise monitor would be installed at the boundary of the Site, with a night time noise limit to be used at this monitor during construction (and the limit to be agreed with Bassetlaw District Council and West Lindsey District Council). Lighting for night time working would be designed so as not to cause a nuisance outside of the Site, in accordance with a Lighting Strategy that will accompany application for development consent.

## Construction Traffic/Site Access

- 4.4.20 It is anticipated at this stage that there would be up to two access points to the proposed power plant site and construction laydown area for vehicles during construction. The principal access to the Site is via the existing private road owned by EDF Energy, which joins the Sturton-le-Steeple to Bole Corner class III, C2 road, 300m to the north of Sturton-le-Steeple. This access road is a purpose built road that serves the existing power stations and is wide enough to allow access by construction traffic without the need for alteration.

## Storage of Construction Plant and Materials

- 4.4.21 There would be laydown areas positioned close to access roads on the Site where any materials would be unloaded and then transported to the area of works. It is not envisaged that these would be for long-term storage of materials (storage would be for circa. 6 months or less).
- 4.4.22 At the end of the shift, mobile plant would be returned to a secure overnight plant storage area, where drip trays can be utilised under the various types of plant, if needed.
- 4.4.23 Storage areas for hazardous or potentially polluting materials would be located in a separate, locked, where appropriate bunded and secure area. 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.

## Lighting

- 4.4.24 Construction temporary site lighting is proposed to enable safe working during construction in hours of darkness. Construction temporary lighting would be arranged so that glare is minimised outside the Site. A Lighting Strategy will be included as part of the application for development consent, and its delivery secured through a Requirement imposed by the DCO.

## Wheel Wash Facilities

- 4.4.25 A self-contained wheel wash would be installed for use vehicles prior to exiting the Site onto the public highway. For loads unable to use the fixed wheel wash, a localised wheel washing would be set up, to ensure no detrimental effect to the highway.

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

- 4.4.26 In accordance with policy requirements, through the ongoing design, 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.
- 4.4.27 The Applicant would require that the contractor produces and maintains a CEMP to control site activities to minimise impacts on the environment. This would include industry best practice measures, and specific measures set out in this PEI Report. A framework CEMP will accompany the application for development consent.
- 4.4.28 In order to manage and monitor waste generated on Site, a framework SWMP will be developed as part of the framework CEMP. It would allow for waste streams to be estimated and monitored and goals set with regards to the waste produced. The CEMP and SWMP would be secured through a Requirement imposed on the DCO.

- 4.4.29 The Applicant 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.
- 4.4.30 Further assessment of impacts of waste is presented in **Chapter 15: Sustainability and Climate Change**.

## 4.5 Proposed Development Operation

### Hours of Operation

- 4.5.1 The Proposed Development would be on standby and to be available in accordance with National Grid requirements under the Capacity Market contract. 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. This is currently anticipated to be up to 1,500 hours/year.

### Site Staff

- 4.5.2 Operation of the Proposed Development is anticipated to create up to 15 operational roles, which may be new jobs or integrated with other EDF Energy operations. Temporary and contractor employees associated with maintenance activities would also be employed as required.

### 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. Due to the predicted low annual running hours, it is likely that there would be several years between each significant plant overhaul period.

### Hazard Prevention and Emergency Planning

- 4.5.4 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 Construction (Design and Management) (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.
- 4.5.5 Written procedures clearly describing responsibilities, actions and communication channels would be available for operational personnel dealing with emergencies.
- 4.5.6 Management of the gas supply would be carefully controlled in accordance with UK requirements. The Environmental Permit for the proposed generating station would consider potential abnormal operation scenarios and prevention or minimisation of accidents through management procedures. A Hazard Identification (HAZID) and Hazard and Operability (HAZOP) study would also be undertaken during the design phase of the Proposed Development.

### Environmental Management

- 4.5.7 The Proposed Development would comply with the Industrial Emissions Directive (IED) (Ref. 4-8) 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**.

## 4.6 Proposed Development Decommissioning

4.6.1 The peaking plant is capable of a life expectancy of 40 years or more, depending on running hours. Eventually decommissioning would involve the removal of the plant. The gas and electricity connections would be disconnected and made safe. An OCGT, whether single turbine or multiple aero-derivative units, could either be removed as a unit for reuse elsewhere (depending on its condition) or alternatively dismantled on Site and removed. Therefore, decommissioning is not anticipated to present any significant environmental impacts beyond those assessed for the construction phase of the Project.

## 4.7 Design Evolution and Alternatives

4.7.1 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (as amended) (the 'EIA Regulations') (Ref 4-9) state that the Environmental Statement (ES) should include an outline of the main alternatives that have been studied and an indication of the main reasons for decisions made, taking into account the environmental effects. This should include consideration of 'do nothing'. Under the EIA Regulations there is currently no requirement to assess alternatives, only a requirement to provide information regarding the alternatives that have actually been considered.

4.7.2 On the matter of alternatives, National Policy Statement (NPS) EN-1 (DECC, 2011a) (Ref 4-10) 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*'.

4.7.2.1 Taken together with EN-1, the NPS for Fossil Fuel Electricity Generating Infrastructure EN-2 (DECC, 2011b) (Ref 4-11) provides the primary basis for decisions on applications for fossil fuels electricity generating stations, including gas-fired power stations (such as the Proposed Development). 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, for example, some power station have very high water demands for cooling; and grid connection. However, 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*'.

4.7.3 It is considered that the '*Do Nothing*' scenario is not appropriate given the established national need for new energy generation (refer to **Chapter 5: Legislative and Policy Context**). Another key disadvantage of the '*Do Nothing*' scenario would be the lack of additional investment in the local economy since the project would not be developed.

4.7.4 The West Burton Power Station 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 has a long history of power generation;
- the existing WBA coal-fired power station is facing closure from 2025 under current legislation, driving the need for further investment in the West Burton Power Station Site;
- the Site has excellent electrical grid, gas, water 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 Site (and particularly the Proposed Power Plant Site) is wholly in the freehold ownership of the Applicant; and
- the Proposed Power Plant Site is located in close proximity to the National Transmission Network.

4.7.5 The consideration of alternatives and design evolution is being 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 continues to evolve in response to consultation feedback and the ongoing 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**).

4.7.6 A number of alternatives are being considered for the Proposed Development, including:

- alternative routes for the proposed gas and electricity connections;
- alternative technologies;
- alternative site drainage solutions;
- alternative ecological mitigation proposals; and
- alternative design options and design evolutions.

### Alternative Technologies

4.7.7 Natural gas is proposed to be the fuel for the Proposed Development for the reasons outlined in this chapter; however, there are still a number of alternative technologies available. This includes options for the OCGT under consideration – industrial gas turbines and aero-derivative gas turbines for the peaking plant, with different ranges of gas turbine output available.

4.7.8 At this stage, no options have been ruled out for the OCGT technology configuration, with further technical evaluation of the strengths of each option still under consideration. Where the type of technology 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 PEI Report and a worst-case is presented – see **Chapter 6: Air Quality**, **Chapter 8: Noise and Vibration** and **Chapter 10: Landscape and Visual Assessment**.

### Alternative Design Options and Design Evolution

4.7.9 Throughout the ongoing design process, consideration is being given to a range of design options. These decisions have, where relevant and possible, been informed by environmental appraisal and assessment work and by consultation with stakeholders. The design has evolved and continues to be refined through a continuous process of environmental assessment, consultation and development.

4.7.10 Aspects of design that have already been determined include:

- up to six OCGT units would be installed;
- gas engines would not be utilised;
- the operational plant would be sited close to WBB power station.

4.7.11 These aspects have not yet been determined, so options have been included and assessed within this PEI Report:

- the manufacturer of the OCGT units, therefore the final dimensions of the proposed structures and buildings;

- final stack heights and locations;
- the provision of surface water discharge through the WBA/WBB drainage systems or via an outfall to the River Trent or;
- the final areas selected for ecological mitigation.

4.7.12 The Rochdale Envelope approach (Ref 4-1) has been applied to address these options and will be reviewed throughout the pre-application stage. The final Rochdale Envelope will be detailed in the application for development consent.

## 4.8 References

- Ref. 4-1 Planning Inspectorate (2013) Advice Note 9 – Using the ‘Rochdale Envelope’. PINS. Bristol.
- Ref. 4-2 HM Government, Building Regulations 2010.
- Ref. 4-3 Department of Communities and Local Government (2007) Building Regulations and Fire Safety Procedural Guidelines. DCLG, London.
- Ref 4-4 WSP/Parsons Brinckerhoff (2017) West Burton Peaking Plant Drainage Study West Burton C and Sub 50W Peaking Plant.
- Ref. 4-5 Defra/ Environment Agency (2016) Pollution Prevention for Businesses (available online at <https://www.gov.uk/guidance/pollution-prevention-for-businesses#storing-materials-products-and-waste>) [accessed 20.07.17).
- Ref 4-6 Defra (2009) Construction Code of Practice for the Sustainable Use of Soil on Development Sites.
- Ref 4-7 HM Government, Construction (Design and Management) (CDM) Regulations 2015.
- Ref 4-8 European Commission (2010) European Directive on Industrial Emissions 2010/75/EU.
- Ref 4-9 HM Government, The Infrastructure Planning (Environmental Impact Assessment) Regulations 2009.
- Ref 4-10 Department of Energy and Climate Change (2011), Overarching National Policy Statement for Energy (EN-1). Available from: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/47854/1938-overarching-nps-for-energy-en1.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf)
- Ref 4-11 Department of Energy and Climate Change (2011), National Policy Statement for Fossil Fuel Electricity Generating Infrastructure (EN-2). Available from: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/47855/1939-nps-for-fossil-fuel-en2.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/47855/1939-nps-for-fossil-fuel-en2.pdf)

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## 5. Legislative Context and Planning Policy Framework

### 5.1 Introduction

5.1.1 This chapter provides an overview of the current and emerging policies relevant to the Project.

### 5.2 Legislative Context

5.2.1 As stated in **Chapter 1: Introduction**, the Proposed Development is a 'Nationally Significant Infrastructure Project' (NSIP) under Section 14 (1)(a) and 15 (2) of the Planning Act 2008 (Planning Act) (Ref 5-1), as the Project would generate energy with an installed capacity of more than 50MW. The Application for development consent will be prepared in accordance with Section 37 of the Planning Act.

5.2.2 Before a NSIP can proceed, a Development Consent Order (DCO) must be granted for that project. Under the Localism Act 2011 (Ref 5-2), the Planning Inspectorate is responsible for examining an application and making a recommendation to the Secretary of State for the Department for Business, Energy and Industrial Strategy (BEIS). A DCO removes the need to apply separately for a number of consents, subject to the prior agreement of the relevant consenting body.

5.2.3 The Planning Act requires decisions on NSIP applications to be made in accordance with the relevant National Policy Statement (NPS), except to the extent that to do so would, as stated in paragraph 1.1.2, NPS EN-1:

- lead to the UK being in breach of its international obligations;
- be in breach of any statutory duty that applies;
- be unlawful;
- result in adverse impacts from the development outweighing the benefits; or
- be contrary to regulations about how decisions are to be taken.

5.2.4 Section 104 of the Planning Act states that the decision maker must also have regard to any local impact reports submitted within the prescribed deadline and any other matters that are considered both important and relevant to their decision. This may include Development Plan Documents.

5.2.5 The Secretary of State must take into consideration any relevant NPS(s) and must decide applications in accordance with them. Both the potential benefits and adverse impacts should be taken into account.

### 5.3 Policy Context

5.3.1 This section briefly details the overarching planning policy context for the Project, with topic specific policy detailed in the relevant topic chapters (**Chapters 6-15**).

#### National Policy Statements

5.3.2 National policy for NSIPs is set out in a number of NPSs. Two NPSs are relevant to the Proposed Development:

- the Overarching National Policy Statement for Energy (EN-1) (Ref 5-3); and
- the National Policy Statement for Fossil Fuel Electricity Generating Infrastructure (EN-2) (Ref-5-4).

- 5.3.3 Given the level and urgency of need, EN-1 advises the decision maker to ‘*start with a presumption in favour of granting consent to applications for energy NSIPs*’. The following sections summarise the paragraphs of the NPSs which are relevant for the consideration of this Project.

#### Overarching National Policy Statement for Energy (NPS EN-1)

- 5.3.4 NPS EN-1 contains the UK Government’s general policy for developing and consenting of NSIPs within the energy sector. Paragraph 3.1.3 and 3.1.4 of EN-1 focus on the decision making process. More specifically, paragraph 3.1.3 states that the decision maker should:

*“assess all applications for development consent for the types of infrastructure covered by the energy NPSs on the basis that the Government has demonstrated that there is a need for those types of infrastructure and that the scale and urgency of that need is as described for each of them in this Part.”*

- 5.3.5 Additionally, paragraph 3.1.4 states the decision maker should:

*“give substantial weight to the contribution which projects would make towards satisfying this need when considering applications for development consent under the Planning Act 2008.”*

- 5.3.6 EN-1 makes it clear that there is significant need for new energy infrastructure in the UK that is secure, diverse, sustainable and affordable (Section 3.3). Paragraph 3.3.1 refers to the urgent need for new electricity capacity, stating:

*“Electricity meets a significant proportion of our overall energy needs and our reliance on it is likely to increase as we move towards our 2050 goals.”*

- 5.3.7 Paragraph 3.3.11 recognises that flexible electricity generation facilities powered by fossils fuel are required to provide back-up for intermittent renewable energy. Furthermore, paragraph 3.3.12 refers to the need for back-up generation. It states that the Government believes these types of technologies are likely to be increasingly relied upon in the future as renewables play a progressively important role in a low carbon electricity system.

- 5.3.8 EN-1 states:

*“Gas will continue to play an important role in the electricity sector providing vital flexibility to support an increasing amount of low-carbon generation and to maintain security of supply.”*

*Additionally: “This ability to source fuel from alternative suppliers helps to give stability to the UK’s generating capacity. In addition, unlike some renewable energy sources such as wind power, fossil fuels may be stockpiled in anticipation of future energy demands.”*

- 5.3.9 Section 3.8 highlights the need for national significant gas infrastructure, stating:

*“Although our reliance on fossil fuels will fall, the transition will take some time, and gas will continue to play an important part in the UK’s fuel mix for many years to come.”*

- 5.3.10 Paragraph 3.8.5 states that gas supply infrastructure must be sufficient to meet ‘peak’ demand. Additionally, paragraph 3.8.15 emphasises how important gas supply capacity is and that providing ‘back-up’ generation can create a ‘*high degree of security supply*’.

- 5.3.11 Paragraph 3.8.19 emphasises the importance of gas in the power generation sector:

*“Gas is the cleanest and most reliable fossil fuel... in the power generation sector, as a reliable source of flexible power generating capacity, to back-up intermittent renewables, so underpinning security of supply and price stability in the electrical market.”*

Additionally: *“gas demand for power generation could increase substantially due to the greater use of electricity for heat and transport”.*

5.3.12 In terms of climate change, paragraph 4.8.6 states:

*“The [decision maker] should be satisfied that applicants for new energy infrastructure have taken into account the potential impacts of climate change using the latest UK Climate Projections available at the time the ES was prepared to ensure they have identified appropriate mitigation or adaptation measures.”*

5.3.13 Paragraph 4.8.8 emphasises the importance of making sure the features of the design of new infrastructure are not:

*“seriously affected by more radical changes to the climate beyond that projected in the latest set of UK climate projections, taking into account of the latest credible scientific evidence on, for example, sea level rise”.*

5.3.14 Refer to the relevant topic specific chapters (i.e. **Chapters 6 – 15**) of this Preliminary Environmental Information (PEI) Report for details of how the Proposed Development should be considered against the technical policies of this NPS (refer to **Table 5.1**).

#### **National Policy Statement for Fossil Fuel Electricity Generating Infrastructure (NPS EN-2)**

5.3.15 NPS EN-2, taken together with NPS EN-1, provides the main foundations for decision making on applications submitted for nationally significant fossil fuel electricity generating stations. EN-2 applies in England and Wales to applications for fossil fuel generating stations with over 50 megawatts (MW) generating capacity.

5.3.16 EN-2 highlights the criteria that must be met before consent for a new fossil fuel generating station can be given. This includes evidence that the opportunities for Combined Heat and Power (CHP) have been explored (paragraph 2.3.2). An assessment will be submitted as part of the Application and a Requirement would be included in the DCO.

5.3.17 EN-2 (and NPS EN-1 Section 4.7) sets out the criteria for Carbon Capture Readiness (CCR). New combustion generating stations with a generating capacity at or over 300MW are required to show that the proposed generating station will be ‘Carbon Capture Ready’ before consent may be given. Notably, Carbon Capture Readiness (CCR) is not applicable for the Proposed Development, as the generating capacity is under 300MW.

5.3.18 In terms of site selection, Section 2.2 of EN-2 outlines 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; water resources (for example, some power station have very high water demands for cooling); and grid connection. However, in outlining such factors, paragraph 2.2.1 states:

*“...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.”*

5.3.19 Paragraph 2.3.13 emphasises the importance of climate change adaptation, advising applicants to:

*“set out how the proposal would be resilient to:*

- *coastal changes and increased risk from storm surge;*
- *effects of higher temperatures, including higher temperatures of cooling water; and*
- *increased risk of drought leading to a lack of available cooling water.”*

- 5.3.20 This NPS also sets out a number of specific impacts that could arise from fossil fuel generating NSIPs and criteria by which they should be assessed (EN-2 Section 2.4). These specific topics include air quality and emissions, landscape and visual, release of dust, residue management, and water quality and resources. Additionally, applicants should demonstrate good design.
- 5.3.21 Refer to the relevant topic specific chapters (i.e. **Chapters 6 – 15**) of this PEI Report for details of how the Proposed Development should be considered against the technical policies of this NPS (refer to **Table 5-1**).

**Table 5-1: Summary of Technical Policies of EN-1 and EN-2**

Topic	NPS	Topic Specific Chapter
Air Quality and Emissions	Both	<b>Chapter 6:</b> Air Quality
Biodiversity and Geological Conservation	EN-1	<b>Chapter 9:</b> Ecology, <b>Chapter 11:</b> Ground Conditions and Hydrogeology; and <b>Chapter 14:</b> Cultural Heritage
Civil and Military Aviation and Defence Interests	EN-1	<b>Chapter 2:</b> Assessment Methodology
Dust, odour, artificial light, smoke, steam and insect infestation	EN-1	<b>Chapter 4:</b> The Proposed Development; <b>Chapter 7:</b> Traffic and Transportation; and <b>Chapter 8:</b> Noise and Vibration
Flood Risk	EN-1	<b>Chapter 12:</b> Floor Risk, Hydrogeology and Water Resources
Historic Environment	EN-1	<b>Chapter 14:</b> Cultural Heritage
Landscape and Visual	Both	<b>Chapter 10:</b> Landscape and Visual Amenity
Land use including open space, green infrastructure and Green Belt	EN-1	<b>Chapter 10:</b> Landscape and Visual Amenity
Noise and Vibration	Both	<b>Chapter 8:</b> Noise and Vibration
Socio-Economics	EN-1	<b>Chapter 13:</b> Socio-Economics
Traffic and Transport	EN-1	<b>Chapter 7:</b> Traffic and Transportation
Waste Management	EN-1	<b>Chapter 2:</b> Assessment Methodology and <b>Chapter 15:</b> Sustainability and Climate Change
Water Quality and Resources	Both	<b>Chapter 12:</b> Floor Risk, Hydrogeology and Water Resources

### National Planning Policy Framework (NPPF)

- 5.3.22 The National Planning Policy Framework (NPPF) (Ref 5-5) was adopted in March 2012 and replaced the majority of the Planning Policy Statements (PPSs) and Guidance Notes. The Department for Communities and Local Government (DCLG) published its Planning Practice Guidance (Ref 5-6), which consolidated and revised all the practice guidance documents.
- 5.3.23 The NPPF sets out the Government's planning policies for England and how these are to be applied. Paragraph 3 of the NPPF makes clear that the document does not contain specific policies

for determining applications for NSIPs, which are to be determined in accordance with the decision making framework set out in the Planning Act 2008 and relevant NPSs, as well as any other matters that are considered both '*important and relevant*'.

5.3.24 Policies of particular relevance to the scope of the EIA include: promoting sustainable transport; requiring good design; promoting healthy communities; conserving and enhancing the natural and historic environment; and meeting the challenge of climate change.

### Local Development Plan Policy

5.3.25 The Planning Act states that applications for development consent should normally to be determined in accordance with relevant NPSs, but states that it is for the decision maker to have regard to other matters which may both '*important and relevant*'. It is commonly recognised that this can include local planning policies, including local policy designations.

5.3.26 The Proposed Development has been considered against the current local development plan. As the Site lies entirely within the administrative area of Bassetlaw District Council (BDC) and Nottinghamshire County Council (NCC), the following are the most relevant in assessing the Proposed Development:

- Nottinghamshire Local Transport Plan: Strategy 2011-2026 (Ref 5-7), as detailed in **Chapter 7: Traffic and Transportation**;
- Bassetlaw District Council Core Strategy and Development Management Policies DPD (adopted December 2011 and updated July 2012) (Ref 5-8); and
- Sturton Ward Neighbourhood Plan 2015-2030 (adopted December 2015) (Ref 5-9).

5.3.27 In terms of local planning policy, BDC's Local Development Scheme (LDS) indicates that a Local Plan will replace the 2011 Core Strategy and Development Management Policies DPD, but is not expected to be adopted until 2019. There are no specific policies relating to the West Burton Site in the Initial Draft Bassetlaw Plan, therefore a detailed review has not been undertaken at this stage.

5.3.28 The Sturton Ward Neighbourhood Plan forms part of the Development Plan and is used to assess planning applications submitted within the Parish, within which the Site is located.

5.3.29 Additionally, the Site lies adjacent to the administrative area of Lincolnshire County Council and West Lindsey District Council, where the following documents are relevant for particular topics:

- Central Lincolnshire Local Plan (Ref 5-10), as referred to in **Chapter 6: Air Quality**, **Chapter 8: Noise and Vibration** and **Chapter 14: Cultural Heritage**;
- Lincolnshire Local Transport Plan 2013/14 to 2022/23 (Ref 5-11); and
- Derby, Derbyshire, Nottingham and Nottinghamshire (D2N2) Local Enterprise Partnership (LEP) Strategic Economic Plan (Ref 5-12), as referred to in **Chapter 13 Socio-Economics**.

### Bassetlaw District Core Strategy and Development Policies DPD (December 2011)

5.3.30 The Site is undesignated and falls outside of the defined settlement boundaries. The Core Strategy contains policies relating to development in rural areas and supporting text explains that proposals for development in wider countryside needs to be carefully assessed against their impact on the character, role and function of the least sustainable settlements in rural Bassetlaw. The policies relevant to this Project are detailed in **Table 5-2**.

**Table 5-2: Relevant Local Planning Policies**

Policy Reference	Policy Wording	Topic Specific Chapter
DM3: General Development in the Countryside	<p><i>“The Council is mindful of the need to ensure that applications for a range of other proposals in the countryside can be addressed. These tend to include... the re-use of brownfield sites in the countryside.”</i></p> <p>Part B states:</p> <p><i>“proposals for the re-use of previously developed land... will be supported where they result in...(v). development that will not create significant or exacerbate existing environmental or highway safety problems.”</i></p>	<b>Chapter 10:</b> Landscape and Visual Amenity
DM4: Design & Character	<p>Seeks to secure a Core Strategy vision to achieve improvements <i>‘in all aspects of design quality for new development in Bassetlaw.’</i></p> <p>Part A sets out principles requiring all major development proposals to demonstrate that they:</p> <p><i>“i. make clear functional and physical links with the existing settlement and surrounding area and not to be designed as ‘standalone’ additions;</i></p> <p><i>ii. complement and enhance the character of the built, historic and natural environment;</i></p> <p><i>iii. are of a scale appropriate to the existing settlement and surrounding area;</i></p> <p><i>iv. provide a qualitative improvement to the existing range of houses, services, facilities, open space and economic development opportunities.”</i></p> <p>Part B sets out general design principles, stating that <i>‘individual development proposals... will only be accepted where they are of a high quality design’</i> that address local character and distinctiveness, architectural quality, public realm, accessibility, amenity and carbon reduction.</p>	<b>Chapter 10:</b> Landscape and Visual Amenity
DM7: Securing Economic Development	<p>Part A states:</p> <p><i>“particular support will be given to economic development proposals that are able to:</i></p> <p><i>... ii. guarantee employment programmes for local residents that provide opportunities for training and development and will contribute to raised workforce skills levels within the District; and/or</i></p> <p><i>... iv. bring significant, good quality inward investment opportunities to the District.”</i></p>	<b>Chapter 13:</b> Socio-Economics

Policy Reference	Policy Wording	Topic Specific Chapter
DM8: The Historic Environment	<p><i>“Support will be given to development proposals... that protect and enhance the historic environment and secure its long-term future.”</i></p> <p>Part B sets out the criteria against which proposals will be assessed stating <i>‘Development proposals within the setting of heritage assets will be expected to consider: scale, design, materials, siting and views away from and towards the heritage asset’</i>.</p>	<b>Chapter 14:</b> Cultural Heritage
DM9 Green Infrastructure; Biodiversity and Geodiversity; Landscape; Open Space and Sports Facilities	<p><i>“Development proposals will be expected to support the Council’s strategic approach to the delivery, protection and enhancement of multi-functional Green Infrastructure.”</i></p> <p>Part B emphasises that proposals will be expected to take opportunities to restore or enhance habitats and species’ populations and to demonstrate that they will not adversely affect or result in the loss of features of recognised importance. The policy states that developments resulting in loss of such features may be supported provided replacement provisions are made. These should be equal or greater value than that which will be lost.</p> <p>Part C requires:</p> <p><i>“new development proposals in and adjoining the countryside to be designed so as to be sensitive to their landscape setting. They will be expected to enhance the distinctive qualities of the landscape character policy zone in which they would be situated, as identified in the Council’s Landscape Character Assessment. Proposals will be expected to respond to the recommendations made in the Assessment by conserving, restoring, reinforcing and creating landscape forms and features accordingly.”</i></p>	<b>Chapter 10:</b> Landscape and Visual Amenity; and <b>Chapter 9:</b> Ecology
DM10: Renewable and Low Carbon Energy	<p>Part A focuses on carbon reduction and states <i>‘the Council will be supportive of proposals that seek to utilise renewable and low carbon energy to minimise CO<sub>2</sub> emissions’</i>. The policy sets out a list of criteria against which proposals for renewable and low carbon energy infrastructure will also need to demonstrate compliance as follows:</p> <ul style="list-style-type: none"> <li>- <i>“are compatible with policies to safeguard the built and natural environment, including heritage assets and their setting, landscape character and features of recognised importance for biodiversity;</i></li> <li>- <i>will not lead to the loss of or damage to high-grade agricultural land (Grades 1 &amp; 2);</i></li> <li>- <i>are compatible with tourism and recreational facilities; will not result in unacceptable impacts in terms of visual appearance; noise; shadow flicker; watercourse engineering and hydrological</i></li> </ul>	<b>Chapter 15:</b> Sustainability and Climate Change

Policy Reference	Policy Wording	Topic Specific Chapter
	<p><i>impacts; pollution; or traffic generation; and</i></p> <p>- <i>will not result in an unacceptable cumulative impact in relation to the factors above.</i>”</p> <p>The policy also states that large-scale renewable and low carbon energy proposals must provide full details of arrangements for decommissioning and reinstatement of the site if/when it ceases to operate.</p>	
DM12: Flood Risk, Sewerage and Drainage	<p>Part A states:</p> <p><i>“proposals for the development of new units in Flood Zones 2, 3a and 3b that are not defined by national planning guidance as being suitable for these zones will not be supported while development sites remain available in sequentially superior locations across the District. Reference should be made to the Council's Strategic Flood Risk Assessment when making assessments about likely suitability. The policy states that site specific Flood Risk Assessments will be required for all developments in flood risk areas, even where flood defences exist”.</i></p> <p>Part B states that all new developments will be supported only where it is demonstrated that the proposal will not ‘<i>exacerbate existing land drainage and sewerage problems</i>’ and that all new development will be required to incorporate Sustainable Drainage Systems (SuDS).</p>	<p><b>Chapter 12:</b> Flood Risk, Hydrology and Water Resources and associated appendix, <b>Appendix 12.1</b> Flood Risk Assessment of PEI Report Volume II)</p>
DM13: Sustainable Transport	<p>Part A states that development proposals will be expected to:</p> <p><i>“i. Minimise the need to travel by private car;</i></p> <p><i>ii. Provide linkages, or develop new, footways, cycle paths and bridleways giving access, to key local facilities (especially town centres); and</i></p> <p><i>iii. Provide appropriate facilities to support access to high-quality public transport.”</i></p> <p>Part B sets out that development proposals will be required to be consistent with, and contribute to the implementation of, the Nottinghamshire Local Transport Plan.</p> <p>Part C indicates the relevant parking standards to be complied with in respect of different types of proposals.</p>	<p><b>Chapter 10:</b> Traffic and Transportation</p>

### The Sturton Ward Neighbourhood Plan 2015-2030 (December 2015)

- 5.3.31 The Sturton Ward Neighbourhood Plan makes reference to the West Burton Power Station Site. **Table 5-3** details where in the PEI Report consideration has been given to the relevant considerations.

**Table 5-3: Relevant Neighbourhood Planning Policies**

Policy Reference	Policy Wording	Topic Specific Chapter
Policy 1: Sustainable Development	<p><i>“All development over the Plan period will be required to minimise its environmental impact and, where applicable, to improve access to the countryside and open spaces for residents.”</i></p> <p><i>“Development proposals will be supported at a scale and in locations that accord with policies set out in the Sturton Ward Neighbourhood Plan where it can be shown that such development would support the continued sustainability and viability of the Plan area.”</i></p>	<b>Chapter 13:</b> Socio-Economics and <b>Chapter 15:</b> Sustainability and Climate Change
Policy 2: Conservation and Enhancement of Existing Natural Features	<p><i>“Development will be permitted where it fulfils all the relevant criteria listed:</i></p> <ul style="list-style-type: none"> <li><i>- protects and enhances designated wildlife sites and landscape distinctiveness; as identified in Appendix G5; and-</i> retains features of high conservation or landscape value including mature trees, hedgerows, species rich grasslands, ponds and wetlands, and woodlands; and</li> <li><i>- introduces or safeguards boundary treatments that are sympathetic to maintaining and enhancing biodiversity on new development or as part of alterations to existing development. Incorporating native species of tree and shrub and provision of bat boxes will be particularly encouraged.”</i></li> </ul> <p><i>The policy also states that “development on sites either adjoining existing settlements or in the open country side must assess the impact of the proposals upon the local biodiversity and if there is a significant loss of trees and shrubs as part of the development then new provision will be expected elsewhere.”</i></p>	<b>Chapter 9:</b> Ecology
Policy 3: Design Principles	<p><i>“New development will be supported where it demonstrates:</i></p> <ul style="list-style-type: none"> <li><i>- layouts that maximise opportunities to integrate development with the existing settlements through creating new connections and improving existing ones to and from new development; and</i></li> <li><i>- consideration of local character in terms of street types, building detailing, colours, shapes and materials, landscaping and relationships between public and private spaces and how these might be used; and</i></li> <li><i>- designs that draw up and reflect local character including building design, mass, and the use of traditional and vernacular materials.”</i></li> </ul>	<b>Chapter 4:</b> Description of Development and all topic Chapters <b>6 – 15</b>

Policy Reference	Policy Wording	Topic Specific Chapter
Policy 4: Protecting the Historic Environment	<i>“Planning applications will be supported where they preserve or enhance conservation areas, listed buildings and other heritage assets.”</i>	<b>Chapter 14:</b> Cultural Heritage
Policy 12: Reducing the Risk of Flooding	<p>This policy states that all development proposals, other than residential extensions and other minor development within settlements listed in the policy, will be required to demonstrate:</p> <p><i>“the development proposed will not have a detrimental impact on the foul and surface water drainage infrastructure and... does not increase the rate of surface water run-off and increase flood risk in the area”.</i></p> <p>Additionally, the Proposed Development will be required to protect existing watercourses and land drainage systems.</p>	<b>Chapter 12:</b> Flood Risk, Hydrology and Water Resources and associated appendix, <b>Appendix 12.1</b> Flood Risk Assessment PEI Report Volume II)
Policy 14: Energy Efficiency and Sustainability	The policy states that proposals which harness the waste heat from commercial operations for the purpose of providing renewable energy for the benefit of community will be encouraged. It goes on to state the <i>‘West Burton and Cottam power stations represent the most obvious opportunities’</i> for initiatives to supply waste heat for the benefit of the community.	Not relevant

## 5.4 Summary

- 5.4.1 The NPSs establish the primary basis on which the Secretary of State is required to determine NSIP applications. For this Project the relevant NPSs are: the Overarching National Policy Statement for Energy (EN-1) (Ref 5-3); and the National Policy Statement for Fossil Fuel Electricity Generating Infrastructure (EN-2) (Ref 5-4).
- 5.4.2 The Application will include a Planning Statement that details a full assessment of the Proposed Development in the context of relevant planning policy.

## 5.5 References

- Ref 5-1 HM Government (2008) The Planning Act 2008. Available from: [http://www.legislation.gov.uk/ukpga/2008/29/pdfs/ukpga\\_20080029\\_en.pdf](http://www.legislation.gov.uk/ukpga/2008/29/pdfs/ukpga_20080029_en.pdf)
- Ref 5-2 HM Government (2011), The Localism Act 2011. Available from: [http://www.legislation.gov.uk/ukpga/2011/20/pdfs/ukpga\\_20110020\\_en.pdf](http://www.legislation.gov.uk/ukpga/2011/20/pdfs/ukpga_20110020_en.pdf)
- Ref 5-3 Department of Energy and Climate Change (2011), Overarching National Policy Statement for Energy (EN-1). Available from: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/47854/1938-overarching-nps-for-energy-en1.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf)
- Ref 5-4 Department of Energy and Climate Change (2011), National Policy Statement for Fossil Fuel Electricity Generating Infrastructure (EN-2). Available from: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/47855/1939-nps-for-fossil-fuel-en2.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/47855/1939-nps-for-fossil-fuel-en2.pdf)
- Ref 5-5 Department for Communities and Local Government (2012), National Planning Policy Framework (NPPF). Available from: <https://www.gov.uk/government/publications/national-planning-policy-framework--2>
- Ref 5-6 Department for Communities and Local Government (2016) Planning Practice Guidance. Available from: <https://www.gov.uk/government/collections/planning-practice-guidance>
- Ref 5-7 Nottinghamshire County Council (2011) Nottinghamshire Local Transport Plan 2011-2026. Available at: <http://www.nottinghamshire.gov.uk/transport/public-transport/plans-strategies-policies/local-transport-plan#ltps>
- Ref 5-8 Bassetlaw District Council (2011), Bassetlaw District Core Strategy & Development Policies DPD. Available at: <http://www.bassetlaw.gov.uk/media/105902/CS1AdoptedCoreStrategy.pdf>
- Ref 5-9 Sturton Ward Planning Group (2015) The Sturton Ward Neighbourhood Plan 2015-2030. Available at: <https://www.bassetlaw.gov.uk/media/500820/Sturton-Ward-Neighbourhood-Plan-Examiners-Report.pdf>
- Ref 5-10 Central Lincolnshire Joint Strategic Planning Committee (2017) The Central Lincolnshire Local Plan 2012-2036. Available at: <https://www.n-kesteven.gov.uk/central-lincolnshire/local-plan/>
- Ref 5-11 Lincolnshire County Council (2013) The Lincolnshire Local Transport Plan 2013/14 to 2022/23. Available at: <https://www.lincolnshire.gov.uk/transport-and-roads/strategy-policy-and-licences/local-transport-plan/34380.article>
- Ref 5-12 Derby, Derbyshire, Nottingham and Nottinghamshire (D2N2) (2014) Local Enterprise Partnership (LEP) Strategic Economic Plan. Available at: <http://www.d2n2lep.org/Growth>

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## 6. Air Quality

### 6.1 Introduction

6.1.1 This chapter of the Preliminary Environmental Information (PEI) Report addresses the potential effects of the proposed gas-fired power station near Gainsborough, Nottinghamshire (the Proposed Development) on air quality. The assessment considers:

- the present-day and future baseline conditions during construction and at opening;
- the effects of construction of the Proposed Development on air quality for human health and ecosystems, with respect to associated construction traffic, construction plant emissions and construction dust;
- the effects of operational process emissions associated with the Proposed Development on air quality for human health and ecosystems; and
- the cumulative effects of emissions associated with the Proposed Development and other committed developments in the vicinity.

6.1.2 This chapter is supported by **Figures 6.1-6.5**, provided in PEI Report Volume III and **Appendix 6A** provided in PEI Report Volume II.

### 6.2 Legislation, Planning Policy and Guidance

#### Legislative Background

##### *Air Quality Legislation*

6.2.1 The principal air quality legislation within the United Kingdom (UK) is the Air Quality Standards Regulations 2010 (Ref 6-1), which transposes the requirements of the European Ambient Air Quality Directive 2008 (European Commission, 2008) and the 2004 fourth Air Quality Daughter Directive (European Commission, 2004). The Regulations set air quality limits for a number of major air pollutants that have the potential to impact public health, such as nitrogen dioxide (NO<sub>2</sub>), carbon monoxide (CO) and particulate matter (PM<sub>10</sub>, which is particulate matter of 10µm diameter or less). The Regulations also include an exposure reduction objective for PM<sub>2.5</sub> in urban areas and a national target value for PM<sub>2.5</sub> (PM<sub>2.5</sub> is particulate matter of 2.5µm diameter or less).

6.2.2 The Environment Act 1995 requires the UK Government to produce a national air quality strategy (NAQS), last reviewed in 2007 (Department for Environment, Food and Rural Affairs (Defra), 2007) (Ref 6-2), containing air quality objectives and timescales to meet those objectives. These objectives apply to outdoor locations where people are regularly present and do not apply to occupational, indoor or in-vehicle exposure. It requires Local Authorities to undertake an assessment of local air quality to establish whether the objectives are being achieved, and to designate air quality management areas (AQMA) if improvements are necessary to meet the objectives. Where an AQMA has been designated, the Local Authority must draw up an air quality action plan (AQAP) describing the measures that will be put in place to assist in achieving the objectives. Defra has responsibility for coordinating assessments and AQAPs for the UK as a whole.

6.2.3 The current objectives and assessment criteria applicable in this assessment for the protection of human health are presented in **Table 6-1**. Concentrations are expressed in micrograms per cubic metre (µg/m<sup>3</sup>), unless otherwise stated.

**Table 6-1: National air quality strategy (NAQS) objectives – protection of human health**

Pollutant	Objective (µg/m <sup>3</sup> )	Averaging Period	Percentile (to be met by date)
Nitrogen dioxide (NO <sub>2</sub> )	200	1-hour mean	99.79 <sup>th</sup> [or not to be exceeded more than 18 times/year] (31 Dec 2005)
	40	Annual mean	(31 Dec 2005)
Particulate matter (PM <sub>10</sub> )	50	24-hour mean	90.4 <sup>th</sup> [or not to be exceeded more than 35 times/ year] (31 Dec 2004)
	40	Annual mean	(31 Dec 2004)
Particulate matter (PM <sub>2.5</sub> )	24	Annual mean	(2020)
Carbon monoxide (CO)	10,000	8-hour, daily running mean	(31 Dec 2003)

6.2.4 For the protection of vegetation and ecosystems, a number of Critical Levels have been developed; Critical Levels are defined as “concentrations of pollutants in the atmosphere above which direct adverse effects on...plants [and] ecosystems...may occur according to present knowledge” (Ref 6-21). The Critical Levels applicable to this assessment are shown in **Table 6-2**.

**Table 6-2: Critical Levels – protection of vegetation and ecosystems**

Pollutant	Objective (µg/m <sup>3</sup> )	Averaging Period	Percentile (to be met by date)
Oxides of nitrogen (NO <sub>x</sub> )	75	Daily mean	-
	30*	Annual mean	-

\* denotes objective set in Air Quality Standards Regulations 2010

6.2.5 In addition to the above Critical Levels set in the legislation, there are non-legislative limits, called Critical Loads that have been derived for different habitats covering the deposition of nitrogen and acidifying species; Critical Loads are defined as “a quantitative estimate of exposure to one or more pollutant below which significant harmful effects on specified elements of the environment do not occur according to present knowledge” (Ref 6-21). These are discussed further in **Section 6.3** and habitat-specific Critical Loads are presented in **Appendix 6A** (PEI Report Volume II).

### Environmental Permitting Regulations

6.2.6 The Environmental Permitting (England and Wales) Regulations 2016 (EPR) (Ref 6-3) apply to all new installations and transpose the requirements of the EU Industrial Emissions Directive (IED) (European Commission, 2010) (Ref 6-4) into UK legislation. Under the IED and EPR, the operator of an installation covered by the IED is required to employ Best Available Techniques (BAT) for the prevention or minimisation of emissions to the environment, to ensure a high level of protection of the environment as a whole. Generating stations exceeding 50 MW thermal input rating (50 MWth) (such as the Proposed Development) are covered by the IED and EPR.

6.2.7 Where legislative ambient air quality limits or objectives are not specified for the pollutant species potentially released from the Proposed Development, Environmental Assessment Levels (EALs), published in the Environment Agency’s (EA) Risk Assessments for Specific Activities: Environmental Permits guidance (Defra and EA, 2016) can be used to assess potential health

effects on the general population. The EALs applicable in this assessment for the protection of human health from pollutants that could be emitted from the Proposed Development are presented in **Table 6-3**.

**Table 6-3: Environmental Assessment Levels (EALs) – protection of human health**

Pollutant	Objective (µg/m <sup>3</sup> )	Averaging Period	Percentile (to be met by date)
Carbon monoxide	30,000	1-hour mean	-

**Industrial Emissions Directive**

- 6.2.8 The IED (European Commission, 2010) provides operational limits and controls to which plant must comply, including Emission Limit Values (ELVs) for pollutant releases to air. The operational generating station at the Proposed Development would fall under the Large Combustion Plant (LCP) requirements (Chapter III) of the IED, since it would be greater than 50 MWth in capacity.
- 6.2.9 In addition, European BAT reference documents (BRefs) are published for each industrial sector regulated under the IED, and they include BAT-Achievable Emission Values (BAT-AELs) which are expected to be met through the application of BAT. These values may be the same as those published in the IED, or they may be more stringent. The current version of the LCP BRef has been in publication since July 2006. However, this BRef is currently undergoing revision and a final draft of the revised LCP BRef was issued in June 2016 (European Commission, 2016) (Ref 6-5), with the final version expected to be published around September 2017. As the BAT-AELs to be published in the final version are not known at this stage, the IED ELVs and current BRef performance levels have been applied in this assessment. This approach is conservative for the impact assessment, since the revised BRef will either maintain current performance levels or improve them.

**Planning Policy Context**

**National Planning Policy**

- 6.2.10 National Policy Statements (NPS) are, where in place, the primary basis for the assessment and determination of applications for nationally significant infrastructure projects (NSIPs), such as the Proposed Development. The Overarching National Policy Statement on Energy EN-1 (Department of Energy and Climate Change, 2011) (Ref 6-6) states:

*“The planning and pollution control systems are separate but complementary. The planning system controls the development and use of land in the public interest...Pollution control is concerned with preventing pollution through the use of measures to prohibit or limit the releases of substances to the environment from different sources to the lowest practicable level. It also ensures that ambient air and water quality meet standards that guard against impacts to the environment or human health.*

*In considering an application for development consent, the [Secretary of State] should focus on whether the development itself is an acceptable use of the land, and on the impacts of that use, rather than the control of processes, emissions or discharges themselves. The [decision maker] should work on the assumption that the relevant pollution control regime and other environmental regulatory regimes...will be properly applied and enforced by the relevant regulator.”* (paragraphs 4.10.2-4.10.3)

- 6.2.11 EN-1 requires the consideration of significant air emissions, their mitigation and any residual effects, the predicted absolute emission levels after application of mitigation, the relative change in air quality from existing concentrations and any potential eutrophication impacts as a result of the

Proposed Development project stages, including contributions from additional road traffic. Where a project could result in deterioration in air quality in an area where national air quality limits are not being met, or may lead to a new area breaching national air quality limits, or where substantial changes in air quality concentrations are predicted, such effects would be expected to be given substantial weight in consideration of the acceptability of the proposal. Where a project is likely to lead to a breach of statutory air quality limits the developer should work with the relevant authorities to secure appropriate mitigation measures to allow the proposal to proceed.

6.2.12 The Overarching National Policy Statement on Fossil Fuel Electricity Generating Infrastructure EN-2 (Department of Energy and Climate Change, 2011) (Ref 6-7) states:

*“Fossil fuel generating stations are likely to emit nitrogen oxides (NO<sub>x</sub>) and sulphur oxides (SO<sub>x</sub>), although SO<sub>x</sub> emissions from gas-fired generating stations may be negligible. To meet the requirements of the Large Combustion Plant Directive (LCPD) and the Industrial Emissions Directive (IED) when it comes into force, fossil fuel generating stations must apply a range of mitigation to minimise NO<sub>x</sub> and other emissions.”* (paragraphs 4.10.2-4.10.3)

6.2.13 **Table 6-4** provides a summary of relevant NPS advice regarding air quality and emissions and presents an assessment of where matters are assessed within this chapter.

**Table 6-4: Summary of relevant NPS advice regarding air quality and emissions**

Summary of NPS	Consideration within the Chapter
<b>NPS EN-1</b>	
Paragraph 5.2.1 states: “Air emissions include particulate matter (for example dust) up to a diameter of ten microns (PM <sub>10</sub> ) as well as gases such as sulphur dioxide, carbon monoxide and nitrogen oxides (NO <sub>x</sub> ). Levels for pollutants in ambient air are set out in the Air Quality Strategy which in turn embodies EU legal requirements. The Secretary of State for the Environment Food and Rural Affairs is required to make available up to date information on air quality to any relevant interested party”.	Particulate emissions as well as those of nitrogen oxides have been included in the assessment of construction, traffic and operational air impacts. Carbon monoxide emissions will be considered in the Environmental Statement (ES). Sulphur dioxide emissions are negligible from a gas-fired power station. Consideration has also been given to baseline air quality conditions in the locality.
Paragraph 5.2.2 states: “CO <sub>2</sub> emissions are a significant adverse impact from some types of energy infrastructure which cannot be totally avoided”. “Any ES on air emissions will include an assessment of CO <sub>2</sub> emissions, but the policies set out in Section 2, including the EU ETS, apply to these emissions”.	An assessment of carbon emissions is included in <b>Appendix 15A: Greenhouse Gas Assessment</b> (Volume II of the PEI Report).
Paragraph 5.2.3 states: “A particular effect of air emissions from some energy infrastructure may be eutrophication, which is the excessive enrichment of nutrients in the environment.”	Air quality impacts on designated ecological receptors associated with nitrogen deposition have been assessed in <b>Section 6.6</b> .
Paragraph 5.2.4 states: “Design of exhaust stacks, particularly height, is the primary driver for the delivery of optimal dispersion of emissions and is often determined by statutory requirements”.	Stack height evaluation is assessed in <b>Section 6.6</b> and <b>Appendix 6A</b> (Volume II of the PEI Report).

Summary of NPS	Consideration within the Chapter
<p>Paragraph 5.2.7 states: “The ES should describe: any significant air emissions, their mitigation and any residual effects distinguishing between the project stages and taking account of any significant emissions from any road traffic generated by the project; the predicted absolute emission levels of the proposed project, after mitigation methods have been applied; existing air quality levels and the relative change in air quality from existing levels; any potential eutrophication impacts”</p>	<p>The air quality impacts of all project stages have been assessed in this chapter including consideration of residual effects in <b>Section 6.9</b>.</p>
<b>NPS EN-2</b>	
<p>Paragraph 2.5.3 states: “Fossil fuel generating stations are likely to emit nitrogen oxides (NO<sub>x</sub>) and sulphur oxides (SO<sub>x</sub>), although SO<sub>x</sub> emissions from gas-fired generating stations may be negligible... fossil fuel generating stations must apply a range of mitigation to minimise NO<sub>x</sub> and other emissions.”</p>	<p>Nitrogen oxide emissions have been considered in the assessment of operational air impacts. Sulphur dioxide emissions are negligible from a gas-fired power station. Consideration has also been given to baseline air quality conditions in the locality and the emission limit values that are achievable for the proposed plant technology, based on legislative limits and use of Best Available Techniques (BAT).</p>
<p>Paragraph 2.5.5 states: “The applicant should carry out an assessment as required in EN-1, consulting the EA and other statutory authorities at the initial stages of developing their proposals, as set out in EN-1 Section 4.2.”</p>	<p>The air quality impacts of all project stages have been assessed in this chapter and presented in <b>Section 6.6</b>.</p>
<p>Paragraph 2.5.7 states: “Mitigation will depend on the type of generating station. However, Flue Gas Desulphurisation (FGD) and Selective Catalytic Reduction (SCR) will have additionally adverse impacts for noise and vibration, release of dust and handling of potentially hazardous materials, for example the ammonia used as a reagent.”</p>	<p>No SCR or FGD use is proposed for this peaking plant as the emission limit values set by legislation and use of BAT are achievable through primary means without the use of such secondary abatement techniques.</p>

6.2.14 **Table 6-5** provides a summary of relevant NPS advice regarding dust, odour, artificial light, smoke, steam and insect infestation.

**Table 6-5: Summary of relevant NPS advice regarding Dust, odour, artificial light, smoke, steam and insect infestation**

Summary of NPS	Consideration within the Chapter
<b>NPS EN-1</b>	
<p>Paragraph 5.6.4 states: “<i>The applicant should assess the potential for insect infestation and</i></p>	<p>The operation of the proposed gas-fired power station is not considered to have the potential</p>

Summary of NPS	Consideration within the Chapter
<p><i>emissions of odour, dust, steam, smoke and artificial light to have a detrimental impact on amenity, as part of the Environmental Statement.”</i></p>	<p>to cause insect infestation, odour, dust, steam or smoke impacts based on the choice of fuel and nature of plant operation. Management of artificial light will be controlled at the detailed design stage in accordance with a draft outline Lighting Strategy that will be prepared to accompany the DCO application. The Lighting Strategy would be secured by way of a Requirement of the DCO.</p>
<p>Paragraph 5.6.5 states: <i>“In particular, the assessment provided by the applicant should describe:</i></p> <ul style="list-style-type: none"> <li>- <i>The type, quantity and timing of emissions;</i></li> <li>- <i>Aspects of the development which may give rise to emissions;</i></li> <li>- <i>Premises or locations that may be affected by the emissions;</i></li> <li>- <i>Effects of the emission on identified premises or locations; and</i></li> <li>- <i>Measures to be employed in preventing or mitigating the emissions.”</i> </li></ul>	<p>The air impact assessment details the identified sensitive receptors in the vicinity of the Site, the current baseline air quality conditions, the assumptions regarding the nature, duration and scale of emissions, and the predicted effect of emissions on identified sensitive receptors, using the Rochdale Envelope and conservative assumptions where necessary in order to present a worst-case scenario. Embedded mitigation measures are also included.</p>
<p>Paragraph 5.6.6 states: <i>“The applicant is advised to consult the relevant local planning authority and, where appropriate, the EA about the scope and methodology of the assessment.”</i></p>	<p>The LPA and the EA have been consulted at Stage 1 of the consultation and through the Scoping Report regarding the proposed approach to assessment of air impacts and they will be further consulted on this PEI at Stage 2 consultation.</p>

6.2.15 The National Planning Policy Framework (NPPF) was published in March 2012 (Department for Communities and Local Government (DCLG), 2012a) (Ref 6-8) and states:

*“The planning system should contribute to and enhance the natural and local environment by: ...preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability...”* (paragraph 109)

6.2.16 Annex 2 of the NPPF defines ‘Pollution’ as *‘anything that affects the quality of land, air, water or soils, which might lead to an adverse impact on human health, the natural environment or general amenity. Pollution can arise from a range of emissions, including smoke, fumes, gases, dust, steam, odour, noise and light’.*

6.2.17 There are both national and local policies for the control of air pollution and local action plans for the management of local air quality within the Bassetlaw District Council (BDC) and West Lindsey District Council (WLDC) areas. The effect of the Proposed Development on the achievement of such policies and plans are matters that may be a material consideration by decision-making authorities, when determining individual applications for planning and development consent, stating:

*“Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning*

*decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan.” (paragraph 124)*

- 6.2.18 The NPPF is accompanied by Technical Guidance to the National Planning Policy Framework (NPPF-TG) (DCLG, 2012b). The NPPF does not include any specific guidance for the assessment of air quality impacts from combustion activities, but does provide some broader guidance on assessments of dust impacts from mineral extraction sites that have been cited in the construction methodology of this assessment. Paragraph 3 of the NPPF is clear that it does not contain specific policies for NSIPs and these are to be determined in accordance with the decision making framework set out in the Planning Act 2008 and relevant NPSs, as well as any other matters that are considered both important and relevant. The NPPF may be considered by the Secretary of State to be important and relevant, and hence this assessment has had regard to its policies.

### **Local Development Plan Policy**

- 6.2.19 Similarly local planning policy may be something which the Secretary of State considers is both important and relevant to the determination of the application for the Proposed Development.
- 6.2.20 Bassetlaw District Council Core Strategy and Development Management Policies DPD (adopted December 2011) constitute the current local development plan (Ref 6-9) and include proposed policy approaches to conservation and enhancement of biodiversity.
- 6.2.21 Sturton Ward Neighbourhood Plan (Ref 6-10) includes a Community Objective to ‘*protect and enhance the best of Sturton Ward’s environmental assets to...promote biodiversity*’ and includes Policy 2: Conservation and Enhancement of Existing Natural Features, which outlines the criteria for permitted development.
- 6.2.22 In 2017, the Central Lincolnshire Local Plan was adopted (Ref 6-11), including the key environmental objective (Objective J.) of which is ‘*to minimise pollution (air, noise and light) and improve air quality*’, and Policy LP26: Design and Amenity which states:

*“All development proposals...should demonstrate, where applicable and to a degree proportionate to the proposal, how the following matters have been considered, in relation to both the construction and life of the development: Adverse impact upon air quality from odour, fumes, smoke, dust and other sources.”*

### **Other Guidance**

- 6.2.23 The EA Risk Assessments for Specific Activities: Environmental Permits guidance (Ref 6-12, Defra and EA, 2016) provides guidance on the assessment of Best Available Techniques and of impacts from permitted installations, primarily for the purposes of Environmental Permitting.
- 6.2.24 Defra has also published technical guidance (Defra, 2016a) to assist local authorities in fulfilling their duties in relation to Local Air Quality Management. Parts of this guidance, and associated tools, are also useful in assessing the impacts of individual developments within the planning process.
- 6.2.25 The Institute of Air Quality Management (IAQM) in collaboration with Environmental Protection UK (EPUK) has published several guidance documents relating to planning and development works, including:
- ‘Land-Use Planning & Development Control: Planning For Air Quality’ (Ref 6-13), which describes the indicative criteria to trigger the initiation of an air quality assessment for a development, together with guidance on the content of an air quality assessment, impact description and significance determination with reference to air quality standards; and

- ‘Guidance on the assessment of dust from demolition and construction’ (Ref 6-14), which presents guidance on qualitative assessment of risk of dust emissions from construction and demolition activities and the level of good practice mitigation that should be applied.

## 6.3 Assessment Methodology and Significance Criteria

### Consultation

- 6.3.1 The consultation undertaken with statutory consultees to inform this chapter, including a summary of comments raised via the formal scoping opinion (Ref 6-15) is summarised in **Table 6-6**.

**Table 6-6: Consultation Summary Table**

Consultee or organisation approached	Date and nature of consultation	Summary of Response	How comments have been addressed
Secretary of State	June 2017 (scoping opinion)	<p>3.28 The SoS considers that the modelling must assess the full range of potential options to be brought forward at DCO application. The worst-case operational scenario(s) must be assessed and all assumptions and/or limitations to the assessment clearly stated. This should include any cumulative effects arising from the operation of WBA and WBB power stations.</p> <p>3.29 The SoS expects the ES to provide a clear link between the assessment parameters used to define the worst-case and the relevant parameters described in the DCO (e.g. stack height/diameter).</p> <p>3.30 Scoping Report paragraphs 3.1.14 and 3.1.15 discuss the potential inclusion of black start capability within the Proposed Development.</p> <p>This is not referenced within the air quality scope but would need to be considered as part of modelling study, in particular the longer term and more frequent use of the black start facility as an emergency supply.</p> <p>3.31 Scoping Report paragraph 5.2.12 refers to the Design Manual for Roads and Bridges (DMRB) screening model for construction traffic.</p> <p>The SoS considers that the Applicant should justify the use of DMRB screening criteria, when more recent Environmental Protection UK and Institute of Air Quality Management (IAQM) Guidance is available that may be more applicable to the scale and nature of the project.</p> <p>3.32 The SoS welcomes the proposed assessment of construction dust and</p>	<p>The assessment has included the full range of potential options to be brought forward at DCO application and the worst-case are reported in <b>Section 6.6</b>.</p> <p>The cumulative effects of WBA and WBB have been considered with reference to previous modelling results for the combined stations, reported in <b>Section 6.6</b>. More detailed sensitivity analysis will be undertaken in the ES.</p> <p>The assumptions relating to the worst-case assessment are stated in <b>Sections 6.3 and 6.6</b>;</p> <p>It is not possible to accurately predict the likely frequency or duration of black-start events. However, historically, black-start events have been very infrequent in the UK. The potential air impacts of black</p>

Consultee or organisation approached	Date and nature of consultation	Summary of Response	How comments have been addressed
		<p>mobile plant emissions using IAQM guidance but queries why the Applicant proposes to adopt the “Guidance on the Assessment of Mineral Dust Impacts for Planning” rather than “Guidance on the assessment of dust from demolition and construction” IAQM 2014, which provides clear significance criteria for construction and demolition works.</p> <p>3.33 The Applicant makes reference to the use of AECOM quantitative significance criteria in Scoping Report paragraph 5.2.15. In the absence of presenting these criteria, the SoS is unable to comment on their appropriateness. Any significance criteria should be based on recognised standards and robustly justified. The assessment should be made in accordance with NPS EN-1 and the Applicant should identify any substantial changes in air quality relative to the baseline and the absolute emissions levels of the proposed development after mitigation methods have been applied.</p> <p>3.34 Scoping Report paragraph 5.2.13 states that mitigation measures to minimise effects will be recommended “where necessary”. The SoS expects that appropriate measures would be outlined in a draft CEMP, Air Quality Management Plan (AQMP) or equivalent submitted as part of the DCO application and secured through a requirement in the draft DCO. Construction and operational mitigation measures should be clearly distinguished.</p> <p>3.53 When considering the effects of emissions to air on designated and non-statutory sites, the Applicant should refer to EA guidance – EA Guidance 1 ‘Air emissions risk assessment for your environmental permit’. This is available from <a href="https://www.gov.uk/guidance/airemissions-risk-assessment-for-yourenvironmental-permit">https://www.gov.uk/guidance/airemissions-risk-assessment-for-yourenvironmental-permit</a>.</p> <p>3.54 The EA guidance states that “some larger (greater than 50 megawatt) emitters may be required to screen to 15km for European sites and to 10km or 15km for SSSIs”. The SoS expects to see justification within the ES for the defined</p>	<p>start operation are considered to be less than those from normal plant operation due to the short duration of black start operation.</p> <p>The most recent guidance documents have been reviewed and the assessment carried out with reference to these guidance methodologies in relation to construction dust and mobile plant emissions, construction traffic emissions and operational point source emissions as described in <b>Section 6.3</b>.</p> <p>The significance criteria used within the assessment are based on the aforementioned guidance documents and are stated in the methodology as described in <b>Section 6.3</b>.</p> <p>Predicted changes in air quality relative to the baseline and the absolute emission levels, with application of mitigation as necessary, have been provided in <b>Sections 6.4 and 6.6</b>.</p> <p>A framework Construction Environmental</p>

Consultee or organisation approached	Date and nature of consultation	Summary of Response	How comments have been addressed
		<p>distances used in the assessment in accordance with this guidance and agreement with the EA and NE as to the approach. In line with NPS-EN1 and NPS-EN2 the Applicant should consider the effect of eutrophication on sensitive habitats.</p>	<p>Management Plan (CEMP) will be submitted as part of the ES as described in <b>Section 6.5</b>. The assessment of effects of emissions to air on designated and non-statutory sites has been made with reference to the relevant EA guidance, as described in <b>Sections 6.3 and 6.6</b>. At this stage of design, the effects on receptors within 2km of the Proposed Development have been assessed and for completeness the study area will be extended up to 10km from the power plant area for the ES.</p>
BDC /WLDC/ NCC	June 2017 (scoping opinion)	<p>WLDC considered the approach in section 5.2 of the Scoping Report to be acceptable.</p> <p>BDC and NCC provided no specific comments relating to air quality.</p>	Not applicable.
EA	24 May 2017	<p>Representatives of the Environment Agency were provided with a short presentation and invitation to provide comments on the proposed approach, including whether it would be appropriate for the EA AQMAU to review the proposed modelling approaches.</p>	<p>The EA did not confirm a desire for the AQMAU to review the modelling approach prior to the PEI Report being issued.</p>

## Assessment Methods

- 6.3.2 The potential emissions to air from construction and, at time of opening, from the Proposed Development have been determined or estimated, and key local receptors have been identified, together with the current local ambient air quality. The potential concentrations resulting from the projected emissions arising from the operational Proposed Development have been predicted

using atmospheric dispersion modelling techniques where appropriate, which has enabled the assessment of the impacts associated with the Proposed Development on the existing local ambient air quality and in particular on the identified sensitive receptors. The assessment methodology for each type of emission is detailed below.

- 6.3.3 In particular the process and traffic emissions assessments have been made with reference to the NAQs and objectives laid out in the Air Quality Standards Regulations (Ref 6-1).

#### **Assessment of Dust Emissions Generated During Construction Works**

- 6.3.4 'Dust' is defined in British Standard (BS) 6069-2:1994 (BSI, 1994) (Ref 6-16) as particulate matter in the size range  $1\mu\text{m}$  -  $75\mu\text{m}$  (microns) in diameter, and is primarily composed of mineral materials and soil particles. This definition is also referred to in NPPF technical guidance (DCLG, 2012b) (Ref 6-17) in the context of dust impacts from mineral extraction operations. Although this document has now been withdrawn and replaced by the Planning Practice Guidance (PPG) (Ref 6-18), the latter PPG provides no definition of dust. As such, the BS (Ref 6-16) definition has been adopted in this assessment.
- 6.3.5 Respirable particulate matter ( $\text{PM}_{10}$ ) is composed of material with an aerodynamic diameter of less than  $10\mu\text{m}$ , and includes the size fractions of greatest impacts on human health. The majority of construction dust is larger than  $10\mu\text{m}$  in diameter and, therefore are typically associated with material depositing onto property and potential amenity effects, although there is evidence that  $\text{PM}_{10}$  and  $\text{PM}_{2.5}$  (material with an aerodynamic diameter of less than  $2.5\mu\text{m}$ ) emissions may result from construction and demolition activities. Particulate matter may therefore have an effect whilst airborne, or as a result of its deposition onto a surface. Consequently the nature of the impact requiring assessment varies between different types of receptor.
- 6.3.6 The movement and handling of soils and spoil during the Proposed Development construction activities is anticipated to lead to the generation of some short-term airborne dust. The occurrence and significance of dust generated by earth moving operations is difficult to estimate, and depends heavily upon the meteorological and ground conditions at the time and location of the work, and the nature of the actual activity being carried out.
- 6.3.7 At present, there is no statutory UK or EU standards relating to the assessment or control of dust. The emphasis of the regulation and control of construction dust should be the adoption of Best Practicable Means (BPM) of working on site. It is intended that significant adverse environmental effects are avoided at the design stage and through embedded mitigation where possible, including the use of good working practices to minimise dust formation.
- 6.3.8 The IAQM provides guidance for good practice qualitative assessment of risk of dust emissions from construction and demolition activities (Ref 6-14). The guidance considers the risk of dust emissions from unmitigated activities to cause human health ( $\text{PM}_{10}$ ) impacts, dust soiling impacts, and ecological impacts (such as physical smothering, and chemical impacts for example from deposition of alkaline materials). The appraisal of risk is based on the scale and nature of activities and on the sensitivity of receptors, and the outcome of the appraisal is used to determine the level of good practice mitigation required for adequate control of dust.
- 6.3.9 The assessment undertaken for this chapter is consistent with the overarching approach to the assessment of the impacts of construction, and the application of example descriptors of impact and risk set out in IAQM guidance. It considered the significance of potential impacts with no mitigation, and recommends mitigation measures appropriate to the identified risks to receptors. The steps in the assessment are to:
- identify receptors within the screening distance of the Site boundary;

- identify the magnitude of impact through consideration of the scale, duration and location of activities being carried out (including demolition, earthworks, construction and trackout) as part of the Proposed Development;
- establish the sensitivity of the area through determination of the sensitivity of receptors and their distance from construction activities;
- determine the risk of significant impacts on receptors occurring as a result of the magnitude of impact and the sensitivity of the area, assuming no additional mitigation (beyond the identified development design and impact avoidance measures) is applied;
- determine the level of mitigation required based on the level of risk, to reduce potential impacts at receptors to insignificant or negligible; and
- summarise the potential residual effects of the mitigated works.

6.3.10 The criteria for assessment of magnitude, sensitivity and risk are summarised in **Tables 6A.5-6A.9** in **Appendix 6A** (PEI Report, Volume II).

#### **Assessment of Construction/ Decommissioning and Operational Road Traffic Effects**

- 6.3.11 At the high temperatures and pressures found within vehicle engines, some of the nitrogen in the air and fuel is oxidised to form oxides of nitrogen, mainly in the form of nitric oxide (NO), which is then converted to nitrogen dioxide (NO<sub>2</sub>) in the ambient atmosphere. NO<sub>2</sub> is associated with adverse effects on human health. Similarly but to a lesser extent, any sulphur in the fuel can be converted to sulphur dioxide (SO<sub>2</sub>) that is then released to atmosphere. The incomplete combustion of fuel in vehicle engines results in the presence of hydrocarbons (HC) such as benzene and 1,3-butadiene, as well as the typical combustion products of CO, PM<sub>10</sub>, PM<sub>2.5</sub> in exhaust emissions. Better emission control technology and fuel specifications are expected to reduce emissions per vehicle in the long term.
- 6.3.12 Although SO<sub>2</sub>, CO, benzene and 1,3-butadiene are present in motor vehicle exhaust emissions, detailed consideration of the associated impacts on local air quality is not considered relevant in the context of this Proposed Development. This is because the concentrations of release and the number of vehicles involved are not likely to give rise to significant effects. In particular, no areas within the administrative boundaries of BDC or WLDC are considered to be at risk of exceeding the relevant objectives for these species, and the risks to achievement of the relevant air quality objectives from the Proposed Development are considered negligible. Emissions of SO<sub>2</sub>, CO, benzene and 1, 3-butadiene from road traffic are therefore not considered further within this assessment.
- 6.3.13 The Proposed Development would introduce additional vehicle movements in the Study Area that could have a negative impact on local air quality. IAQM guidance 'Land-Use Planning & Development Control: Planning for Air Quality' (Ref 6-13) sets out indicative criteria to trigger the initiation of an assessment of air quality assessment of a proposed development, including changes in traffic flows (Annual Average Daily Traffic, AADT). The criteria vary, dependent on whether or not the site is located within or may have an impact upon an AQMA. The relevant IAQM criteria are as follows:
- the development will cause a change of Light Duty Vehicle flows, on local roads with relevant receptors, of more than 100 AADT within or adjacent to an AQMA; or more than 500 AADT elsewhere; and
  - the development will cause a change of Heavy Duty Vehicle flows, on local roads with relevant receptors, of more than 25 AADT within or adjacent to an AQMA; or 100 AADT elsewhere.
- 6.3.14 The IAQM 2017 guidance (Ref 6-13) states that the exceedance of the above screening criteria *'does not automatically lead to a requirement for a Detailed Assessment'*; further, in relation to construction phase traffic impacts, the guidance refers to the IAQM's 2014 guidance on

*construction phase impacts (Ref 6-14) which states that 'for site traffic on the public highway, if it cannot be scoped out (for example by using the EPUK's criteria<sup>1</sup>), then it should be assessed using the same methodology and significance criteria as operational traffic impacts.'*

- 6.3.15 The EPUK criteria (Ref 6-19), indicates that an air quality assessment should be considered for developments that include 'large, long-term construction sites that would generate large HGV flows (>200 movements per day) over a period of a year or more'. DMRB HA207/07 guidance (Ref HA, 2007) (Ref 6-20) sets out criteria to establish the need for an air quality assessment. The guidance considers the changes in traffic anticipated as a result of a development, to identify the need for further evaluation or assessment; for example, in the DMRB guidance changes in Annual Average Daily Traffic (AADT) flows of more than 1,000 vehicles or 200 HGV movements are considered further through quantitative assessment. For changes in traffic below these criteria, significant changes in air quality are not expected. This guidance has been referenced for both the construction and opening assessments.
- 6.3.16 The numbers and types of vehicles that would be involved in the decommissioning of the Proposed Development (anticipated to take place in circa 2066) are not known at this stage, however it is anticipated that this would be similar in scale to (or fewer than) the number and types of vehicles and on-site plant as for the construction phase. Therefore the construction phase assessment presented in this chapter is considered to be representative of decommissioning activities.
- 6.3.17 Consideration will be given within the Environmental Statement (ES) assessment to the potential cumulative traffic emissions from the construction of the Proposed Development and other identified cumulative schemes. This is discussed further in **Section 6.9** (Residual Effects) and will be considered in **Chapter 16: Cumulative and Combined Effects of the ES** that accompanies the application for development consent.

#### **Assessment of Emissions Generated from Construction / Decommissioning Site Plant (Non-Road Mobile Machinery)**

- 6.3.18 The construction phase for the Proposed Development could potentially take place in phases and last up to six years, between 2020 and 2026, although construction could take place in a single phase lasting 2-3 years, as described in **Chapter 4: The Proposed Development**.
- 6.3.19 There are likely to be emissions to air during construction activities arising from on-site construction plant or Non-Road Mobile Machinery (NRMM). The IAQM guidance (Ref 6-14) states:
- "Experience of assessing the exhaust emissions from on-site plant ... and site traffic suggests that they are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed. For site plant and on-site traffic, consideration should be given to the number of plant/vehicles and their operating hours and locations to assess whether a significant effect is likely to occur."*
- 6.3.20 The assessment of construction site plant has referenced the IAQM construction dust initial screening criteria (Ref 6-14), which indicates that receptors beyond 350m of a construction site boundary (or 500m from site exit) may be screened out of further assessment; and the Highways Agency DMRB guidance (HA, 2007) (Ref 6-20), which states that only properties and habitat sites within 200m of roads should be considered in traffic assessments, to determine the potential for impacts from the Proposed Development NRMM on sensitive receptors. A qualitative assessment of the potential for impact from NO<sub>2</sub> and PM<sub>10</sub> emissions from NRMM on identified receptors has therefore been made based on the criteria outlined in the above guidance.

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<sup>1</sup> Ref 6-19 EPUK 2010 - Development Control :Planning for Air Quality, 2010 Update

### *Assessment of Operational Process Emissions from the Plant*

- 6.3.21 The IED (Ref 6-4) defines ELVs for gas turbines (including Open-Cycle Gas Turbines (OCGT)) for NO<sub>x</sub>, SO<sub>2</sub>, CO and PM<sub>10</sub>, however emissions of SO<sub>2</sub> and PM<sub>10</sub> from gas-fired plant are at such low levels relative to the air quality objectives that they are considered negligible and the risk to the achievement of the PM<sub>10</sub> and SO<sub>2</sub> air quality objectives is considered negligible. These emissions have therefore been screened from further assessment within the operational process emissions from the plant.
- 6.3.22 Emissions of CO are not expected to be negligible, however based on project experience and professional judgment, emissions of CO at the IED limit do not drive the need for additional mitigation, such as the determination of stack height, and are very unlikely to present a risk to achievement of the NAQS objective or EAL. Emissions of CO have not been assessed at this stage within the PEI Report but will be presented in the ES.
- 6.3.23 The Proposed Development may also provide a 'black-start' capability which would provide the capability to start the selected technology without any assistance from the National Grid electricity transmission system. It is not possible to accurately predict the likely frequency or duration of black-start events. However, historically, black-start events have been very infrequent in the UK. In the event of black start operation, a limited period (several hours) of operation on diesel would be required. While this has the potential to increase SO<sub>2</sub> and PM<sub>10</sub> emissions and change emissions of NO<sub>x</sub> and CO, the infrequent and short term operation of the plant on black start is such that the predicted change in air quality impacts is negligible; therefore no separate assessment of black start impacts has been undertaken for the PEI Report.
- 6.3.24 Emissions from the Proposed Development, assumed to be operational by 2026, have been assessed using the EA Risk assessment methodology (Defra and EA, 2016) (Ref 6-12) in order to identify where proposed emissions can be screened as having a negligible impact. The Proposed Development could become operational as early as 2023, however the impact assessment has been conducted conservatively assuming the current baseline as the opening baseline and the potential impacts from an earlier opening date would therefore be unchanged from those reported in this PEI Report. Detailed dispersion modelling using the atmospheric dispersion model ADMS5.2 has been used to calculate the concentrations of pollutants at identified receptors. These concentrations have been compared with the air quality assessment level for each pollutant species, as summarised in **Table 6.1–6.3**.
- 6.3.25 Dispersion modelling calculates the predicted concentrations arising from the emissions to atmosphere, based on Gaussian approximation techniques. The model employed has been developed for UK regulatory use.
- 6.3.26 The assessment has been based on the operational design parameters for the Proposed Development, including the alternative plant technologies and configurations under consideration for the Proposed Development, using a Rochdale Envelope approach, as described in this section. The worst-case operational scenarios, with respect to the potential air quality impacts, have been determined and are reported in this chapter. The determination of optimum stack height has been driven by the predicted impacts from NO<sub>x</sub>, as described in **Section 6.5**.
- 6.3.27 The assessment of worst-case long-term and short-term emissions resulting from operation of the Proposed Development has been undertaken by comparison of the maximum process contributions at identified sensitive receptors with the NAQS annual mean and hourly mean objectives, and Critical Levels for ecological receptors, taking into consideration the baseline air quality, in accordance with EA risk assessment methodology (Ref 6-12), and factoring the long-term impacts for annual operating hours, which are expected to be no more than 1,500 hours per year.
- 6.3.28 The potential for cumulative impacts from emissions from West Burton A (WBA) Power Station (coal-fired) which is scheduled to close under current legislation by 2025, and emissions from West

Burton B (WBB) gas-fired CCGT station have been considered within the determination of the existing and future baseline. There is also potential for cumulative impacts from additional committed developments in the vicinity of the Proposed Development; these will be considered within **Chapter 16: Cumulative and Combined Effects of the ES**.

- 6.3.29 In addition, the Applicant may also develop a smaller power station (sub-50MW output) on land adjacent to the Proposed Development. In the event that such a scheme is progressed, the potential cumulative impacts from the Proposed Development and the smaller scheme will be assessed, taking into consideration the results of the assessment presented within the ES. These cumulative impacts have not been assessed at this stage as the scope of the sub-50MW scheme is being developed.
- 6.3.30 An assessment of nutrient nitrogen enrichment has been undertaken by applying published deposition velocities to the predicted annual average NO<sub>x</sub> concentrations at the identified statutory habitat sites, determined through dispersion modelling, to calculate nitrogen deposition rates. These deposition rates have then been compared to the Critical Loads for nitrogen published by UK Air Pollution Information System (APIS) (Ref 6-21) for the most sensitive species in each individual habitat site, taking into consideration the baseline air quality.
- 6.3.31 Increases in acidity from deposition contributions of NO<sub>x</sub> from the process contribution have also been considered. In this assessment, the nitrogen kilo equivalent (Keq/ha/yr), which are the units in which acidity Critical Loads are described, have been derived from nitrogen deposition modelling values using standard conversion factors. The acidity deposition rates and baseline deposition rates have been used within the Critical Load Function Tool (Ref 6-21) to determine whether the contribution would result in exceedance of the defined critical levels for the most sensitive feature. Process contributions of SO<sub>2</sub> to the acidity deposition rate have been assumed to be zero as the emissions from the process are negligible. Non-statutory habitat sites have not been assessed as the sensitive species present at these receptors and their associated Critical Loads for nutrient and acid deposition are not on public records.

## Study Area

- 6.3.32 The study area for construction phase impacts has been applied, with reference to the IAQM guidance (Ref 6-14), extending:
- up to 350m beyond the Site boundary and 50m either side of the construction traffic route (for a distance of up to 500m from the Site entrance), for the identification of human health receptors; and
  - up to 50m from the Site boundary or either side of the construction traffic route (for a distance of up to 500m from the Site entrance) for the identification of ecological receptors.
- 6.3.33 The study area for operational phase impacts extends up to 2km from the Proposed Development Power Plant Site in order to assess the potential maximum impacts on sensitive human health and ecological receptors, as in practice, the predicted impacts become negligible beyond this distance; for completeness the study area will be extended to up to 10km from the power plant area for the ES, in line with EA risk assessment methodology (Ref 6-12). This PEI Report, therefore, reports the worst-case air impacts associated with the Proposed Development.

## Significance Criteria

### *Evaluation of Significance – Construction Dust and Emissions from NRMM*

- 6.3.34 For potential amenity effects, such those related to dust deposition, the aim is to bring forward a scheme, to include mitigation measures as necessary, that minimises the potential for complaints to be generated as a result of the Proposed Development construction works.

6.3.35 The IAQM guidance (Ref 6-14) does not provide a method for the evaluation of impacts on receptors from construction dust or exhaust emissions from NRMM, rather a means to determine the level of mitigation required to avoid significant impacts on receptors. The guidance indicates that application of appropriate mitigation should ensure that residual effects will normally be 'not significant'.

**Evaluation of Significance – Traffic Emissions**

6.3.36 The evaluation of the significance of road traffic air quality effects has been based on the criteria set out in the IAQM guidance (Ref 6-13). There are three aspects of a potential effect caused by a development that must be taken into account when assessing its significance. These are:

- the magnitude of the change caused by the Proposed Development;
- the absolute predicted environmental concentration in relation to the air quality objectives (baseline plus Proposed Development scenario); and
- the number and sensitivity of receptors exposed.

6.3.37 Particular significance should be given to a change that takes the concentration from below to above the NAQS objective or vice versa because of the importance ascribed to the objectives in assessing local air quality.

6.3.38 With regard to road traffic emissions, the change in pollutant concentrations with respect to baseline concentrations is described at receptors that are representative of exposure to impacts on local air quality within the study area. The absolute magnitude of pollutant concentrations in the baseline and 'With Development' scenario is also described and this is used to consider the risk of the air quality limit values being exceeded in each scenario.

6.3.39 For a change of a given magnitude, the IAQM (Ref 6-13) has published recommendations for describing the magnitude of impacts at individual receptors and describing the significance of such impacts. This terminology has been changed where appropriate in order to maintain consistency with the rest of this PEI Report – where the IAQM uses 'substantial' this has been changed to 'major', and 'slight' has been changed to 'minor'; other IAQM terms are consistent with those presented in this PEI Report.

**Table 6-7: Air quality impact descriptors for changes in ambient pollutant concentrations of NO<sub>2</sub> and PM<sub>10</sub>**

Long-term average concentration at receptor	Percentage change in annual mean concentration				
	Up to 0.5% Imperceptible	0.5-1% Very low	2-5% Low	6-10% Medium	>10% High
75% or less of AQAL	Negligible	Negligible	Negligible	Minor	Moderate
76-94% of AQAL	Negligible	Negligible	Minor	Moderate	Moderate
95-102% of AQAL	Negligible	Minor	Moderate	Moderate	Major
103-109% of AQAL	Negligible	Moderate	Moderate	Major	Major
110% or more of AQAL	Negligible	Moderate	Major	Major	Major

AQAL = Air Quality Assessment Level (NAQS objective or EU limit value or EAL)

6.3.40 The IAQM guidance (Ref 6-13) is not explicit in the identification of whether the above impact descriptor should be considered 'significant' or 'not significant' effects, rather it indicates that the

descriptors should be applied to individual receptors and a 'moderate' adverse impact at one receptor may not mean that the overall impact has a significant effect; other factors need to be considered. However it indicates further that 'negligible' impacts are likely to lead to effects that are 'not significant' and 'major' impacts describe the potential for 'significant' effects. The judgement of significance of effects adopted within this assessment is discussed below.

### *Evaluation of Significance – Point Source Emissions*

- 6.3.41 The evaluation of the significance of air quality effects from the operational point sources has been based on the criteria set out in the IAQM guidance (Ref 6-13), and on the criteria outlined in the Environment Agency EPR Risk Assessment (Ref 6-12).
- 6.3.42 The IAQM guidance (Ref 6-13) indicates that the Environment Agency threshold criterion of 10% of the short term AQAL is sufficiently small in magnitude to be regarded as having an 'insignificant' effect. The IAQM guidance deviates from the Environment Agency guidance (discussed below) with respect to the background contribution; the IAQM guidance indicates that severity of peak short-term concentrations can be described without the need to reference background concentrations as the process contribution (PC) is used to measure impact, not the overall concentration at a receptor. The peak short-term PC from an elevated source is described as follows:
- PC  $\leq$ 10% of the NAQS represents an 'insignificant' (negligible) impact;
  - PC 11-20% of the NAQS is small in magnitude representing a 'slight' (minor) impact;
  - PC 21-50% of the NAQS is medium in magnitude representing a 'moderate' impact; and
  - PC  $>$ 51% of the NAQS is large in magnitude representing a 'substantial' (major) impact.
- 6.3.43 The Environment Agency EPR Risk Assessment (Ref 6-12) screening criteria for comparison of process contributions with Air Quality Strategy objectives state that an emission may be considered insignificant (or negligible) where:
- short-term PC  $\leq$ 10% of the NAQS; and
  - long-term PC  $\leq$ 1% of the NAQS.
- 6.3.44 The second stage of screening considers the PCs in the context of the existing background pollutant concentrations; the predicted environmental concentration (PEC) is considered acceptable where:
- short-term PC  $<$ 20% of the short-term NAQS minus twice the long-term background concentration; and
  - long-term PEC (PC + background concentration)  $<$ 70% of the NAQS.
- 6.3.45 Where the PEC is not predicted to exceed the NAQS objective and the proposed emissions comply with the BAT associated emission levels (or equivalent requirements) the emissions are considered acceptable by the EA.
- 6.3.46 The impact of point source emissions on ecological receptors with statutory designation, through deposition of nutrient nitrogen or acidity, has been evaluated using the Environment Agency insignificance criterion of 1% of the long term objective, as above. The impact of point source emissions on non-statutory designations (Local Wildlife Sites - LWSs) have been evaluated using the Environment Agency criterion of requiring the PEC to comply with the long-term objectives for ecological receptors.
- 6.3.47 Where emissions are not screened as insignificant (negligible), the descriptive terms for the air quality effect outlined in **Table 6-7** have been applied.

**Evaluation of Significance – Proposed Development as a whole**

- 6.3.48 Following the assessment of each individual air quality effect, the significance of all of the reported effects is then considered for the Proposed Development in overall terms. The potential for the Proposed Development to contribute to or interfere with the successful implementation of policies and strategies for the management of local air quality are considered if relevant, but the principal focus is any change to the likelihood of future achievement of the NAQS values set out in **Table 6.1**, since achievement of local authority goals for local air quality management is directly linked to the achievement of the NAQS values.
- 6.3.49 In terms of the significance of the effects (consequences) of any adverse impacts, an effect is reported as being either ‘not significant’ or as being ‘significant’. If the overall effect of the development on local air quality or on amenity is found to be ‘moderate’ or ‘major’ this is deemed to be ‘significant’. Effects found to be ‘minor’ or ‘negligible’ are considered to be ‘not significant’.

**Data Sources**

**Traffic Volume Data**

- 6.3.50 The traffic data used within this assessment has been sourced from **Chapter 7: Traffic and Transport** and its accompanying appendix (see **Appendix 7A: Transport Assessment - PEI Report Volume II**) is presented in **Table 6-8**.

**Table 6-8: Proposed Development traffic flows on public highway**

<b>Proposed Development Phase</b>	<b>Peak traffic flow (AADT)</b>
Construction	112 HGV movements (Months 54-66) 338 total vehicle movements (Months 61-63)
Operation	<10 total vehicle movements

**Combustion Plant Data**

- 6.3.51 At this design stage, the technology providers and hence final layout and combustion emission parameters have not been fixed and a Rochdale Envelope is being applied for certain parameters where flexibility needs to be retained. These parameters are outlined in **Chapter 4: The Proposed Development**. The air quality effects associated with alternatives for consideration within the design scheme have been fully explored and the worst-case results are presented within this assessment. The design evolution will continue as the Project progresses and any changes in design parameters will remain within the envelope evaluated in this assessment.
- 6.3.52 Opening point source emissions data has been determined from information supplied by the Original Equipment Manufacturers (OEMs) that would potentially supply the OCGT units for the Proposed Development.
- 6.3.53 Conservative assumptions have been made with regard to operational parameters, to determine the maximum potential effects of the operation of the Proposed Development on sensitive receptors; these assumptions include:
  - worst-case emissions from any of the OEM-provided information;
  - operation of the plant throughout the year for peak short-term impact assessment;
  - operation of the plant for the maximum proposed 1,500 hours per year for peak long-term impact assessment; and
  - maximum emission rates, at IED ELVs for all combustion units.

- 6.3.54 The actual hours of operation of the Proposed Development would be subject to the national demand for electricity and the economic viability of gas-fired generation.
- 6.3.55 The Proposed Development would include either a single larger OCGT, or up to five smaller OCGTs to a maximum combined power output of up to 299MW. Each OCGT unit would vent to a dedicated stack. The modelled point source release parameters have been based on the OCGT technology options, for the minimum and maximum number of units, which thereby include the worst-case impacts. The modelled emission parameters are summarised in **Table 6-9**.

**Table 6-9: Modelled combustion plant air emission parameters**

Assumed Parameter	Single large OCGT	Small OCGT (each of five)
Nominal power output (MW)	<299	52 [261 total, five units]
Average stack exit conditions:		
Maximum volumetric flow (Am <sup>3</sup> /s)	1,800	320
Oxygen content (%)	14	13
Moisture content (%)	8.5	11
Temperature (°C)	580	420
Maximum volumetric flow at reference conditions (Nm <sup>3</sup> /hr) <sup>1</sup>	2,450,000	572,000 [2,860,000 total, five units]
Approx. flue diameter (m)	9.0	3.5
Average efflux velocity (m/s)	30	34
Single Cycle Net Efficiency (%)	39	41
NO <sub>x</sub> ELV (IED, mg/Nm <sup>3</sup> ) <sup>2</sup>	56	59
NO <sub>x</sub> release rate (g/s)	38	9.4 [47 total, five units]
Stack height (m)	30-45	35-45
Assumed maximum operating hours / year	1,500	1,500

1. Reference conditions: 273K, 15% O<sub>2</sub>, dry

2. IED Single cycle efficiency >35% apply factor to IED ELV of (stated efficiency x ELV/35)

#### Rochdale Envelope Parameters

- 6.3.56 At this early design stage, the final layout and locations of the Proposed Development stacks and structures have not been fixed, although these would remain within the envelope described (**Chapter 4: The Proposed Development**). Therefore, alternative layouts and locations have been assessed within the dispersion modelling, with the worst-case impacts predicted at receptors reported here.
- 6.3.57 The alternative design schemes modelled parameters are presented in **Table 6-10**.

**Table 6-10: Modelled alternative design schemes for the Proposed Development**

Design Scheme	GT summary	Layout and location
A1	Single OCGT (<300MW)	Nominal N-S alignment of unit, stack assessed in each of the four corners of the area of the Site in which the plant could be located (SE, SW, NE, NW).
A2	Single OCGT (<300MW)	Additional enclosure of OCGT and associated units within a building (assumed to be up to 30m in height); stack height of 45m.
B1	Five OCGTs (<300MW total)	Nominal N-S alignment of individual units, stacks ~25m apart aligned E-W, located at various locations within Site boundary.
B2	Five OCGTs (<300MW total)	Nominal E-W alignment of individual units, stacks ~25m apart aligned N-S, located at various locations within Site boundary.

Notes: N, E, S, W refer to cardinal points

6.3.58 The assessment has also taken into consideration the sensitivity of predicted results to dispersion model input variables, to identify the realistic worst-case process contributions at sensitive receptor locations. These variables include:

- meteorological data, for which five years' recent data from a representative meteorological station (Robin Hood airport) have been used; and
- buildings, structures and local topography that could affect dispersion from the source.

The sensitivity of the predicted results to these variables is presented within **Appendix 6A** (PEI Report Volume II).

## 6.4 Baseline Conditions

### Sensitive Receptors

6.4.1 Based on IAQM guidance (Ref 6-14), during the construction phase, receptors potentially affected by NRMM exhaust emissions, dust soiling and short term concentrations of PM<sub>10</sub> generated during construction activities are limited to those located within 350m of the nearest construction activity, or within 50m either side of a public road used by construction traffic (up to a distance of 500m from the construction site entrances). Ecological receptors are limited to those located within 50m of the nearest construction activity and/or within 50m either side of a public road used by construction traffic (up to a distance of 500m from the construction site entrances).

6.4.2 Receptors potentially affected by the exhaust emissions associated with construction phase road vehicle movements are those located within 200m of a public road used by Site construction traffic. In this instance, it is assumed for the purposes of assessment that construction traffic would use the existing site entrance, on Gainsborough Road, linking to the A620 to the north. Several properties are identified as relevant receptors along this construction route.

6.4.3 Receptors potentially affected by operational emissions from the Proposed Development, including local residential and amenity receptors within 2km, have been identified through desk study of local mapping and through consultation. Isoleth figures of pollutant dispersion have been examined to identify the receptors that would receive the highest point source contributions and the assessment of impact has been made at these receptors.

6.4.4 Ecological receptors potentially affected by operational emissions have been identified (see **Chapter 9: Ecology and Nature Conservation**); statutory designated sites including Sites of Special Scientific Interest (SSSIs) up to 2km have been included in the assessment. No statutory international nature conservation designations have been identified within 10km of the Site; however several non-statutory designations (LWS) are located within 2km. Details of the sites and reasons for designations are provided in **Chapter 9: Ecology and Nature Conservation**. Identified receptors are detailed in **Table 6-11**. Potential impacts on ecological receptors have been assessed, including designated ecological sites and non-statutory habitat sites within 2km of the Proposed Development, in accordance with EA guidance (Ref 6-1) and with reference to the critical load data provided in the Air Pollution Information System (APIS) (Ref 6-20).

**Table 6-11: Identified receptors with potential for air quality impacts from the Proposed Development**

ID	Receptor name	Receptor type	Grid reference	Distance and direction from Proposed Development boundary	Distance from Proposed Development road link
R1	Manor Cottage, East Street, Bole	Residential	479499, 387023	0.9km NW	>350m
R2	South Street, Bole	Residential	479110, 386849	1.0km NW	>350m
R3	Hill Top Farm	Residential	479081, 388083	1.8km N	>350m
R4	Mill House Farm	Residential	478906, 386428	1.1km W	35m
R5	Grange Farm	Residential	478663, 386031	1.2km W	20m
R6	High Farm cottages	Residential	478050, 386327	1.9km W	>350m
R7	St Ives	Residential	478654, 385082	1.3km SW <sup>(1)</sup>	85m
R8	North Street, Sturton le Steeple	Residential	479000, 384560	1.4km SW	>350m
R9	Watkins Lane, Sturton le Steeple	Residential	478620, 384650	1.6km SW	>350m
R10(T)	PRoW – river Trent bank	Transient	480400-480500, 385700-386700	0.1-0.3km E	-
E1	Lea Marsh	SSSI	481573, 386640	1.0km NE	-
E2	Lea Marsh	SNCI	-	250m E	-
E3	West Burton Power Station	LWS	-	Located partially within Site	-
E4	West Burton Reedbed	LWS	-	50m SE	-
E5	Burton Round Ditch	LWS	-	100m S	-

ID	Receptor name	Receptor type	Grid reference	Distance and direction from Proposed Development boundary	Distance from Proposed Development road link
E6	Bole Ings	LWS	-	400m N	-
E7	Bole Ings Drains	LWS	-	400m N	-
E8	Mother Drain, Upper Ings	LWS	-	1.1km E	-
E9	West Burton Meadow	LWS	-	1.2km SW	-
E10	Bole Ings Flood Pasture	LWS	-	1.4km NE	-
E11	Saundby Ponds	LWS	-	1.6km N	-
E12	Saundby Marsh Drains	LWS	-	1.7km N	-
E13	Lea Meadow	LWS	-	1.8km NE	-

Notes:

- 1 R7 is located 60m from the construction access road
- 2 SSSI = Site of Special Scientific Interest; SNCI = Site of Nature Conservation Importance; LWS = Local Wildlife Site

## Existing Air Quality

- 6.4.5 Existing air quality conditions in the vicinity of the Site have been evaluated through a review of local authority air quality management reports, Defra published data and other sources. As described, the key pollutants of concern resulting from construction and operation of the Proposed Development are NO<sub>x</sub>, NO<sub>2</sub>, CO, PM<sub>10</sub> and PM<sub>2.5</sub>, therefore the assessment of baseline conditions considers these pollutants only.

### Local Air Quality Management

- 6.4.6 Under the requirements of Part IV of the Environment Act, BDC and WLDC have a duty to undertake the periodic review and assessment of local air quality within their administrative areas.
- 6.4.7 Over the course of the review and assessment process, BDC has not declared an AQMA within its administrative area.
- 6.4.8 The most recent Annual Management Report available from BDC (2016) (Ref 6-22) concluded that the majority of the district has very good air quality, although there are several areas within the district that have elevated levels of NO<sub>2</sub> close to the annual mean NAQS objective. It states that annual mean concentrations of NO<sub>2</sub> are either unchanged or showing a slight downward trend within the district and NO<sub>2</sub> concentrations will continue to be closely monitored by the Council at locations within Worksop and Retford. The review and assessment process has not identified any air quality issues in the vicinity of the Proposed Development Site, nor the air quality study area surrounding it.
- 6.4.9 BDC does not operate any automatic monitoring stations within its administrative area. However it measures annual mean concentrations of NO<sub>2</sub> passively, using diffusion tubes. The nearest of

these diffusion tubes is located at a roadside location in Retford, approximately 11km from the Proposed Development, and therefore is not considered representative of background air quality in the vicinity of the Proposed Development and the area under study.

- 6.4.10 Over the course of the review and assessment process, WLDC has not declared an AQMA within its administrative area.
- 6.4.11 The most recent Annual Management Report available from WLDC (2016) (Ref 6-23) concluded that air quality within the district was significantly below the NAQS objectives.
- 6.4.12 Automatic monitoring is undertaken at one location within the district, at Gainsborough Cemetery 4km to the north-east, as part of the EDF Energy programme (Ref 6-24) to monitor emissions from the power stations in the Trent Valley; the automatic monitor currently monitors real-time concentrations of NO<sub>2</sub>. The results gathered to date show that the NO<sub>2</sub> air quality objectives are being met and indicate a downward trend in concentrations. Summary monitoring data from 2013-2015 is presented in **Table 6-12**.

**Table 6-12: EDF automatic monitoring data (background location)**

Parameter	2015 (µg/m <sup>3</sup> )	2014 (µg/m <sup>3</sup> )	2013 (µg/m <sup>3</sup> )	Data Capture (%)
NO <sub>2</sub> annual mean	13.6	13.8	15.2	96.2
Exceedances of NO <sub>2</sub> hourly mean (99.79 <sup>th</sup> %ile)	0	0	0	13.6

Notes: Monitor located at grid reference 482021, 389974

- 6.4.13 WLDC also operates a number of NO<sub>2</sub> diffusion tubes within the district, the closest of which are located within Gainsborough, including background, roadside and kerbside locations. Summary monitoring data for 2015 is presented in **Table 6-13**.

**Table 6-13: Annual mean NO<sub>2</sub> diffusion tube data (2015)**

Monitor ID & Location	Distance to Site (km)	2015 (µg/m <sup>3</sup> )	Monitor type
WL1, Spring Gardens, Gains.	3.9	19.5	Roadside
WL2, Etherington Street, Gains.	3.8	14.1	Roadside
WL3/4/5 (automatic co-location), Gainsborough Cemetery.	4.1	17.7	Background
WL6, Cherry Tree Rd, Gains.	4.3	26.9	Kerbside
WL7, Lea Rd, Gains.	3.1	19.0	Roadside
WL8, Marshall Way, Gains.	4.1	17.4	Roadside

- 6.4.14 The above background monitoring location (including automatic monitor, diffusion tubes WL3/4/5) is considered to represent the baseline air quality including contributions from the WBA Power Station Site and contributions from WBB Power Station Site, although it is anticipated that the peak process contributions from each of these stations do not occur in the same location, as a result of differences in stack heights, stack locations and emission characteristics.

- 6.4.15 Modelling undertaken for the ES for WBB Power Station (Ref 6-25), of WBA and Cottam Power Stations indicated that the peak process contributions from these plant occur approximately 7km from the source, in north-east Gainsborough. Therefore, it would be unlikely to coincide with peak process contributions from the Proposed Development. The modelling undertaken for WBB indicated that peak process contributions from WBB would occur approximately 2km north-east of the source close to Lea Marsh, and therefore could occur in a similar location to process contributions from the Proposed Development combustion sources. At this stage of design, as the final locations and emission characteristics of the Proposed Development are not yet fixed, the cumulative emissions from these sources have not been modelled, however, the indicative results from previous modelling of WBB have been considered within the assessment. Dispersion modelling of cumulative emissions from WBB and the Proposed Development will be presented within the ES once the design has developed further; it is anticipated that WBA station will close by 2025 under current legislation, and therefore, under the proposed construction programme opening year (potentially as late as 2026), it is possible that WBA would not be in operation concurrently with WBC. The inclusion of WBA process contributions to existing baseline pollutant concentrations therefore represents a conservative assessment of the future baseline at the Proposed Development opening year.
- 6.4.16 Background data has also been obtained from Defra published maps for the locations of likely maximum impact from point source emissions from the Proposed Development, and at identified sensitive receptor locations. Background mapping data for 2017 is conservatively assumed to be representative of the construction (2020 peak construction) and opening (2026) baselines. Background data assumed for the maximum impact location from the point source emissions is provided in **Table 6-14** and indicates NO<sub>2</sub>, CO, PM<sub>10</sub> and PM<sub>2.5</sub> concentrations within the vicinity of the Proposed Development are consistently well below the NAQS annual mean objectives. Background data for NO<sub>2</sub> sensitive receptors is provided in **Section 6.6, Table 6.16**.

**Table 6-14: Defra background air quality data (annual mean) – current and future year projections**

Location	Pollutant	2017 – Current	2026 – Opening
Maximum impact location, down-wind of Site (480500, 386500)	NO <sub>2</sub> (µg/m <sup>3</sup> )	11.2	11.2
	CO (mg/m <sup>3</sup> ) - 2001	0.25	0.25
	PM <sub>10</sub> (µg/m <sup>3</sup> )	15.4	15.4
	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	10.4	10.4
Gainsborough cemetery, automatic monitor (481500, 390500)	NO <sub>2</sub> (µg/m <sup>3</sup> )	15.2	15.2

Based on 2013 base-mapping except where indicated

- 6.4.17 The Defra NO<sub>2</sub> background mapping data for Gainsborough Cemetery is comparable with the automatic monitoring data in the same location for 2013, which is the background mapping index year; but slightly lower than the co-located diffusion tube data.
- 6.4.18 The Defra background data is therefore considered to be representative of baseline NO<sub>2</sub> levels at the identified sensitive receptors. As a worst-case the (higher) automatic monitoring data has been used to represent the baseline at the maximum impact location from the Proposed Development, approximately 4km south-east of the automatic monitor.
- 6.4.19 Baseline pollutant concentrations at the identified statutory designation ecological receptors have been obtained from APIS (Ref 6-21) and are provided in **Appendix 6A** (PEI report Volume II).

## 6.5 Development Design and Impact Avoidance

### Construction

#### *Construction Environmental Management Plan*

- 6.5.1 Emissions of dust and particulates from the construction phase of the Proposed Development would be controlled in accordance with industry best practice, through incorporation of appropriate control measures according to the risks posed by the activities undertaken, as determined through this assessment process. The management of dust and particulates and application of adequate mitigation measures would be controlled through the proposed Construction Environmental Management Plan (CEMP). A framework CEMP will be submitted as part of the application for development consent. The Considerate Constructors Scheme (CCS) would be adopted to assist in reducing pollution and nuisance from the Proposed Development.

#### *Construction Road Traffic*

- 6.5.2 The existing power station has pre-determined designated routes which HGVs must use and the construction road traffic would be managed in accordance with the existing arrangements via a Requirement in the DCO for a Construction Traffic Management Plan (CTMP), to minimise impacts on local receptors (to be secured via a Requirement in the DCO).

### Opening and Operational Impacts

#### *IED Emission Limit Value (ELV) Compliance*

- 6.5.3 The Proposed Development would be designed such that process emissions to air comply with the ELV requirements specified in the IED. This would be regulated by the EA through the Environmental Permit required for the operation of the Proposed Power Station.
- 6.5.4 The alternative technologies under consideration are all indicated to meet the IED ELVs without the use of secondary abatement techniques, such as Selective Catalytic Reduction for the control of NO<sub>x</sub> emissions.

#### *Stack Height*

- 6.5.5 The stack heights for the plant have been optimised with consideration given to minimisation of ground-level air quality impacts, and the visual impacts of taller stacks. Dispersion modelling has been undertaken to determine the optimum stack height range through comparison of the maximum impacts at human health and ecological receptors. Further information on the determination of the stack heights is provided in **Appendix 6A** (PEI Report Volume II).
- 6.5.6 The selected stack heights (35m for each of five smaller OCGT unit stacks, 30m for a single OCGT stack, assuming that no building is used around the OCGT, or 45m if a building is installed (subject to the final building height) have been incorporated into the plant design and are based on height above finished ground level.

#### *Visible Plumes*

- 6.5.7 The potential for visible plumes from the plant stacks is considered to be very low as a result of the water content and temperature of the flue gas. There is no steam cycle or wet cooling tower plume associated with the operation of the OCGT units and therefore condensing plumes are not expected to ever occur.

## Decommissioning

- 6.5.8 Appropriate best practice mitigation measures will be applied during any decommissioning works and documented in a Decommissioning Environmental Management Plan (DEMP), secured via a Requirement in the DCO; no additional mitigation for decommissioning of the Proposed Development beyond such best practice is foreseen to be required at this stage. The predicted air quality effects of eventual decommissioning of the Proposed Development are considered to be comparable to – or less than – those assessed for construction activities.

## 6.6 Likely Impacts and Effects

### Construction

#### *Assessment of Demolition and Construction Dust and NRMM Emissions*

- 6.6.1 Identified sensitive receptors to dust soiling, PM<sub>10</sub> and NRMM exhaust emission effects from construction works are detailed in **Table 6.11**.
- 6.6.2 No residential human health receptors have been identified within the screening distance and therefore the effects of demolition and construction dust soiling and PM<sub>10</sub> impacts, and emissions from NRMM, on these receptors, have been screened out. The only identified sensitive receptors identified within the screening distance are potential transient receptors, such as users of the Public Right of Way (PRoW) along the River Trent, within 350m of the north-east Site boundary. However, in accordance with Defra guidance Local Air Quality Management TG09 (Ref 6-26) these receptors are identified as low sensitivity, as relevant sensitive locations to particulates are those in which individuals may be exposed for eight hours a day or more. Therefore, such transient receptors are not identified as sensitive for this assessment and are screened out.
- 6.6.3 No sensitive ecological receptors have been identified within the screening distance. Therefore, the effects of demolition and construction dust, and emissions from NRMM, on ecological receptors have been screened out.
- 6.6.4 The effects of emissions to air from the demolition and construction site activities associated with the Proposed Development on the identified receptors are considered to be not significant based on application of best practice mitigation measures through the proposed CEMP and the distances to the identified sensitive receptors.

#### *Assessment of Construction Traffic Emissions*

- 6.6.5 Predicted HGV movements during the construction and operation of the Proposed Development are shown in **Table 6-15**. The construction phase AADT is predicted to peak at 112 two-way HGV movements accessing the Site via the existing access point per day (months 54-66). The AADT total number of vehicles is predicted to peak at less than 350 two-way movements on Gainsborough Road (months 61-63). On this basis, further quantitative assessment of road traffic impacts associated with the construction phase has not been undertaken, as the screening criteria recommending initiation of a detailed assessment of air quality impacts have not been exceeded.

**Table 6-15: Traffic associated with the Construction and Operation of the Proposed Development**

<b>Proposed Development Phase</b>	<b>Peak traffic flow (AADT)</b>	<b>Screening criterion for initiation of detailed assessment – change in traffic flow (AADT)</b>
Construction	112 HGV movements 338 total movements	200 HGV movements 1,000 total vehicles movements

Operation	<10 total movements	100 HGV movements (no AQMA) 500 LDV movements (no AQMA)
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6.6.6 The effects of emissions to air from the construction traffic associated with the Proposed Development on the identified receptors are therefore considered to be not significant as the predicted traffic flows are below the screening thresholds indicated in published Guidance.

## Opening and Operation

### Assessment of Opening Traffic Emissions

6.6.7 The predicted AADT opening traffic is less than 10 vehicles arriving and departing the Site. Therefore, traffic associated with the Proposed Development at time of opening has been screened out of the assessment as this would be below the criteria set out in the IAQM requiring an air quality assessment as shown in **Table 6-15**. The effects of emissions to air from the operational traffic associated with the Proposed Development on the identified receptors are therefore considered to be not significant.

### Assessment of Operational Point Source Emissions

6.6.8 The impact of point source emissions at human health receptors has been determined from isopleth figures of pollutant dispersion and maximum model output at discrete receptor locations. The maximum hourly, daily and annual mean predicted concentrations have been compared with the NAQS objectives, as summarised in **Table 6-16** to **Table 6-18**; detailed concentrations are provided in **Appendix 6A** (ES Volume II). Isopleth figures showing the maximum predicted annual and hourly mean process contributions of NO<sub>2</sub> are provided in **Figures 6.2** and **6.3** (PEI Report Volume III).

6.6.9 These results represent the output from the worst-case modelled scenario of five OCGTs with stacks aligned north to south; variation in the predicted results with alternative Rochdale Envelope scenarios is discussed in later paragraphs in this section.

6.6.10 The dispersion modelling includes a number of conservative assumptions in combination, including:

- use of the worst-case year of meteorological data modelled;
- maximum building sizes within the assessed Rochdale Envelope;
- worst-case location of the stack(s) within the Proposed Power Plant Site;
- worst-case OCGT configuration within the assessed Rochdale Envelope, other configurations resulted in lower predicted impacts as shown in **Appendix 6A** (PEI Report Volume II);
- maximum annual operation for the plant (1,500 hours);
- operation of the plant at IED emission limits (for worst-case NO<sub>x</sub>); and
- conservative estimates of background concentrations at the maximum impact location.

6.6.11 The following abbreviations are used in **Tables 6.16-18**:

- PC: this is the Process Contribution and represents the change caused by the Proposed Development;
- headroom: this is the short term PC as a percentage of the available headroom between the baseline concentration and the NAQS objective; and

- PEC: this is the Predicted Environmental Concentration and is PC plus baseline concentration. It is the concentration expected at a particular receptor once the effect of the Proposed Development is taken into account.

**Table 6-16: Maximum short-term NO<sub>2</sub> predicted concentrations at worst-affected human health receptors**

Receptor ID	Hourly mean NO <sub>2</sub> PC (µg/m <sup>3</sup> , 99.79 <sup>th</sup> %ile)	PC/NAQS	Baseline NO <sub>2</sub> (µg/m <sup>3</sup> )	PC as % of headroom	Effect descriptor
R10(T)	30	15%	30	18%	Minor adverse
R1	17	8.4%	23	9.5%	Negligible

(T) denotes transient receptor

**Table 6-17: Maximum long-term NO<sub>2</sub> predicted concentrations at human health receptors**

Receptor ID	Annual mean NO <sub>2</sub> PC/NAQS	Magnitude of change	Baseline NO <sub>2</sub> (µg/m <sup>3</sup> )	Annual mean PEC/NAQS	Effect descriptor
R1	0.3%	Imperceptible	12	29%	Negligible
R2	0.4%	Imperceptible	12	30%	Negligible
R3	0.2%	Imperceptible	11	29%	Negligible
R4	0.6%	Very low	13	32%	Negligible
R5	0.5%	Very low	13	32%	Negligible
R6	0.4%	Imperceptible	11	28%	Negligible
R7	0.4%	Imperceptible	11	29%	Negligible
R8	0.5%	Very low	11	29%	Negligible
R9	0.4%	Imperceptible	11	29%	Negligible
R10	1.9%	Low	15	40%	(No relevant receptors identified for long-term effects)

6.6.12 The maximum hourly mean predicted concentration of nitrogen dioxide at the worst affected receptor (R10, transient PRow user) represents 15% of the hourly mean NAQS objective and therefore is not negligible as defined by the EA criteria, however the Proposed Development hourly mean contribution combined with the baseline concentration is well below the NAQS and therefore the effect is described as minor adverse (not significant). The maximum hourly mean predicted concentration of nitrogen dioxide at the worst affected residential receptor (East Street, Bole) represents 8.4% of the hourly mean NAQS objective and therefore is negligible as defined by the IAQM and EA criteria; the Proposed Development hourly mean contribution combined with the baseline concentration is well below the NAQS and therefore the effect is described as negligible (not significant).

6.6.13 The maximum long-term process contribution of nitrogen dioxide from any of the operational scenarios results in a very low magnitude of change in the annual mean concentration at several of

the identified receptors (R4, R5, R8), of which Mill House Farm receptor (R4) represents the worst affected residential receptor. The transient receptor (R10) which represents users of the PRoW (river Trent) is predicted to experience the highest change in annual mean concentration, with low magnitude.

- 6.6.14 The annual mean baseline concentration at these receptors is well below the NAQS objective with the Proposed Development, therefore the long-term effect of the Proposed Development emissions at receptors R4, R5 and R8 is described as negligible (not significant). The effect on transient receptors represented by R10 is not described as there are no relevant long-term receptors likely to be present at this location. The magnitude of change in annual mean NO<sub>2</sub> at all other human health receptors is very low or imperceptible and the effect of the emissions is therefore described as negligible adverse (not significant) at these locations.
- 6.6.15 The impact of process contributions of point source emissions at the identified ecological receptor has been determined from isopleth figures of pollutant dispersion and maximum model output at the receptor location. The annual mean NO<sub>x</sub> process contribution has been compared with the annual mean Critical Level at the statutory designated ecological receptor, as shown in **Table 6.18**.

**Table 6-18: Maximum NO<sub>x</sub> process contributions at Lea Marsh SSSI**

Receptor ID	Annual mean NO <sub>x</sub> PC/NAQS (µg/m <sup>3</sup> )	Magnitude of change	Baseline NO <sub>x</sub> (µg/m <sup>3</sup> )	Annual mean PEC/NAQS	Effect descriptor
E1 (Lea Marsh SSSI)	0.8%	Very low	17.4	59%	Negligible

- 6.6.16 The maximum process contribution of NO<sub>x</sub> from any of the operational scenarios results in a very low magnitude of change in the annual mean concentration at the ecological receptor; the predicted environmental concentration at this receptor is well below the objective with the Proposed Development, therefore the effect of the Proposed Development operational emissions at this receptor is described as negligible adverse (not significant).
- 6.6.17 The assessment of effects on the worst-case non-statutory designations (LWS) is presented in **Appendix 6A, Table 6A.5** (PEI Report Volume II); the maximum process contributions from any of the operational scenarios is less than the annual mean objective at the identified LWS and therefore the effect of the Proposed Development operational emissions at these receptors is described as negligible adverse (not significant).
- 6.6.18 In addition to the above assessment of the ground level concentration at the identified ecological receptors, an assessment of deposition impacts at the SSSI has also been undertaken as presented in **Appendix 6A, Tables 6A.6-6A.7** (PEI Report Volume II). The identified SSSI (E1) is designated for species that may be sensitive to nutrient nitrogen deposition and acid deposition. The maximum process contribution of nutrient nitrogen deposition at the identified receptor is less than 1% of the critical load published for the most sensitive habitat type. The process contribution of sulphur deposition at the ecological receptor is expected to be negligible as the emissions of SO<sub>2</sub> from natural gas combustion are negligible; therefore only the process contribution of nitrogen kilo-equivalent deposition has been compared with the acidity critical load, and the maximum nitrogen deposition process contribution to acid deposition at the ecological receptor is less than <0.1% of the critical load published for the most sensitive habitat type; therefore the effect of nutrient nitrogen and acid deposition from the Proposed Development at this receptor is described as negligible adverse (not significant).
- 6.6.19 The opening point source emissions effects on identified receptors has been determined to have negligible adverse effect and therefore the effects are considered to be not significant.

### Rochdale Envelope Parameters

- 6.6.20 The alternative design schemes included within this assessment under the Rochdale Envelope approach have been modelled and the design scheme (see **Table 6.10**) resulting in the worst-case predicted concentrations at receptors have been used in the assessment of effects significance; this means that the results presented in the main report may be illustrative of several different design schemes and therefore the overall effect of the Proposed Development may be lower than that presented, as the preferred scheme to be taken forward may present lesser impacts on some receptors than presented in this assessment.
- 6.6.21 The maximum predicted concentrations at the worst affected human health and ecological receptors associated with the alternative design schemes are shown in **Table 6.19** as the percentage of reported values used in the effects significance assessment; so a reported result in **Table 6.19** of 100% means that result is the same as was reported in the main assessment above, and therefore represents the worst-case; if a result is less than 100% then this means that the result is a lower impact than the worst-case presented.

**Table 6-19: Rochdale Envelope – maximum process contributions at worst affected receptors (as % of reported values)**

Design Scheme	Human health receptors		Ecological Receptors	
	Long-term	Short-term	Long-term	Short-term
A1	2%	6-33%	19-22%	29-78%
A2	2%	12%	18%	43%
B1	94-98%	92-94%	94-100%	88-97%
B2	94-100%	100%	96-97%	88-100%

- 6.6.22 The above sensitivity analysis highlights that the scenarios with five smaller OCGTs result in the highest process contributions at sensitive receptors, but that the location and orientation of stacks relative to the units within the Site boundary makes only limited difference to the maximum predicted concentrations at receptors. The single OCGT scenarios showed more variation in maximum process contributions at the identified receptors, however these were typically much lower than for the five OCGT scenarios, for the assessed stack heights and emission parameters. Application of the above sensitivity results to process contributions does not adversely alter the predicted effects significance assessment and therefore the reported receptor effects can be considered worst-case.

### Consideration of Cumulative Effects

- 6.6.23 At this stage in the design, the potential cumulative effects of WBA and WBB with the Proposed Development emissions on identified sensitive receptors has been considered with reference to previous modelling results (Ref 6-25) for the combined stations. The predicted change in NO<sub>2</sub> concentration resulting from the operation of the WBA, WBB and Cottam power stations was:
- annual mean of 3.6µg/m<sup>3</sup>, occurring at a location 2.4km north-east of the stations (close to the Proposed Development predicted maximum); and
  - hourly mean of 48µg/m<sup>3</sup>, occurring at a location 2.3km north-east of the stations.
- 6.6.24 The above concentrations have been added to the Proposed Development maximum predicted concentrations for comparison with the NAQS objectives as shown in **Table 6.20**.

**Table 6-20: Maximum predicted NO<sub>2</sub> predicted concentrations in combination with existing power station process contributions**

Averaging period	Proposed Development PC (µg/m <sup>3</sup> )	Existing Power Stations PC (µg/m <sup>3</sup> )	Baseline (µg/m <sup>3</sup> )	Combined Power stations PEC (µg/m <sup>3</sup> )	PEC/NAQS
Maximum hourly mean (99.79 <sup>th</sup> %ile)	30	48	30	109	54%
Maximum annual mean	0.75	3.6	15	20	49%

- 6.6.25 The combined maximum process contributions for the Proposed Development and the existing power stations, added to the baseline data, results in a maximum predicted environmental concentration of 54% of the NAQS hourly mean objective, and a maximum long-term predicted environmental concentration of 49% of the NAQS annual mean objective. The baseline data will already include contributions from the existing power stations and therefore the assessed values are considered to be conservative. The combined power station maximum process contributions are therefore considered unlikely to result in exceedance of the NAQS objectives. The Proposed Development contributions represent at maximum a minor adverse effect and therefore the combined effects of the power station emissions are considered not significant.
- 6.6.26 The effects of emissions to air associated with the operation of the Proposed Development are considered to be represented by those described in the Opening (**Section 6.6.9–6.6.20**). The opening and operational phase point source emissions effects on identified receptors have been determined to have negligible adverse effect and the operational effects are therefore considered to be not significant.
- 6.6.27 There is also potential for cumulative impacts from additional committed developments in the vicinity of the Proposed Development - these will be considered within **Chapter 16: Cumulative and Combined Effects of the ES**.

### Decommissioning

- 6.6.28 The predicted air quality effects of eventual decommissioning of the Proposed Development are considered to be comparable to – or less than – those assessed for construction activities based on the groundwork, traffic movements and level of site work required to decommission the Proposed Development being less than that required for its construction. Appropriate best practice mitigation measures will be applied during any decommissioning works and documented in a DEMP; no additional mitigation for decommissioning of the Proposed Development beyond such best practice is foreseen to be required at this stage.

### Evaluation of Effects from the Proposed Development as a Whole

- 6.6.29 The effects of construction emissions, from demolition and construction dust, construction road traffic and on-site plant, have been screened out of assessment as the scale of activities fall below the screening criteria requiring assessment and therefore the effects of construction on air quality are considered to be not significant. The operational point source emissions effects on identified receptors have been determined to have negligible adverse effect and therefore the operational effects are considered to be not significant. Sensitivity analysis has identified that the results presented are not adversely altered with the alternative design schemes presented and that the dispersion model variables present a realistic worst-case. The effects of eventual decommissioning are considered to be comparable to – or less than – those assessed for construction activities and

are therefore considered to be not significant. Therefore, the air quality effects from the Proposed Development as a whole are considered to be not significant.

## 6.7 Mitigation and Enhancement Measures

- 6.7.1 As described earlier, the management of dust and particulates and application of adequate mitigation measures will be controlled through the CEMP, and through application of appropriate best practice mitigation. A framework CEMP will be submitted as part of the application for development consent. A Requirement will be imposed on the DCO requiring the submission and approval (prior to construction), and then implementation of a final CEMP.
- 6.7.2 The environmental effects from construction of the Proposed Development have been identified as not significant; therefore no additional mitigation has been identified as necessary for the construction phase of the Proposed Development.
- 6.7.3 The air quality assessment of operational impacts has assumed that the ELVs will be met for the operational plant, as required under the IED and in accordance with use of BAT under the environmental permitting regime. The effects from operation of the Proposed Development have been identified as not significant; therefore no additional mitigation has been identified as necessary for the operational phase of the Proposed Development.

## 6.8 Limitation or Difficulties

- 6.8.1 No technical limitations or difficulties that could have implications for the assessment were encountered. The assessment presented in this PEI Report takes the data available from OEMs and assesses worst-case impacts based on the Rochdale Envelope for the Proposed Development. Refinement of the assessment in the ES is expected to be limited to either no change in effect or potentially a slight reduction in effects from those presented in this chapter, through further clarification of design assumptions.

## 6.9 Residual Effects and Conclusions

- 6.9.1 The air quality assessment of construction impacts assumes that the measures outlined within the Development Design and Impact Avoidance section (**Section 6.5**) would be incorporated into the design of the Proposed Development, as they are standard best practice measures that are routinely applied across UK construction sites. No additional mitigation has been identified as necessary for the construction phase of the Proposed Development. For this reason, the residual effects would be as reported within **Section 6.6** (i.e. not significant).
- 6.9.2 As described in **Section 6.5**, the existing power station has pre-determined designated routes which HGVs must use and the construction road traffic would be managed in accordance with the existing arrangements, to minimise impacts on local receptors. On this basis, no additional mitigation is considered necessary and the residual effects of emissions to air from construction traffic would be as reported in **Section 6.6** (i.e. not significant).
- 6.9.3 The air quality assessment of impacts at opening has assumed that the ELVs will be met for the operational plant as required under the IED and in accordance with use of BAT under the environmental permitting regime. No additional mitigation has been identified as necessary for the opening phase of the Proposed Development. For this reason, the residual effects would be as reported within **Section 6.6**.
- 6.9.4 Consistent with construction mitigation, it has been assumed that relevant best practice mitigation measures would be in place during any decommissioning works. No additional mitigation has been identified as necessary for the decommissioning phase of the Proposed Development.

## 6.10 References

- Ref 6-1 HM Government (2010) Air Quality Standards Regulations 2010.
- Ref 6-2 Department for Environment, Food and Rural Affairs (2007) *The Air Quality Strategy for England, Scotland, Wales and Northern Ireland*.
- Ref 6-3 HM Government Environmental Permitting (England and Wales) Regulations 2010.
- Ref 6-4 European Commission (2010) European Directive on Industrial Emissions 2010/75/EU.
- Ref 6-5 European Commission (2016) Best Available Techniques (BAT) Reference Document for Large Combustion Plants LCP (Final Draft), June 2016.
- Ref 6-6 Department of Energy and Climate Change (2011), Overarching National Policy Statement for Energy (EN-1).
- Ref 6-7 Department of Energy and Climate Change (2011), National Policy Statement for Fossil Fuel Electricity Generating Infrastructure (EN-2).
- Ref 6-8 Department for Communities and Local Government (DCLG) (2012) *The National Planning Policy Framework*. DCGL.
- Ref 6-9 Bassetlaw District Council (2011) *BDC Core Strategy and Development Policies*.
- Ref 6-10 Sturton Ward Planning Group (2016) *Sturton Ward Neighbourhood Plan*.
- Ref 6-11 Central Lincolnshire Joint Strategic Planning Committee (2017) *Central Lincolnshire Local Plan*.
- Ref 6-12 Department for Environment, Food & Rural Affairs and Environment Agency (2016). *Air emissions risk assessment for your environmental permit*. '<https://www.gov.uk/government/collections/risk-assessments-for-specific-activities-environmental-permits> [Date accessed 12/07/17]
- Ref 6-13 Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK) (2017) *Land-Use Planning & Development Control: Planning For Air Quality*.
- Ref 6-14 Institute of Air Quality Management (2014) *Guidance on the Assessment of Dust from Demolition and Construction*.
- Ref 6-15 Planning Inspectorate (2017) *Scoping Opinion Proposed West Burton C Power Station*, Planning Inspectorate Reference: EN010088, June 2017.
- Ref 6-16 British Standards Institute (1994) British Standard 6069-2:1994 *Characterisation of Air Quality. Glossary*.
- Ref 6-17 Department for Communities and Local Government (2012) *Technical Guidance to the National Planning Policy Framework*.
- Ref 6-18 Department for Communities and Local Government (2016) *Planning Practice Guidance*.
- Ref 6-19 Environmental Protection UK (2010) *Development Control: Planning for Air Quality 2010 Update*, April 2010.

- Ref 6-20 Highways Agency (2007) *Design Manual for Roads and Bridges (DMRB), Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 1, HA207/07 Air Quality*.
- Ref 6-21 Centre for Ecology and Hydrology and APIS (2016) <http://www.apis.ac.uk> [Date accessed 12/07/17].
- Ref 6-22 Bassetlaw District Council (2016) *Air Quality Annual Status Report (ASR)*, August 2016.
- Ref 6-23 West Lindsey District Council (2017) *Annual Status Report 2016*, Bureau Veritas, January 2017.
- Ref 6-24 EDF Energy (2013) *AQS Management Plan Annual Review for 2013 for North Trent Stations*.
- Ref 6-25 EDF Energy (2005) *West Burton CCGT Power Station, Environmental Statement*, Parsons Brinkerhoff, December 2005.
- Ref 6-26 DEFRA (2009) *Local Air Quality Management Technical Guidance LAQM.TG(09)*, February 2009.

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## 7. Traffic and Transport

### 7.1 Introduction

7.1.1 This chapter of the Preliminary Environmental Information (PEI) Report addresses the potential effects of the Proposed Development on traffic and transport.

### 7.2 Legislation, Planning Policy and Guidance

#### Planning Policy Context

7.2.1 This section outlines the planning policy of relevance to traffic and transport. A full overview of all relevant planning policy is provided in **Chapter 5: Legislative Context and Planning Policy Framework**, which also sets out the primacy of National Policy Statements (NPS) in decision-making on nationally significant infrastructure projects (NSIPs) such as the Proposed Development.

#### *National Planning Policy*

#### *National Policy Statement for Energy (NPS EN-1)*

7.2.2 The National Policy Statement for Energy (NPS EN-1) (Department for Energy and Climate Change (DECC), 2011a) (Ref 7-1) was published in 2011. Section 5.13 of EN-1 outlines the planning policy for traffic and transport, including guidance on the carrying out of the relevant parts of the Environmental Impact Assessment (EIA) (which have been taken into account in producing this assessment). The most relevant paragraphs for the transport assessment are 5.13.2 to 5.13.4 which state:

*“5.13.2 The consideration and mitigation of transport impacts is an essential part of Government’s wider policy objectives for sustainable development as set out in Section 2.2 of this NPS.*

*5.13.3 If a project is likely to have significant transport implications, the applicant’s ES (see Section 4.2) should include a transport assessment, using the NATA/WebTAG139 methodology stipulated in Department for Transport guidance, or any successor to such methodology. Applicants should consult the Highways Agency and Highways Authorities as appropriate on the assessment and mitigation.*

*5.13.4 Where appropriate, the applicant should prepare a travel plan including demand management measures to mitigate transport impacts. The applicant should also provide details of proposed measures to improve access by public transport, walking and cycling, to reduce the need for parking associated with the proposal and to mitigate transport impacts.”*

7.2.3 In terms of the Secretary of State’s decision making, Section 5.13 of the NPS EN-1 states that the IPC (now Secretary of State) should ensure that the applicant has sought to mitigate the impacts on the surrounding road infrastructure that may occur as a result of a new energy NSIP. Where the proposed mitigation measures are insufficient to reduce the impact on the transport infrastructure to acceptable levels, the Secretary of State should consider requirements to mitigate the adverse impacts on transport networks arising from the development, which could include:

- demand management measures;
- water-borne or rail transport, where cost effective;
- attaching conditions to a planning consent where there is likely to be substantial HGV traffic.

National Policy Statement for Fossil Fuel Electricity Generating Infrastructure (NPS EN-2)

7.2.4 Section 2.2 of EN-2 (DECC, 2011b) (Ref 7-2) outlines the planning policy for traffic and transport, specifically in respect of fossil fuel generating stations such as the Proposed Development. The relevant paragraphs for the transport assessment are 2.2.5 and 2.2.6, which state:

*“2.2.5 New fossil generating stations need to be accessible for the delivery and removal of construction materials, fuel, waste and equipment, and for employees.*

*2.2.6 Government policy encourages multi-modal transport and materials (fuel and residues) may be transported by water or rail routes where possible. Applicants should locate new fossil generating stations in the vicinity of existing transport routes wherever possible. Although there may in some instances be environmental advantages to rail or water transport, whether or not such methods are viable is likely to be determined by the economics of the scheme. Road transport may be required to connect the site to the rail network, waterway or port. Any application should therefore incorporate suitable access leading off from the main highway network. If the existing access is inadequate and the applicant has proposed new infrastructure, the IPC should satisfy itself that the impacts of the new infrastructure are acceptable as set out in Section 5.13 of EN-1.”*

7.2.5 **Table 7-1** provides a summary of relevant NPS advice regarding traffic and transport, including signposting to where matters are considered in this chapter.

**Table 7-1: Summary of relevant NPS advice regarding traffic and transport**

Summary of NPS	Consideration within the Chapter
<b>NPS EN-1</b>	
Paragraph 5.13.3 states: <i>“If a project is likely to have significant transport implications, the applicant’s ES should include a transport assessment, using the NATA /WebTAG139 methodology stipulated in Department for Transport guidance, or any successor to such methodology. Applicants should consult the Highways Agency and Highways Authorities as appropriate on the assessment and mitigation.”</i>	See <b>Appendix 7A:</b> Transport Assessment (PEI Report Volume II)
Paragraph 5.13.4 states: <i>“Where appropriate, the applicant should prepare a travel plan including demand management measures to mitigate transport impacts. The applicant should also provide details of proposed measures to improve access by public transport, walking and cycling, to reduce the need for parking associated with the proposal and to mitigate transport impacts.”</i>	See <b>Appendix 7A:</b> Transport Assessment (PEI Report Volume II)
Paragraph 5.13.5 states: <i>“If additional transport infrastructure is proposed, applicants should discuss with network providers the possibility of co-funding by Government for any third-party benefits. Guidance has been issued in England which explains the circumstances where this may be possible, although the Government cannot guarantee in advance that funding will be available for any given uncommitted scheme at any specified time.”</i>	Not relevant
Paragraph 5.13.6 outlines the requirement to provide mitigation measures for any transport impacts associated with the project, including during the construction phase.	See <b>Appendix 7A:</b> Transport Assessment (PEI Report Volume II)

### National Planning Policy Framework

- 7.2.6 In March 2012, the Government published the National Planning Policy Framework (NPPF) (Department for Communities and Local Government (DCLG), 2012) (Ref 7-3). The NPPF sets out the Government's planning policies for England. The NPPF refers explicitly to the five guiding principles of sustainable development in the Government's document 'Securing the Future':
- living within the planet's environmental limits;
  - ensuring a strong, healthy and just society;
  - achieving a sustainable economy;
  - promoting good governance; and
  - using sound science responsibly.
- 7.2.7 The NPPF (paragraphs 28 – 41) states that the transport system needs to be balanced in favour of sustainable transport modes, giving people a real choice about how to travel. The policy states that local authorities should support a pattern of development, which, where reasonable to do so, facilitates the use of sustainable modes of transport. Plans and decisions should ensure that developments that generate significant movement are located where the need to travel would be minimised and the use of sustainable transport modes can be maximised.
- 7.2.8 The NPPF recommends that a Transport Statement (TS) or Transport Assessment (TA) should support all developments that generate significant amounts of movement and that development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe.

### Local Planning Policy

#### Nottinghamshire Local Transport Plan 2011 - 2026

- 7.2.9 The Local Transport Plan for Nottinghamshire (Ref 7-4) sets out a number of objectives which have been developed from previous plans and sets out how Nottinghamshire County Council (NCC) will manage, maintain and improve the transport system for the benefit of people living and travelling in the county. The objectives of the LTP in relation to traffic and transport can be summarised as:
- improving accessibility;
  - improving safety;
  - improving quality of life;
  - reduce congestion;
  - improving air quality;
  - supporting economic regeneration; and
  - making best use of the existing infrastructure.

### Other Guidance

#### Planning Practice Guidance

- 7.2.10 Planning Practice titled 'Travel plans, transport assessments and statements in decision-taking' (Ref 7-5) was published in March 2014 on the Government's planning guidance planning portal (DCLG, 2014). This guidance has been used to inform this assessment.

### *Guidelines for the Environmental Assessment of Road Traffic*

- 7.2.11 The Guidelines for the Environmental Assessment of Road Traffic (Ref 7-6) were published in 1993 by the Institute of Environmental Assessment. The guidelines provide a basis for a comprehensive and consistent approach to the appraisal of traffic and transport impacts. Extensive reference has been made to these guidelines throughout the preparation of this chapter.

### *Department for Transport Circular 02/2013: The Strategic Road Network and the Delivery of Sustainable Development*

- 7.2.12 Circular 02/2013 (Ref 7-7) was published in September 2013 by the Department for Transport which sets out the way in which Highways England will engage with the development industry to deliver sustainable development and, thus, economic growth, whilst safeguarding the primary function and purpose of the strategic road network. This document has been used to inform the assessment.

### *The Strategic Road Network: Planning for the Future*

- 7.2.13 The Strategic Road Network: Planning for the Future 'A Guide to Working with Highways England on Planning Matters' (Ref 7-8) published by Highways England in September 2015 offers advice and information regarding the information it expects to see within a planning proposal. This document has been used to inform the Transport Assessment (**Appendix 7A** (PEI Report Volume II)).

## 7.3 Assessment Methodology and Significance Criteria

### Overview

- 7.3.1 The environmental impact of the traffic predicted to be generated by the Proposed Development has been assessed with reference to the Guidelines for the Environmental Assessment of Road Traffic (Ref 7-6) and other guidance as detailed in **Section 7.2**. In accordance with guidance, issues including severance, driver delay, pedestrian amenity and delay, accidents and safety associated with the Proposed Development have been investigated and are reported herein.
- 7.3.2 Any likely significant environmental effects relating to noise and vibration and air pollution, generated by traffic associated with the Proposed Development are considered in the relevant chapters of this PEI Report (i.e. **Chapter 6: Air Quality** and **Chapter 8: Noise and Vibration**).

### Extent of Study Area

- 7.3.3 The study area for this assessment has been defined by reference to the Guidelines for the Environmental Assessment of Road Traffic (Ref 7-6). These guidelines set out two rules as follows:
- Rule 1: include highway links where traffic flows are predicted to increase by more than 30% (or where the number of Heavy Goods Vehicles (HGVs) is predicted to increase by more than 30%); and
  - Rule 2: include any other specifically sensitive areas where the traffic flow (or HGV component) are predicted to increase by more than 10%.
- 7.3.4 The road links that have been considered in the assessment of traffic effects, which is set out in **Section 7.6**, to determine that these rules are satisfied are:
- C2 Gainsborough Road, south of the West Burton Power Station Site main entrance;
  - C2 Sturton Road, north of the West Burton Power Station Site main entrance;
  - A620 Gainsborough Road, west of Sturton Road roundabout; and

- A620 Saundby Road, north of Sturton Road roundabout.

### Sensitivity of Receptors

- 7.3.5 The sensitivity of a road, or the immediate area through which it passes, can be defined by the type of user groups who may use them. Vulnerable users include elderly residents and children. It is also necessary to consider footpath and cycle route networks that cross the roads within the study area.
- 7.3.6 A desktop exercise has been undertaken to classify the sensitivity of the routes within the study area. **Table 7-2** identifies the links, the assigned sensitivity rating and the justification.

**Table 7-2: Sensitivity of receptors**

Link no.	Link Description	Link Sensitivity	Rationale
1	Gainsborough Road (south of West Burton Power Station main entrance)	Medium	The two-lane single carriageway Gainsborough Road between the West Burton Power Station main site entrance and Station Road passes through open country. A pedestrian footway is provided along the eastern side of the carriageway. Very little frontage development. Continuing south, the road passes through the villages of Sturton-le-Steeple, North and South Leverton, Treswell and East Drayton to the A57.
2	Sturton Road (north of West Burton Power Station main site entrance)	Low	The two-lane single carriageway Sturton Road between the West Burton Power Station main entrance and the A620 roundabout passes through open country. There are no pedestrian facilities along the road however a public footpath crosses Sturton Road to the north of Middle Farm.
3	A620 Gainsborough Road (west of Sturton Road roundabout)	Medium	The two-lane single carriageway A620 between Sturton Road roundabout and Retford passes through largely open country. However, the A620 passes through the village of Claborough with residential development fronting onto the A620. Pedestrian facilities are provided at certain points along the route.
4	A620 Saundby Road (north of Sturton Road roundabout)	Low	The two-lane single carriageway A620 between the Sturton Road roundabout and the A631 passes through open country. A pedestrian footway is provided along the eastern side of the carriageway. Very little frontage development along the route. A public footpath crosses the A620 at the junction with Ramper Road.

### Assessment Methods

- 7.3.7 The assessment methodology adopted in this chapter, as contained in the Guidelines for the Environmental Assessment of Road Traffic (Ref 7-6), is recognised as the industry standard methodology for the assessment of traffic and highway impacts. The guidelines outline the issues and the respective changes in volume and composition of traffic regarded as necessary before each issue results in traffic and transport impacts.
- 7.3.8 The following assessment scenarios have been assessed:

- Construction phase (2020 – 2026);
- Opening Year (2026); and
- Decommissioning (2066).

7.3.9 The following environmental effects are susceptible to changes as a result of the Proposed Development.

- **Severance:** Severance occurs in a community when a major artery separates people from places and other people. Severance occurs from difficulty of crossing a road or where the road itself creates a physical barrier. Severance can be caused to pedestrians or motorists. The Guidelines for the Environmental Assessment of Road Traffic (Ref 7-6) suggest that changes in total traffic flow of 30%, 60% and 90% result in slight, moderate and substantial changes in severance respectively.
- **Pedestrian Amenity:** Pedestrian amenity is broadly defined as the relative pleasantness of a journey, and is considered to be affected by traffic flow, traffic composition, pavement width and separation between vehicles and pedestrians. The impact manifests itself in fear and intimidation, exposure to noise and vehicle emissions. The Guidelines for the Environmental Assessment of Road Traffic (Ref 7-6) suggest that a doubling or halving of total traffic flow or the HGV composition could lead to perceptible negative or positive impacts upon pedestrian amenity.
- **Fear and Intimidation:** The volume of traffic and its HGV composition are the factors that contribute to fear and intimidation. In the absence of thresholds set out in the Guidelines for the Environmental Assessment of Road Traffic, this PEI Report considers that changes in total traffic flow of 30%, 60% and 90% are considered to result in slight, moderate or substantial impacts.
- **Highway Safety:** Highway safety is assessed by the frequency and severity of injury accidents that are attended by the police and recorded in official accident statistics. Intensification of use or changes in the composition of traffic has the potential to have an effect on collision rates. The examination of recent collision statistics on routes within the study area will highlight any hotspots that need further examination.
- **Driver Delay:** The use of industry standard junction capacity modelling programs provides a methodology to quantify junction delay. Driver delay is only likely to be significant where the existing study area highway network is at or close to capacity.

### Significance Criteria

7.3.10 Using the information set out above, the magnitude of traffic impacts is defined as set out in **Table 7.3**.

**Table 7-3: Traffic and transport assessment framework – magnitude of impacts**

Type of Impact	Magnitude of Impact			
	Very Low	Low	Medium	High
Severance	Change in total traffic flow of <30%	Change in total traffic flow of 30% to 60%	Change in total traffic flow of 60% to 90%	Change in total traffic flow of >90%
Pedestrian amenity	Change in traffic flow (or HGV component) < 50%	Change in traffic flow (or HGV component) of 51% to 100%	Change in traffic flow (or HGV component) of 101% to 150%	Change in traffic flow (or HGV component) of > 151%
Fear and intimidation	Change in total traffic flow of <30%	Change in total traffic flow of 30% to 60%	Change in total traffic flow of 60% to 90%	Change in total traffic flow of >90%
Highway safety	Magnitude of impact derived using professional judgment informed by the frequency and severity of collisions within the study area and the forecast increase in traffic.			
Driver delay	Magnitude of impact derived using professional judgment informed by the increase in vehicle delay and whether a junction is at, or close to capacity.			

7.3.11 By combining the receptor sensitivity with the magnitude of impact using the assessment matrix shown in **Table 7-4**, traffic effects are classified as negligible, minor, moderate or major (adverse or beneficial).

**Table 7-4: Classification of effects**

Type of Impact	Sensitivity / Importance of Receptor			
	High	Medium	Low	Very Low
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Very Low	Minor	Negligible	Negligible	Negligible

7.3.12 Only moderate and major effects are considered to be significant.

### Sources of Information/Data

7.3.13 As set out in further detail in the Transport Assessment at **Appendix 7A** (PEI Report Volume II), a series of 7-day automatic traffic counts (ATCs) were undertaken between Thursday 8<sup>th</sup> June 2017 and Wednesday 14<sup>th</sup> June 2017 to provide a baseline for comparison on the roads.

7.3.14 In addition to the ATC counts, it was agreed with NCC that the impact of the Proposed Development would be examined at the following junctions on the local highway network for the overall network morning (AM) and evening (PM) peak hours:

- A631/A620/Station Road Roundabout; and
- A620/Saundby Road/Sturton Road Roundabout.

7.3.15 These junction surveys were undertaken on Wednesday 7<sup>th</sup> June 2017 between the hours of 07:00 and 19:00 hours.

### Consultation

7.3.16 A summary of the consultation responses specific to transport and access that have been received is provided in **Table 7-5**.

**Table 7-5: Consultation summary table**

Consultee or organisation approached	Date and nature of consultation	Method	Summary of Response
Nottinghamshire County Council	May 2017 (e-mail)	NCC agreed to the traffic count locations proposed by AECOM.	Traffic counts were commissioned by AECOM in June 2017 (refer to <b>Section 7.3</b> ).
Secretary of State	May 2017 (Scoping Opinion)	<p>A full Transport Assessment is required to be undertaken.</p> <p>The applicant should take account of the NPS preference for rail and waterborne transportation, where feasible, over road transport to reduce traffic and associated impacts.</p> <p>Further justification for the criteria assessed should be provided in the ES.</p> <p>The full traffic survey method should be detailed within the ES.</p> <p>The Construction Workers Travel Plan and Construction Traffic Management Plan should clearly cross reference to the relevant effects within the ES and be secured in the draft DCO requirements.</p>	Full details provided within the TA (see <b>Appendix 7A</b> in PEI Report Volume II). As detailed in <b>Section 7.5</b> , the Applicant would implement a range of good practice mitigation measures during the construction phase to minimise traffic impacts upon local highways – this includes implementation of a Construction Workers Travel Plan (CWTP) (a Framework CWTP is provided in <b>Appendix 7A</b> (PEI Report Volume II), plus the contractor would be required to prepare a Construction Traffic Management Plan (CTMP).
Highways England	May 2017 (Scoping Opinion)	<p>Environmental impacts arising from any disruption during construction, traffic volume, composition or routing change and transport infrastructure modification should be fully assessed and reported.</p> <p>Information should be provided regarding the likely traffic impacts on the wider SRN in order to determine any need for highway impact assessment and capacity improvements.</p>	Full details provided within the TA (see <b>Appendix 7A</b> in PEI Report Volume II).
Nottinghamshire County Council	May 2017 (Scoping Opinion)	The proposed ES methodology meets with the County Council's strategic transport planning requirements.	Noted.

Consultee or organisation approached	Date and nature of consultation	Method	Summary of Response
West Lindsey District Council	May 2017 (Scoping Opinion)	The primary focus of the Transport Assessment on the construction phase is expected from a development of this size and type, although the operational and decommissioning phase should be acknowledged.	Noted.
MMO (PRoW)	May 2017 (Scoping Opinion)	There are a number of public rights of way within 500 metres of the project site, including a footpath which passes along the eastern bank of the River Trent. The ES should contain details on the potential impacts of the Project on any other users of the River Trent, such as recreational fisherman, recreational boat users and any proposed mitigation measures should these be necessary.	Full details provided within the TA (see <b>Appendix 7A</b> in PEI Report Volume II).
Doncaster Metropolitan District Council	July 2017 (email in response to TA Scoping Report)	No assessment of the A631/A638 junction in Bawtry is required.	Noted.
Nottinghamshire County Council	August 2017 (email in response to TA Scoping Report)	A formal HGV routing agreement should be put in place.  Concern regarding HGVs, particularly high loads using the A620 to the west through Welham due to low bridges.  Junctions should be modelled that are likely to experience greater than 30 two-way peak hour movements.	This is considered within the framework CTMP (see <b>Appendix 7A</b> in PEI Report Volume II).  Full details provided within the TA (see <b>Appendix 7A</b> in PEI Report Volume II).
Lincolnshire County Council	August 2017 (email in response to TA Scoping Report)	No issues with the Scoping Report.	Noted.
Highways England	August 2017 (email in response to TA Scoping Report)	No further assessment will be required for the Strategic Road Network.	Noted.

## 7.4 Baseline Conditions

### Existing Baseline

#### Site Location

- 7.4.1 The West Burton Power Station Site is located approximately 3.5km to the south-west of Gainsborough and 1km to the north-east of Sturton-le-Steeple.
- 7.4.2 The West Burton Power Station Site lies close to the junction of the A631 and A620. The A631 runs east-west from the Sheffield/ Rotherham area, crossing the A1(M) at Tickhill and providing one of the few crossings of the River Trent at Gainsborough. The A620 follows a more south-west/north-east orientation between Ranby and its junction with the A631 at Beckingham, en-route passing through the market town of Retford and the villages of Claborough and Welham. These two routes provide direct links to the A1 and the areas to the west of the A1. The A631 Gainsborough river crossing provides a link with areas to the east of the River Trent.
- 7.4.3 The West Burton Power Station Site is accessed from a C-class road, the C2 (Gainsborough Road), which joins the A620 at Bole Corner.

#### Existing Traffic Flows

- 7.4.4 The following highway links form the agreed highway network of interest for this assessment:
- C2 Gainsborough Road, south of the West Burton Power Station Site main entrance;
  - C2 Sturton Road, north of the West Burton Power Station Site main entrance;
  - A620 Gainsborough Road, west of Sturton Road roundabout; and
  - A620 Saundby Road, north of Sturton Road roundabout.
- 7.4.5 Baseline 24 hour annual average daily traffic (AADT) two-way link flows for the agreed study area are provided in **Table 7-6**.

**Table 7-6: 2017 Baseline Traffic Flows (24 hour AADT)**

Link no.	Link Description	Total Vehicles	Total HGVs
1	C2 Gainsborough Road (south of West Burton Power Station main entrance)	2,315	205
2	C2 Sturton Road (north of West Burton Power Station main site entrance)	2,531	215
3	A620 Gainsborough Road (west of Sturton Road roundabout)	4,634	588
4	A620 Saundby Road (north of Sturton Road roundabout)	6,944	721

#### Baseline Accident Record

- 7.4.6 Personal Injury Accident (PIA) data covering a five year period plus this year (01/01/2012 – 30/04/2017) has been obtained from NCC. The area of investigation included the A620 from its junction with the A631 to its junction with Sturton Road in addition to Sturton Road and Gainsborough Road.

7.4.7 In total, 16 accidents were recorded within the analysed area. Of these, ten were recorded as 'slight' and seven as 'serious'. **Table 7-7** summarises the accidents that have occurred over the specified period.

**Table 7-7: Summary of recorded accidents (01/01/2012 – 30/04/2017)**

Location	Accident Severity			
	Slight	Serious	Fatal	Total
A631 / A620 Junction	3	3	0	6
A620 (between A631 and Sturton Road)	3	1	0	4
A620 / Sturton Road Junction	2	0	0	2
Sturton Road (north of power station site entrance)	0	2	0	2
Power Station Site Entrance	1	0	0	1
Station Road / Gainsborough Road Junction	1	0	0	1
<b>Total</b>	<b>10</b>	<b>6</b>	<b>0</b>	<b>16</b>

7.4.8 As can be seen from **Table 7-7**, the study area has a generally low accident record. The main accident cluster occurred at the A631/A620 roundabout where 6 accidents were recorded over the five year study period of which 3 were of slight severity and 3 of serious severity, Of these 3 involved 2 vehicles colliding on the roundabout, 2 involved driver loss of control and 1 involved a rear end shunt.

7.4.9 One accident of slight severity occurred at the power station site entrance over the five year study period and involved a car turning right at the power station site entrance colliding with an oncoming motorcycle. As there have been no other reoccurrences of incidents throughout the five year plus study period at this location, it is considered that the incident is likely to be a unique occurrence that would not be exacerbated by development traffic from the Proposed Development.

7.4.10 None of the 16 accidents to occur within the study area involved a HGV.

### Future Baseline

7.4.11 Construction of the Proposed Development is due to start in Q2 2020 and would be undertaken in up to three phases over a period of up to 6 years – construction activities are thus anticipated to be completed in 2026. However, given that the proposed build programme is flexible, following discussions with EDF Energy, it was agreed that an accelerated construction programme comprising a single phase build lasting 36 months should be considered in order to represent a 'realistic' worst-case scenario for assessment purposes. As baseline traffic flows on the road network are projected to increase year on year, for the purposes of this assessment and to represent a worst-case scenario, it is assumed that the 36-month build programme would start in Q2 2023 and end in Q2 2026.

7.4.12 It is expected that the construction workforce would peak at approximately 200 workers per day in months 61 – 63 (i.e. Q2 2025). A profile of the anticipated workforce each month through the construction period is provided in **Appendix 7A** (PEI Report Volume II).

7.4.13 Future year baseline traffic flows for the assessment year of 2025 for the peak of construction have been derived by applying the national standard programme Trip End Model Presentation Program (TEMPRO) to derive traffic growth factor the flows, as indicated in **Table 7-8**. These growth factors have been taken into account when comparing the baseline and future traffic scenarios.

**Table 7-8: TEMPRO traffic growth factors (average day)**

Year	Vehicle Type	Growth Factor
2017 – 2025	All	1.1431

7.4.14 Future year baseline scenarios are not detailed for 2026 (opening) due to the very low traffic flows generated by the operation of the Proposed Development. Therefore, a quantitative assessment of operational traffic has not been necessary, as the vehicle numbers generated would be significantly lower than those that would be experienced during the construction period.

7.4.15 Future year baseline traffic flows for the assessment year of 2025 peak of construction are presented in **Table 7-9**.

**Table 7-9: 2025 Baseline traffic flows (24 hour AADT)**

Link no.	Link Description	Total Vehicles	Total HGVs
1	C2 Gainsborough Road (south of West Burton Power Station main entrance)	2,646	234
2	C2 Sturton Road (north of West Burton Power Station main site entrance)	2,893	246
3	A620 Gainsborough Road (west of Sturton Road roundabout)	5,297	672
4	A620 Saundby Road (north of Sturton Road roundabout)	7,938	824

7.4.16 The assessment has had regard to the traffic generated by ‘committed’ developments, in accordance with the methodology for assessing potential cumulative effects with other schemes, as detailed in **Chapter 16: Cumulative and Combined Effects**; as follows

- proposed ash processing facility within the West Burton Power Station Site;
- 49MW battery storage facility within the West Burton Power Station Site;
- sub 50MW power plant at West Burton Power Station Site;
- construction of quarry access road at Cowpasture Lane Gravel Pit; and
- 67 dwelling residential development, Gainsborough.

7.4.17 The total committed development two-way flows for each link road within the study area are shown in

7.4.18 **Table** 7-10.

**Table 7-10: Committed development flows (24 hour AADT)**

Link no.	Link Description	Total Vehicles	Total HGVs
1	C2 Gainsborough Road (south of West Burton Power Station main entrance)	192	192
2	C2 Sturton Road (north of West Burton Power Station main site entrance)	192	192
3	A620 Gainsborough Road (west of Sturton Road roundabout)	0	0
4	A620 Saundby Road (north of Sturton Road roundabout)	192	192

7.4.19 **Table 7-11** summarises the future year baseline including committed development traffic flows for the assessment year 2025 peak of construction.

**Table 7-11: 2025 Baseline + Committed Development (24 hour AADT)**

Link no.	Link Description	Total Vehicles	Total HGVs
1	C2 Gainsborough Road (south of West Burton Power Station main entrance)	2,838	426
2	C2 Sturton Road (north of West Burton Power Station main site entrance)	3,085	438
3	A620 Gainsborough Road (west of Sturton Road roundabout)	5,297	672
4	A620 Saundby Road (north of Sturton Road roundabout)	8,130	1,016

## 7.5 Development Design and Impact Avoidance

7.5.1 As set out in **Chapter 4: The Proposed Development**, there are areas for which there is currently variability in the design that could affect the assessment. The Rochdale Envelope defined for building sizes and limits of deviation for building locations do not affect this assessment and is therefore not considered further.

7.5.2 Traffic movements would be controlled during the Proposed Development construction phase in order to minimise potential impacts on the surrounding road network, namely construction HGVs arriving or departing the West Burton Power Station Site would travel to/from the north via the A620. Signage is already in place at the West Burton Power Station Site entrance directing HGVs north towards the A620. In addition, a HGV and Abnormal Indivisible Load (AIL) routing plan would be included within a Construction Traffic Management Plan (CTMP) which HGV drivers would be required to adhere to, controlled by a Requirement of the DCO.

7.5.3 In addition to the above, the Applicant would implement a range of good practice mitigation measures during the construction phase to minimise traffic impacts upon local highways, including:

- Implementation of a Construction Workers Travel Plan (CWTP) aimed at identifying measures and establishing procedures to encourage construction workers to adopt modes of transport which reduce reliance on single occupancy private car use (a Framework CWTP is provided in **Appendix 7A** (PEI Report Volume II)).

- Liaison with the appointed contractor for the potential to implement construction worker minibuses and car sharing options (considered as part of the CWTP).
- The contractor would be required to prepare a CTMP to identify a number of measures to control the routing and impact that HGVs would have on the local road network during construction (a framework CTMP is provided in **Appendix 7A** (PEI Report Volume II)). It is proposed that all construction HGVs would be required to arrive and depart the West Burton Power Station Site from the north via the A620 avoiding the village of Sturton-le-Steeple.

7.5.4 Once the Proposed Development is operational, up to 15 permanent operational roles would be created. Due to the very low traffic flows this would generate, no mitigation measures are proposed.

7.5.5 Decommissioning would be expected to require some traffic movements associated with the removal (and recycling, as appropriate) of material arising from demolition and potentially the import of materials for land restoration and re-instatement. To minimise the impacts of decommissioning upon local highways, it is anticipated that a Decommissioning Traffic Management Plan (DTMP) would be prepared to control the routing and impact of HGVs.

## 7.6 Likely Impacts and Effects

### Construction

7.6.1 Access to and from the West Burton Power Station Site for construction workers would be via the existing entrance located off the C2 Gainsborough Road.

7.6.2 Construction of the Proposed Development is due to start in Q2 2020 and would be undertaken in up to three phases over a period of up to 6 years, construction activities are thus anticipated to be completed in 2026. However, given that the proposed build programme is flexible, an accelerated construction programme comprising a single phase build lasting 36 months (starting in Q2 2023 and ending Q2 2026) should be considered in order to represent a 'realistic' worst-case scenario for traffic assessment purposes, based upon the Applicant's experience developing generating stations of a similar scale and nature to the Proposed Development.

7.6.3 It is expected that the construction workforce would peak at approximately 200 workers per day in months 61 – 63 (i.e. Q2 2025). A profile of the anticipated daily workforce each month through the construction period is provided in **Appendix 7A** (PEI Report Volume II). The standard construction working hours for the Proposed Development would be 07:00 to 19:00 Monday to Friday (except bank holidays) and 08:00 to 18:00 on Saturday. Key exceptions to these working hours could include activities that must continue beyond these hours and non-noisy activities with night working if desired. However, the traffic impacts associated with any potential extended working hours is not considered material due to the significantly lower traffic volumes when compared to daytime working and the fact that any extension to working hours would be temporary.

7.6.4 Based on the methodology contained within the TA (**Appendix 7A** in PEI Report Volume II), the weekday construction worker shift is likely to generate approximately 113 vehicular trips (one-way) during the AM arrival and PM departure periods at the peak of construction.

7.6.5 HGVs delivering construction materials would access the West Burton Power Station Site from the existing site entrance located off the C2 Gainsborough Road with all HGVs arriving and departing to/ from the north via the A620. The volume of HGVs associated with construction of the Proposed Development on the network would be at its maximum of 112 two-way daily vehicle movements (56 in and 56 out) at the peak of construction in months 61 – 63. Deliveries would be made between 07:00 and 19:00 hours.

7.6.6 A number of Abnormal Indivisible Loads (AIL) movements are expected to be required during the construction programme, as associated with the delivery of large items of plant and equipment. The

ports of Goole, Hull and Immingham are situated nearest the Site. Historically, delivery of AILs to the West Burton Power Station Site have been received at the Port of Hull and barged down the River Trent to a jetty at Cottam Power Station (also owned and operated by EDF Energy). The components have then been transported for the final six mile road journey to the West Burton Power Station Site through the villages of Treswell, South and North Leverton and Sturton-le-Steeple. This AIL route is, therefore, already an established route option and no further assessment of this route is considered necessary, should the Proposed Development require AILs.

7.6.7 A second AIL route option that could be considered is via the strategic road network. Detailed consideration would be given to the appropriate delivery port and AIL routes during the detailed design. However, it is a reasonable assumption that all major ports are able to accommodate abnormal loads and that adequate access to the strategic road network is achievable. On this basis, only the AIL route from the strategic network to the West Burton Power Station Site requires assessment.

7.6.8 It is particularly worthy of note that the historical heavy load route to the West Burton Power Station Site utilises the A614 and A631 from the A1. This route has historically been used to deliver heavy electrical generation and transmission equipment of up to approximately 250 tonnes (ref: Beckingham Marshes Access Survey, Wynns Ltd. (January 2011)). This AIL route is, therefore, already an established heavy load route and thus no further assessment of this route is required. Any routing would be controlled by the CTMP, which would be secured by way of a Requirement of the DCO.

7.6.9 **Table 7-12** summarises the profile of construction phase peak traffic levels (see the TA in **Appendix 7A** (PEI Report Volume II) for further details).

**Table 7-12: Daily construction vehicle profile (peak month of construction)**

Hour Beginning	Construction worker vehicles		Construction HGVs	
	Arrival	Departure	Arrival	Departure
00:00	0	0	0	0
01:00	0	0	0	0
02:00	0	0	0	0
03:00	0	0	0	0
04:00	0	0	0	0
05:00	0	0	0	0
06:00	34	0	0	0
07:00	62	0	4	4
08:00	11	0	4	4
09:00	6	0	5	5
10:00	0	0	5	5

Hour Beginning	Construction worker vehicles		Construction HGVs	
	Arrival	Departure	Arrival	Departure
11:00	0	0	5	5
12:00	0	0	5	5
13:00	0	0	5	5
14:00	0	0	5	5
15:00	0	0	5	5
16:00	0	6	5	5
17:00	0	17	4	4
18:00	0	84	4	4
19:00	0	6	0	0
20:00	0	0	0	0
21:00	0	0	0	0
22:00	0	0	0	0
23:00	0	0	0	0
<b>Total</b>	<b>113</b>	<b>113</b>	<b>56</b>	<b>56</b>

7.6.10 Based on the vehicle assignment contained within the TA (**Appendix 7A**, PEI Report Volume II), **Table 7-13** summarises the likely changes in link flows within the agreed study area for the assessment year 2025 peak of construction. As detailed in the TA (**Appendix 7A**, PEI Report Volume II), HGV traffic has been assigned based on the existing HGV routing agreement which is to/from the north to the A631 via the A620. The construction workers assignment has been based on the geographic split of population within a 30 minute drive-time of the Site.

**Table 7-13: 2025 base + committed + Proposed Development daily two-way traffic flows**

Link no.	Link Description	Baseline Flow (inc. com dev)		Construction traffic		Percentage Increase	
		Total veh.	Total HGVs	Total veh.	Total HGVs	Total veh.	Total HGVs
1	C2 Gainsborough Rd (south of West Burton Power Station Site entrance)	2,838	426	20	0	0.7%	0.0%

Link no.	Link Description	Baseline Flow (inc. com dev)		Construction traffic		Percentage Increase	
		Total veh.	Total HGVs	Total veh.	Total HGVs	Total veh.	Total HGVs
2	C2 Sturton Rd (north of West Burton Power Station Site entrance)	3,085	438	318	112	10.3%	25.6%
3	A620 Gainsborough Road	5,297	672	20	0	0.4%	0.0%
4	A620 Saundby Road	8,130	1,016	298	112	3.7%	11.0%

7.6.11 The assessment matrix (**Table 7-4**) has been used to assess the transportation effects associated with construction traffic at the peak of construction by combining the receptor sensitivity with the magnitude of impact.

#### **Severance**

7.6.12 The predicted change in total traffic associated with Proposed Development construction activities is significantly less than 30% on each link road (very low impact). Therefore, the severance effect is negligible (not significant).

#### **Pedestrian Amenity**

7.6.13 The the change in total traffic (or HGV component) is significantly less than 50% on each link road (very low impact). Therefore, the effect for pedestrian amenity is negligible (not significant).

#### **Fear and Intimidation**

7.6.14 The change in total traffic is significantly less than 30% on each link road (very low impact). Therefore, the effect on fear and intimidation is negligible (not significant).

#### **Highway Safety**

7.6.15 Accident data for the most recent five years has been acquired for the study area and is summarised in **Section 7.4**. The statistics provide information on the location and severity of each Personal Injury Accident (PIA). Given that the level of increase in traffic flow resulting from the development is negligible, the effect on highway safety is negligible (not significant).

#### **Driver Delay**

7.6.16 The performance of a junction is judged by the ratio of flow to capacity (RFC). As a general guide, a junction operating below a threshold of 0.85 is considered to operate within its design capacity. Junction modelling has been undertaken at two key junctions in the vicinity of the West Burton Power Station Site (the results of which are provided in the TA (**Appendix 7A** in PEI Report Volume II)) for the AM and PM peak hours (07:00 – 08:00 and 17:00 – 18:00). This demonstrates that each junction would operate within its design capacity at the peak of construction (Q2 2025). Junction modelling, therefore, indicates that the driver delay effect of the Proposed Development would be negligible (not significant).

## Overview

- 7.6.17 In summary, the effects of Proposed Development construction traffic on all road links and junctions within the study area are considered to be negligible, and therefore not significant.

## Opening and Operation

- 7.6.18 Up to 15 permanent operational roles would be created (refer to **Chapter 13: Socio-Economics**). As indicated in **Chapter 13: Socio-economics**, of these 15 roles, taking into account gross operation worker requirements and the additionality factors, approximately five net operational roles would be generated. However, for the purposes of this assessment, it is assumed that 15 operational roles would be created. Conservatively assuming car occupancy of one, this could equate to an additional 15 cars accessing the West Burton Power Station Site per day (30 vehicle movements).
- 7.6.19 There would also be additional HGV traffic generated by deliveries associated with Proposed Development operational and maintenance plant/equipment. This is expected to equate to a maximum of four HGVs per day. Fuel for the Proposed Development would be natural gas which arrives at Site via pipeline, therefore, there would be no vehicular movements associated directly with the transport of gas to the Site.
- 7.6.20 Due to the very low traffic flows which would result once the Proposed Development is operational in 2026, the vehicle numbers generated would be significantly lower than those anticipated during the construction period. The overall traffic effects during Proposed Development operation are considered to be negligible (not significant).

## Decommissioning

- 7.6.21 Decommissioning would be expected to require some traffic movements associated with the removal (and recycling, as appropriate) of material arising from demolition and potentially the import of materials for land restoration and re-instatement. However, vehicle numbers are not expected to be higher than those experienced during the Proposed Development construction period.
- 7.6.22 Current baseline data collected for the purposes of this assessment will not be valid at the year of Proposed Development decommissioning (i.e. 2066). However, as it is unlikely that baseline traffic figures on local roads would reduce appreciably over the next 40 years, it is considered that the percentage increase in traffic due to Proposed Development decommissioning would be negligible. Therefore, overall the effects of decommissioning traffic would be no greater than that of the construction traffic as detailed herein. Effects are, therefore, anticipated to be not significant.

## 7.7 Mitigation and Enhancement Measures

- 7.7.1 The assessment as presented herein indicates that the Proposed Development is not anticipated to generate any significant traffic-related effects. Therefore, no measures additional to those as indicated in **Section 7.5** are considered to be necessary.

## 7.8 Limitation or Difficulties

- 7.8.1 Other than the current non-availability of baseline accident data for the study area, no limitations or difficulties have been identified.

## 7.9 Residual Effects and Conclusions

- 7.9.1 The additional traffic due to Proposed Development construction activities would result in small, temporary increases of traffic flows, including HGVs, on the roads leading to the West Burton Power Station Site. In line with the significance criteria presented herein and in the TA (**Appendix 7A** in PEI Report Volume II), the effects of construction traffic on all road sections and junctions are considered to be negligible and thus not significant. Notwithstanding, a number of traffic management measures would be implemented during the Proposed Development construction phase to minimise traffic impacts upon the local road network (refer to **Section 7.5**).
- 7.9.2 The generation of traffic during Proposed Development operation would be minimal when compared to the construction period. Therefore, Proposed Development operational phase traffic effects are also considered to be negligible and thus not significant.
- 7.9.3 The generation of traffic during the Proposed Development decommissioning phase is expected to involve traffic movements associated with the removal (and recycling, as appropriate) of material arising from demolition and potentially the import of materials for land restoration and re-instatement. However the effects of decommissioning traffic would be no greater than that of the construction traffic and are therefore considered to be negligible and thus not significant. Notwithstanding, it is anticipated that a Decommissioning Traffic Management Plan (DTMP) would be implemented during the decommissioning phase to control the impact and routing of HGVs.

## 7.10 References

- Ref 7-1 Department for Energy and Climate Change (2011a) National Policy Statement for Energy (EN-1).
- Ref 7-2 Department for Energy and Climate Change (2011b) National Policy Statement for Fossil Fuel Electricity Generating Infrastructure (EN-2).
- Ref 7-3 Department for Communities and Local Government (2012) National Planning Policy Framework.
- Ref 7-4 Nottinghamshire County Council (2011) Nottinghamshire Local Transport Plan 2011 – 2026.
- Ref 7-5 Planning Practice Guidance (2014) Travel Plans, Transport Assessment and Statements in Decision-taking.
- Ref 7-6 Institution of Environmental Management and Assessments (IEMA) (1993) Guidelines for the Environmental Assessment of Road Traffic.
- Ref 7-7 Department for Transport Circular 02/2013 (2013) The Strategic Road Network and the Delivery of Sustainable Development.
- Ref 7-8 Highways England (2015) The Strategic Road Network: Planning for the Future – A Guide to Working with Highways England on Planning Matters.

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## 8. Noise & Vibration

### 8.1 Introduction

- 8.1.1 This chapter of the Preliminary Environmental Information (PEI) Report addresses the potential effects of noise and vibration resulting from the Proposed Development on local Noise Sensitive Receptors (NSRs).
- 8.1.2 Impacts during the construction, operation and decommissioning periods of the Proposed Development are assessed. In particular, the chapter considers potential impacts on identified NSRs in terms of:
- predicted noise and vibration levels during the site clearance and construction works associated with the Proposed Development;
  - predicted changes in road traffic noise levels on the local road network during the construction phase;
  - predicted noise and vibration resulting from operation of the Proposed Development; and
  - predicted noise and vibration resulting from decommissioning of the West Burton C power station are considered comparable to those that would be experienced during the construction period.
- 8.1.3 This chapter is supported by **Figure 8.1** provided in PEI Report Volume III.

### 8.2 Legislation, Planning Policy and Guidance

#### Legislative Background

##### *Environmental Protection Act 1990*

- 8.2.1 The Environmental Protection Act 1990 (EPA) Part 3 (Ref 8-1) prescribes noise (and vibration) emitted from premises (including land) so as to be prejudicial to health or a nuisance as a statutory nuisance.
- 8.2.2 Local Authorities are required to investigate any public complaints of noise and if they are satisfied that a statutory nuisance exists, or is likely to occur or recur, they may serve a noise abatement notice. A notice is served on the person responsible for the nuisance. It requires either simply the abatement of the nuisance or works to abate the nuisance to be carried out, or it prohibits or restricts the activity. Contravention of a notice without reasonable excuse is an offence. Right of appeal to the Magistrates Court exists within 21 days of the service of a noise abatement notice.
- 8.2.3 In determining if a noise complaint amounts to a statutory nuisance the Local Authority can take account of various guidance documents and existing case law; no statutory noise limits exist. Demonstrating the use of '*Best Practicable Means*' (BPM) to minimise noise levels is an accepted defence against a noise abatement notice.

##### *Control of Pollution Act 1974*

- 8.2.4 Sections 60 and 61 of the Control of Pollution Act 1974 (CoPA) (Ref 8-2) provide the main legislation regarding demolition and construction site noise and vibration. If noise complaints are received, a Section 60 notice may be issued by the Local Planning Authority with instructions to cease work until specific conditions to reduce noise have been adopted.

- 8.2.5 Section 61 of the CoPA provides a means for applying for prior consent to carry out noise generating activities during construction. Once prior consent has been agreed under Section 61, a Section 60 notice cannot be served provided the agreed conditions are maintained on-site.
- 8.2.6 CoPA requires that BPM (as defined in Section 72 of CoPA) be adopted for construction noise on any given site. CoPA makes reference to British Standard (BS) 5228 as BPM.

### **Environmental Permitting Regulations 2016**

- 8.2.7 The Environmental Permitting (England and Wales Regulations) 2016 (Ref 8-3) require the application of Best Available Techniques (BAT) to activities performed within installations regulated by the legislation in order to manage the impact of these operations on the surrounding environment. This, therefore, just applies to the operational period, not construction.
- 8.2.8 In terms of noise specifically, the selection of BAT will have to be considered and balanced with releases to different environmental media (air, land and water) and to give due consideration to issues such as usage of energy and raw materials. Noise, therefore, cannot be considered in isolation from other impacts on the environment.
- 8.2.9 The definition of pollution includes *'emissions which may be harmful to human health or the quality of the environment, cause offence to human senses or impair or interfere with amenities and other legitimate uses of the environment'* (clause 2). BAT is therefore likely to be similar, in practice, to the requirements of the Statutory Nuisance legislation which requires the use of BPM to prevent or minimise noise nuisance. In the case of noise, *'offence of any human senses'* may be judged by the likelihood of complaints. However, the lack of complaint should not necessarily imply the absence of a noise problem. In some cases it may be possible, and desirable, to reduce noise emissions still further at reasonable costs and this may therefore represent BAT for the control of noise emissions from an installation. Consequently, the aim of BAT should be to ensure that there is no reasonable cause for annoyance to persons beyond the installation boundary.
- 8.2.10 Guidance regarding Environmental Permitting and noise is available in the Environment Agency's Integrated Pollution Prevention and Control (IPPC) H3 document 'Horizontal Guidance for Noise Part 2 - Noise assessment and Control' (Ref 8-4). However, *'Horizontal Guidance for Noise Part 1 – Regulation and Permitting'* (Ref 8-5), which provided useful guidance relating to noise limits from industrial installations in terms of absolute rating levels and rating levels relative to background noise levels (as defined in BS 4142:1997 (now superseded)) was withdrawn in February 2016. Therefore, industry wide noise limits no longer apply.

## **Planning Policy Context**

### **National Planning Policy**

#### **National Policy Statements for Energy**

- 8.2.11 Section 5.11 of the Overarching National Policy Statement (NPS) for Energy (EN-1) (Ref 8-6) refers to the Government's policy on noise within the Noise Policy Statement for England (discussed further below) and sets out requirements for noise and vibration assessment for Nationally Significant Infrastructure Projects, such as the Proposed Development.
- 8.2.12 With regards decision making, NPS EN-1 states:

*"The project should demonstrate good design through selection of the quietest cost-effective plant available; containment of noise within buildings wherever possible; optimisation of plant layout to minimise noise emissions; and, where possible, the use of landscaping, bunds or noise barriers to reduce noise transmission."* (paragraph 5.11.8)

8.2.13 **Section 9.5** describes the impact avoidance measures identified relevant to the Proposed Development.

8.2.14 The NPS for Fossil Fuel Electricity Generating Infrastructure (EN-2) (Ref 8-7) sets out policy specific to fossil fuel power stations. In paragraph 2.7.1, specific sources of noise are identified. Those that are relevant to the Proposed Development include ‘*the gas and steam turbines that operate continuously during normal operation*’. It then reiterates the point made in NPS EN-1, stating that:

*“The primary mitigation for noise from fossil fuel generating stations is through good design, including enclosure of plant and machinery in noise-reducing buildings wherever possible and to minimise the potential for operations to create noise” and goes on to state that “Noise from gas turbines should be mitigated by attenuation of exhausts to reduce any risk of low-frequency noise transmission.”* (paragraph 2.7.5)

8.2.15 **Table 8-1** provides a summary of the NPS advice regarding noise and vibration and how each has been considered.

**Table 8-1: Summary of relevant NPS advice regarding Noise and Vibration**

Summary of NPS	Consideration within the Chapter
<b>NPS EN-1</b>	
<p>Paragraph 5.11.4 states: <i>“Where noise impacts are likely to arise from the proposed development, the applicant should include the following in the noise assessment:</i></p> <ul style="list-style-type: none"> <li>• <i>A description of the noise generating aspects of the development proposal leading to noise impacts, including the identification of any distinctive, tonal, impulsive or low frequency characteristics of the noise;</i></li> <li>• <i>Identification of noise sensitive premises and noise sensitive areas that may be affected;</i></li> <li>• <i>The characteristics of the existing noise environment;</i></li> <li>• <i>A prediction of how the noise environment will change with the proposed development;</i></li> <li>• <i>In the shorter term such as during the construction period;</i></li> <li>• <i>In the longer term during the operating life of the infrastructure;</i></li> <li>• <i>At particular times of the day, evening and night as appropriate;</i></li> <li>• <i>An assessment of the effect of predicted changes in the noise; and</i></li> <li>• <i>Measures to be employed in mitigation noise.</i></li> </ul> <p><i>The nature and extent of the noise assessment should be proportionate to the likely noise impact.”</i></p>	<p>For descriptions of noise generating aspects of the development see <b>Section 8.6</b>.</p> <p>Noise Sensitive Premises have been identified in <b>Table 8.4</b> – Monitoring Locations.</p> <p>Information relating to the existing noise environment has been presented in <b>Section 8.4</b>.</p> <p>Both construction and operational impacts have been presented in <b>Section 8.6</b>.</p> <p>The mitigation of construction and operational noise has been discussed in <b>Section 8.7</b>.</p>

Summary of NPS	Consideration within the Chapter
<p>Paragraph 5.11.5 states: <i>“The noise impact of ancillary activities associated with the development, such as increased road and rail traffic movements, or other forms of transportation, should also be considered.”</i></p>	<p>Construction related traffic noise has been assessed in <b>Section 8.6.</b></p>
<p>Paragraph 5.11.6 states: <i>“Operational noise, with respect to human receptors, should be assessed using the principles of the relevant British Standards and other guidance. Further information on assessment of particular noise sources may be contained in the technology-specific NPSs. In particular, for...electricity networks (EN-5) there is assessment guidance for specific features of those technologies. For the prediction, assessment and management of construction noise, reference should be made to any relevant British Standards and other guidance which also give examples of mitigation strategies.”</i></p>	<p>The effects of operational noise and its impact on human receptors can be found between <b>Section 8.6.</b></p>
<p>Paragraph 5.11.7 states: <i>“The applicant should consult EA and Natural England (NE), as necessary and in particular with regard to assessment of noise on protected species or other wildlife. The results of any noise surveys and predictions may inform the ecological assessment. The seasonality of potentially affected species in nearby sites may also need to be taken into account.”</i></p>	<p>Potential effects of noise on ecology and nature conservation are considered in <b>Chapter 9: Ecology and Nature Conservation.</b></p>
NPS EN-2	
<p>Paragraph 2.7.2 states: <i>“The ES should include a noise assessment as described in Section 5.11 in EN-1.”</i></p>	<p>A noise assessment is included within this chapter (<b>Chapter 8</b>) of the PEI Report, and will be refined within the Environmental Statement (ES) that accompanies the application for development consent (Application), as necessary.</p>

### National Planning Policy Framework

- 8.2.16 The National Planning Policy Framework (NPPF) was introduced in March 2012 (Ref 8-8). The document sets out the Government’s planning policies for England and how these are expected to be applied. The Framework supersedes the previous guidance document PPG 24 ‘*Planning and Noise*’ (Ref 8-9).
- 8.2.17 The NPPF is a matter which the Secretary of State (SoS) is likely to consider ‘*relevant and important*’ in determining an application for a development consent.
- 8.2.18 The planning system is required to contribute to and enhance the natural and local environment. Consequently, the aim is to prevent both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of noise pollution.
- 8.2.19 The NPPF states that planning policies and decisions should aim to:

- *“avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*
- *mitigate and reduce to a minimum other adverse impacts on quality of life arising from noise from new development, including through the use of conditions;*
- *recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established [subject to the provisions of the Environmental Protection Act 1990 and other relevant law]; and*
- *identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.”* (paragraph 123)

8.2.20 With regards to ‘adverse effects’ and ‘significant adverse effects’ the NPPF refers to the Noise Policy Statement for England Explanatory Note (NPSE) (Ref 8-10), which is described below.

#### Noise Policy Statement for England

8.2.21 The NPSE seeks to clarify the underlying principles and aims in existing policy documents, legislation and guidance that relate to noise. The NPSE applies to all forms of noise, including environmental noise, neighbour noise and neighbourhood noise.

8.2.22 The statement sets out the long term vision of the government’s noise policy, which is to:

*“promote good health and a good quality of life through the effective management of noise within the context of policy on sustainable development”.* (paragraph 2.15)

8.2.23 This long-term vision is supported by three aims:

- *“avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvements of health and quality of life.”* (paragraph 1.7)

8.2.24 The long-term policy vision and aims are designed to enable decisions to be made regarding what is an acceptable noise burden to place on society.

8.2.25 The ‘Explanatory Note’ within the NPSE provides further guidance on defining ‘significant adverse effects’ and ‘adverse effects’ using the concepts:

- *“No Observed Effect Level (NOEL) - the level below which no effect can be detected. Below this level no detectable effect on health and quality of life due to noise can be established;*
- *Lowest Observable Adverse Effect Level (LOAEL) - the level above which adverse effects on health and quality of life can be detected; and*
- *Significant Observed Adverse Effect Level (SOAEL) - the level above which significant adverse effects on health and quality of life occur.”*

8.2.26 The three aims can therefore be interpreted as follows:

- the first aim is to avoid noise levels above the SOAEL;
- the second aim considers situations where noise levels are between the LOAEL and SOAEL. In such circumstances, all reasonable steps should be taken to mitigate and minimise the effects. However, this does not mean that such adverse effects cannot occur; and
- the third aim seeks, where possible, to positively improve the health and quality of life through the pro-active management of noise whilst also taking account of the guiding principles of

sustainable development. It is considered that the protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim.

8.2.27 The NPSE recognises that it is not possible to have single objective noise-based measures that define the SOAEL, LOAEL and NOEL that are applicable to all sources of noise in all situations. The levels are likely to be different for different noise sources, receptors and at different times of the day.

**Planning Practice Guidance**

8.2.28 In March 2014, DCLG released its Planning Practice Guidance (PPG) web-based resource to support the NPPF (Ref 8-11). The guidance advises that local planning authorities' should consider:

- *“Whether or not a significant adverse effect is occurring or likely to occur;*
- *Whether or not an adverse effect is occurring or likely to occur; and*
- *Whether or not a good standard of amenity can be achieved.”*

8.2.29 This guidance introduced the additional concepts of NOAEL (No Observed Adverse Effect Level), and UAEL (Unacceptable Adverse Effect Level). Full details of the PPG on effects are provided in **Table 8-2**.

8.2.30 Factors to be considered in determining if noise is a concern are identified including the absolute noise level of the source, the existing ambient noise climate, time of day, frequency of occurrence, duration, character of the noise and cumulative impacts.

8.2.31 With particular regard to mitigating noise impacts on residential development, the guidance highlights that impacts may be partially off-set if residents have access to a relatively quiet façade as part of their dwelling or a relatively quiet amenity space (private, shared or public).

**Table 8-2: Planning Practice Guidance**

<b>Perception</b>	<b>Examples of outcomes</b>	<b>Increasing effect level</b>	<b>Action</b>
Not noticeable	No effect	No observed effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude; can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No observed adverse effect	No specific measures required
<b>Lowest Observed Adverse Effect Level</b>			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude (e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise). Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed adverse effect	Mitigate and reduce to a minimum

Perception	Examples of outcomes	Increasing effect level	Action
<b>Significant Observed Adverse Effect Level</b>			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude (e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise). Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant observed adverse effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/ or an inability to mitigate effect of noise leading to psychological stress or physiological effects (e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory).	Unacceptable adverse effect	Prevent

## Local Planning Policy

### *Bassetlaw District Council*

8.2.32 The Bassetlaw District – Local Development Framework (December 2011) (Ref 8-12), has been reviewed and no policies have been identified which relate specifically to noise emissions from the Proposed Development.

### *West Lindsey District Council*

8.2.33 As described in **Chapter 5: Legislative Context and Planning Policy Framework**, policy is provided by a range of local documents; the most important of which is the adopted Central Lincolnshire Local Plan, published in April 2017 (Ref 8-13).

8.2.34 The Central Lincolnshire Local Plan 2017, includes policy LP26: Design and Amenity which states:

*“All development...must achieve high quality sustainable design that contributes positively to local character, landscape and townscape, and supports diversity, equality and access for all.”*

8.2.35 It goes onto state:

*“Development proposals will be assessed against the following relevant design and amenity criteria:*

#### **Amenity Considerations**

*The amenities which occupiers of neighbouring properties may reasonably expect to enjoy must not be unduly harmed by or as a result of development. Proposals should demonstrate, where applicable, how the following matters have been considered, in relation to both the construction and life of the development:*

- *m. Compatibility with neighbouring land uses; and*
- *r. Adverse noise and vibration.”*

## Other Guidance

### **British Standard 7445-1:2003 and 7445-2:1991**

- 8.2.36 BS 7445 *'Description and measurement of environmental noise'* (Ref 8-14 and Ref 8-15) defines parameters, procedures and instrumentation required for noise measurement and analysis.

### **British Standard 5228:2009+A1:2014**

- 8.2.37 BS 5228-1 *'Code of practice for noise and vibration control on construction and open sites. Noise'* (Ref 8-16) provides a 'best practice' guide for noise control, and includes Sound Power Level (L<sub>w</sub>) data for individual plant as well as a calculation method for noise from construction activities. BS 5228-2 *'Code of practice for noise and vibration control on construction and open sites. Vibration'* (Ref 8-17) provides comparable 'best practice' for vibration control, including guidance on the human response to vibration.

### **British Standard 6472:2008**

- 8.2.38 BS 6472-1 *'Guide to evaluation of human exposure to vibration in buildings Part 1: Vibration sources other than blasting'* (Ref 8-18) presents recommended frequency weighted vibration spectra (for continuous vibration) and vibration dose values (VDV) (for intermittent vibration) above which adverse comment is likely to occur in residential properties.

### **British Standard 7385:1993**

- 8.2.39 BS 7385-2 *'Evaluation and measurement for vibration in buildings. Guide to damage levels from groundborne vibration'* (Ref 8-19) presents guide values for transient and continuous vibration, above which there is a likelihood of cosmetic damage. The standard establishes the basic principles for carrying out vibration measurements and processing the data, with regard to evaluating vibration effects on buildings.

### **British Standard 4142:2014**

- 8.2.40 BS 4142 *'Methods for rating and assessing industrial and commercial sound'* (Ref 8-20) can be used for assessing the effect of noise of an industrial nature, including mechanical services plant noise. The method compares the difference between 'rating level' of the industrial noise, with the 'background level' at the receptor position.

### **World Health Organisation**

- 8.2.41 The World Health Organisation's (WHO) *'Guidelines for Community Noise'* (Ref 8-21) recommend external daytime and evening environmental noise limits, and internal night-time limits to avoid sleep disturbance.
- 8.2.42 The WHO *'Night Noise Guidelines for Europe'* (Ref 8-22) recommend updated guidelines on night-time noise limits to avoid sleep disturbance.

### **Calculation of Road Traffic Noise**

- 8.2.43 Department of Transport (DfT)/Welsh Office Memorandum *'Calculation of Road Traffic Noise'* (Ref 8-23) describes procedures for traffic noise calculation, and is suitable for environmental assessments of schemes where road traffic noise may have an effect.

### **Design Manual for Road and Bridges**

- 8.2.44 The Highways England *'Design Manual for Road and Bridges Volume 11 Section 3 Part 7 HD213/11 (Revision 1) Traffic Noise and Vibration'* (DMRB) (Ref 8-24) provides guidance on the

appropriate level of assessment to be used when assessing the noise and vibration effects arising from all road projects, including new construction, improvements and maintenance. The guidance can also be used for assessing changes in traffic noise levels as a result of non-road projects such as this.

**ISO 9613-2:1996**

8.2.45 ISO 9613-2:1996 ‘Attenuation of Sound during Propagation Outdoors, Part 2: General Method of Calculation’ (Ref 8-25) specifies an engineering method for calculating the attenuation of sound during propagation outdoors in order to predict the levels of environmental noise at a distance from a variety of sources.

**ISO 4866-2:1996**

8.2.46 ISO 4866:2010 ‘Mechanical Vibration and Shock – Vibration of Fixed Structures – Guidelines for the Measurement of Vibrations and Evaluation of Their Effects on Structures’ (Ref 8-26) establishes the principals for carrying out vibration measurement and processing data with regard to evaluating vibration effects on structures.

### 8.3 Assessment Methodology and Significance Criteria

#### Consultation

8.3.1 **Table 8-3** summarises the consultation responses of relevance to noise and vibration received as a result of the Scoping Opinion (**Appendix 1A** (PEI Report Volume II)).

**Table 8-3: Consultation summary table**

Consultee or organisation approached	Date and nature of consultation	Method	Summary of Response
Secretary of State (SoS)	The SoS agrees that the methodology and choice of noise receptors should be confirmed with the BDC Environmental Health Officer (EHO) and in so far as it relates to the Environmental Permit, with the EA. The SoS recommends that the Applicant take into account the noise monitoring locations set out by WLDC in their scoping response	Scoping Opinion Comment	The choice of monitoring locations was informed by the annual West Burton noise monitoring programme, and supplemented through liaison with BDC and WLDC via the Scoping Opinion. The seven selected positions were chosen to be representative of the potentially worst-affected and closest NSRs to the Site in each direction.
SoS	Detailed information should be provided on the construction and operational noise data and assumptions used to underpin the proposed noise modelling (for example atmospheric and ground parameters used in ISO 9613-2 calculations).	Scoping Opinion Comment	Full details of the assumptions made within the construction and operational noise predictions will be provided in the ES.
SoS	The SoS acknowledges the	Scoping	BS4142:2014 has been used

Consultee or organisation approached	Date and nature of consultation	Method	Summary of Response
	<p>Applicant's intention to use BS4142:2014 criteria to assess a likely significant operational noise effect which is appropriate having had regard to the nature of the Proposed Development. The SoS reminds the Applicant of the requirements in the Noise Policy Statement for England (NPSE), which suggests that noise assessment thresholds should be described in terms of the Lowest Observed Adverse Effect Level (LOAEL) and Significant Observed Adverse Effect Level (SOAEL). The Applicant should identify mitigation measures to address adverse effects.</p>	<p>Opinion Comment</p>	<p>to assess the significance of operational noise, see <b>Section 8.6</b>.</p> <p>AECOM's interpretation of the guidance provided within NPSE and BS 4142:2014 with respect to effect significance is defined in <b>Section 8.3</b> and through the combined use of <b>Tables 8.13, 8.14</b> and <b>8.15</b>.</p>
<p>SoS</p>	<p>Scoping Report paragraph 5.4.2 states that annual noise surveys associated with WBA have been undertaken. The surveys include day, evening and night 15 minute noise measurements undertaken at noise sensitive receptors. Whilst the SoS notes that the Applicant proposes to agree noise monitoring requirements with the BDC EHO, the Applicant would also need to provide a clear justification for any departure from the reference time intervals stated within BS 4142:2014.</p>	<p>Scoping Opinion Comment</p>	<p>Referenced in <b>Section 8.6</b> and no departure from BS 4142:2014 methodology has been made.</p>
<p>SoS</p>	<p>The noise assessment should state any assumptions made in relation to the rating level for operational noise sources and the range of likely operational conditions, allowing for diurnal variation.</p>	<p>Scoping Opinion Comment</p>	<p>The assumptions related to the prediction of rating levels for different assessment periods and operational configurations are presented in the <b>Section 8.6</b>.</p>
<p>SoS</p>	<p>Scoping Report paragraph 5.4.10 states that the focus of the assessment will be on recommendations for appropriate mitigation. The SoS recommends that mitigation proposals are presented in the form of Construction Noise and</p>	<p>Scoping Opinion Comment</p>	<p>Recommendations relating to the construction related impact mitigation have been outlined in <b>Section 8.5</b> including reference to a DCO Requirement.</p>

Consultee or organisation approached	Date and nature of consultation	Method	Summary of Response
	Vibration Management Plans or as part of a CEMP and/or that the Applicant demonstrates that such mitigation is secured through appropriate requirements in the draft DCO.		
SoS	Operational noise mitigation measures should be addressed in the ES, including any measures to address the risk of low frequency noise emissions from gas turbine exhausts. Measures such as engineering design to reduce noise; layout of plant and equipment to minimise transmission; and any operational controls should be discussed. The SoS recommends that operational noise requirements in the draft DCO are clearly distinguished from construction noise requirements.	Scoping Opinion Comment	The level of required attenuation predicted to be required for each proposed plant configuration and potential mitigation methods have been discussed in <b>paragraphs 8.7.6 – 8.7.10</b> and <b>Tables 8.32 and 8.33</b> .
SoS	Consideration should be given to monitoring noise complaints during construction and when the development is operational.	Scoping Opinion Comment	It is proposed that monitoring of potential construction noise complaints would be included within the CEMP. ( <b>Section 8.5</b> ).
SoS	The results from the noise and vibration assessments should inform the terrestrial, aquatic/marine ecological assessments.	Scoping Opinion Comment	The assessment relating to impact on terrestrial, aquatic and marine ecology has been considered in <b>Chapter 9: Ecology and Nature Conservation</b> .
Bassetlaw District Council (BDC)	4th May 2017 Confirmation of Proposed Baseline monitoring Locations	Email	Confirmation of BDC agreement to the proposed scope of baseline survey.
West Lindsey District Council (WLDC)	4 <sup>th</sup> May 2017 Confirmation of Proposed Baseline monitoring Locations	Email	Confirmation of agreement to the proposed scope of baseline survey. Request for an additional location at the southern edge of Gainsborough (included in survey – see <b>Section 8.4</b> ).

## Assessment Methods

### Baseline Sound Surveys

- 8.3.2 The location of potential NSRs in proximity to the Site has been considered when assessing the effects associated with noise and vibration levels from the construction, operation and decommissioning periods of the Proposed Development.
- 8.3.3 Key NSR locations have been selected which are considered to be representative of the nearest and potentially most sensitive existing receptors to the Site. It is considered that if noise and vibration levels are suitably controlled at the key receptors identified, then noise and vibration levels would be suitably controlled at other sensitive receptors in the surrounding area.
- 8.3.4 In order to define existing sound conditions at NSRs, long-term ambient sound measurements have been undertaken at seven representative residential NSR locations around the existing West Burton Power Station Site. The noise monitoring locations and protocol were discussed in advance and during the surveys with Bassetlaw District Council (BDC) and West Lindsey District Council (WLDC). The seven locations are shown in **Table 8-4** and on **Figure 8.1** (PEI Report Volume III).

**Table 8-4: Monitoring locations**

Monitoring location	Address	Details
ML1	Kent House, North Street, Sturton- le-Steeple	Located in the rear garden to the north of the residential property
ML2	Gatekeepers House, West Burton	Located in the rear garden to the north of the residential property
ML3	Mill House Farm	Located in the rear garden to the south of the residential property
ML4	Manor Cottage, East Street, Bole	Located in the rear garden to the south of the property
ML5	194 Lea Road, Gainsborough	Located in the rear garden to the west of the residential property
ML6	Green Lane, Lea	Located in the rear garden to the north of the residential property
ML7	Knaith Hall, Knaith	Located in the garden to the west of the residential property

- 8.3.5 All measurements were undertaken between Friday 14<sup>th</sup> July and Monday 24<sup>th</sup> July 2017.
- 8.3.6 Daytime relates to the period between 07:00 and 23:00 (with evening between 19:00 and 23:00), and night-time between 23:00 and 07:00.
- 8.3.7 All measurements were taken at approximately 1.2-1.5m above ground level (AGL), with the exception of ML6, which was approximately 1.8m AGL (due to having to attach the microphone to a garden trellis), and in accordance with the requirements of British Standard BS 7445 (Ref 8-14). All monitoring locations were positioned at least 3.5m from any reflecting surface, other than the ground (*i.e.* free-field). Details of ongoing activities and typical noise sources in the area were recorded during visits to the monitoring locations to set up and collect the measurement equipment.

### Noise Survey Instrumentation

- 8.3.8 Details of the instrumentation (sound level meters (SLMs)) used during the surveys are presented in **Table 8-5**.

**Table 8-5: Measurement equipment**

Monitoring location	Manufacturer	SLM model	SLM serial number	Microphone model	Microphone serial number
ML1	Rion	NL-52	01021278	Rion UC59	04334
ML2	Svantek	959	15606	GRAS 40AE	98114
ML3	B&K	2250	2827270	B&K 4189	2820205
ML4	Svantek	958	14693	GRAS 40AE	17973
ML5	Norsonic	Nor140	1403077	NOR1225	91924
ML6	B&K	2238	2381585	B&K 4188	2200371
ML7	B&K	2250	2827271	B&K 4189	2820200

- 8.3.9 All SLMs used were Class 1 precision instruments. Each was programmed to log a number of parameters including  $L_{Aeq}$ ,  $L_{A90}$  and  $L_{Amax}$  values, in 15-minute contiguous intervals.
- 8.3.10 The calibration levels were checked prior to and following all measurements with a Brüel & Kjær 4231 field calibrator (serial number 2217877). No significant drift, more than 0.2 dB, occurred. Full calibration details are available upon request.

**Meteorological Conditions**

- 8.3.11 Observations regarding weather conditions were made whilst attending the Site. In addition, a weather monitoring station was in operation at ML3. The weather station collected data relating to the wind speed (average and max), direction, precipitation and temperature.
- 8.3.12 At the start of the survey period (Friday 14<sup>th</sup> July 2017), weather conditions on-site were observed to be dry with patchy cloud; wind blowing from a north westerly direction with an average speed of approximately 2 m/s and a max wind speed of approximately 4 m/s. Road surfaces were noted to be dry and the ambient temperature was approximately 20°C.
- 8.3.13 During the second site visit (Monday 17<sup>th</sup> July 2017) weather conditions were noted to be dry with minimal cloud coverage and no wind. Road surfaces were noted to be dry and the ambient temperature was approximately 28°C.
- 8.3.14 Upon collection of the survey (Monday 24<sup>th</sup> July 2017), weather conditions on-site were observed to be wet with thick cloud; wind blowing from a easterly direction with an average speed of approximately 1.8 m/s and a max wind speed of approximately 2.2 m/s. Road surfaces were noted to be wet and the ambient temperature was approximately 14°C.
- 8.3.15 A daily overview of the data collected from the weather station has been presented in **Table 8-6**.

**Table 8-6: Daily Overview of Meteorological Conditions**

Date	Time Period	Wind Direction Average Degrees Clockwise from North	Range of 15-minute Average Wind Speeds (m/s)	Ambient Rain Gauge (mm)
Friday 14th July	16:30 – 23:00	283	0.7 – 3.0	0.3
	23:00 – 07:00	200	0.6 – 2.0	0.1

Date	Time Period	Wind Direction Average Degrees Clockwise from North	Range of 15-minute Average Wind Speeds (m/s)	Ambient Rain Gauge (mm)
Saturday 15th July	07:00 – 23:00	201	1.2 – 3.2	1.0
	23:00 – 07:00	212	1.0 – 2.9	0.0
Sunday 16th July	07:00 – 23:00	290	0.6 – 2.6	0.0
	23:00 – 07:00	233	0.2 – 1.3	0.0
Monday 17th July	07:00 – 23:00	262	0.4 – 1.8	0.0
	23:00 – 07:00	197	0.3 – 0.6	0.0
Tuesday 18th July	07:00 – 23:00	79	0.3 – 2.0	0.0
	23:00 – 07:00	44	0.5 – 1.9	0.0
Wednesday 19th July	07:00 – 23:00	139	1.0 – 3.8	0.0
	23:00 – 07:00	207	0.4 – 3.2	2.4
Thursday 20th July	07:00 – 23:00	269	1.1 – 3.3	10.3
	23:00 – 07:00	153	1.0 - 3.8	0.0
Friday 21st July	07:00 – 23:00	151	2.2 – 5.1	0.0
	23:00 – 07:00	133	0.6 – 3.4	11.2
Saturday 22nd July	07:00 – 23:00	194	0.2 – 4.3	8.1
	23:00 – 07:00	209	0.2 – 1.8	0.0
Sunday 23rd July	07:00 – 23:00	287	0.4 - 2.0	2.3
	23:00 – 07:00	215	1.2 – 2.3	0.1
Monday 24th July	07:00 – 13:00	310	2.0 – 5.1	0.0

8.3.16 Overall the meteorological conditions were in general within the limits considered suitable by relevant standards for collecting sound level measurements, with the exception of some elevated wind speeds during Friday 21<sup>st</sup> July and elevated levels of precipitation during Thursday 20<sup>th</sup> daytime and Friday 21<sup>st</sup> July night-time. However, the measured levels are considered representative of a range of conditions prevailing at NSRs within the study area. No periods of baseline sound level data collection were therefore excluded from the assessment.

### Assessment of Construction Noise Effects

8.3.17 Before the appointment of a construction contractor, site specific details on the construction activities, programme and number or type of construction plant are not yet available. Therefore, detailed construction noise predictions at specific NSRs have not been undertaken. Nevertheless, indicative construction noise predictions have been undertaken using the calculation methods set out in BS 5228:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites' (Ref 8-16), based upon construction information from other power stations projects and data provided by EDF Energy relating to the construction period of the Proposed Development.

8.3.18 The calculation method provided in BS 5228 takes account of factors including the number and types of equipment operating, their associated Sound Power Levels (SWLs), their modes of operation (% on-times within the working period), the distance to NSRs, and the effects of any intervening ground cover or barrier/topographical screening. This allows prediction of the magnitude of impact.

8.3.19 BS 5228 contains a number of example methodologies for identifying significant construction noise effects based on fixed thresholds or noise level changes. Taking into account this guidance the threshold values detailed in **Table 8-7** have been adopted in this PEI Report to define the SOAEL (the ‘significant observed adverse effect level’, as defined in Section 8.2) and the LOAEL (the ‘lowest observable adverse effect level’) for residential receptors.

**Table 8-7: Construction Noise SOAEL and LOAEL for residential receptors**

Time of Day	SOAEL $L_{Aeq,T}$ dB (façade)	LOAEL $L_{Aeq,T}$ dB (façade)
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	75	65
Evenings (19:00 – 23:00 weekdays) and Weekends (13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays)	65	55
Night-time (23:00 – 07:00)	55	45

8.3.20 The criterion for the SOAEL at residential receptors corresponds to the threshold values for Category C in the BS 5228 example ABC method. Similarly, the criterion for the LOAEL corresponds to the threshold values for Category A in the BS 5228 example ABC method. In accordance with the NPPF and NPSE, it is important to consider receptors that exceed the LOAEL and ensure adverse effects are mitigated and minimised.

8.3.21 When considering exceedances of the SOAEL and LOAEL, other project-specific factors have been taken into account, such as the existing ambient noise levels, number of receptors affected and the frequency and duration of the impact.

8.3.22 Based upon the above, the magnitude of the impact of construction noise on residential receptors has been classified in accordance with the descriptors in **Table 8.8**.

**Table 8-8: Construction Noise magnitude of impact criteria for residential receptors**

Magnitude of Impact	Daytime $L_{Aeq,T}$ dB (façade)	Evening / Weekend $L_{Aeq,T}$ dB (façade)	Night-time $L_{Aeq,T}$ dB (façade)
High	> 80	> 70	> 60
Medium	>75-80	>65-70	>55-60
Low	>65-75	>55-65	>45-55
Very Low	≤ 65	≤ 55	≤ 45

### Assessment of Daytime Construction Works Traffic on the Public Highway

8.3.23 The Proposed Development would affect traffic flows on existing roads in the area surrounding the Site during construction. The assessment focuses on the impact at existing residential properties located alongside the local road network.

8.3.24 Construction traffic noise has been assessed by considering the increase in traffic flows during the construction works, following the guidance of CRTN and DMRB.

8.3.25 18-hour (06:00 – 24:00) Annual Average Weekday Traffic (AAWT) data have been obtained for the year 2025 ‘with’ and ‘without’ construction traffic during the peak construction period, in order to determine if any existing roads are predicted to be subject to a potentially significant change in 18-

hour traffic flows. Basic Noise Level (BNL) calculations have been undertaken to predict the change in noise level between the 'with' and 'without' scenarios.

- 8.3.26 The criteria for the assessment of traffic noise changes arising from construction works have been taken from Table 3.1 of DMRB and are provided in **Table 8-9**.

**Table 8-9: Traffic noise criteria**

Magnitude of impact	Change in traffic noise level $L_{A10,18h}$ dB
High	$\geq 5$
Medium	3 to <5
Low	1 to <3
Very low	<1

- 8.3.27 DMRB advises that an increase in road traffic flows of 25% (where the traffic speed and composition remain consistent) equates to an increase in road traffic noise of 1dB(A). A doubling of traffic flow would be required for an increase in 3dB(A).
- 8.3.28 It is generally accepted that changes in noise levels of 1dB(A) or less are imperceptible, and changes of 1 to 3dB(A) are not widely perceptible. Consequently, at the selected road traffic noise receptors the magnitude of the predicted change in noise levels uses the scale shown in **Table 8-9** above with respect to construction traffic. The criteria are based on the current guidance on short-term changes in traffic noise levels in DMRB. The SOAEL is set at a change in traffic noise of +3dB and the LOAEL at +1dB.

## Assessment of Demolition and Construction Vibration Effects

### Effects on Humans – Annoyance

- 8.3.29 Vibration due to construction activities has the potential to result in adverse impacts at nearby NSRs. The transmission of ground-borne vibration is highly dependent on the nature of the intervening ground between the source and receiver and the activities being undertaken. BS 5228-2: 2009+A1: 2014 'Code of Practice for Noise and Vibration Control on Construction and Open Sites - Vibration' (Ref 8-17) provides data on measured levels of vibration for various construction works, with particular emphasis on piling. Impacts are considered for both damage to buildings and annoyance to occupiers.
- 8.3.30 **Table 8-10** details Peak Particle Velocity (PPV) vibration levels and provides a semantic scale for the description of demolition and construction vibration effects on human receptors, based on guidance contained in BS 5228-2.

**Table 8-10: Construction vibration threshold at residential dwellings**

Peak Particle Velocity (PPV) level	Description	Magnitude of impact
$\geq 10$ mm/s	Vibration is likely to be intolerable for any more than a very brief exposure to this level.	High
1.0 to < 10 mm/s	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents.	Medium

Peak Particle Velocity (PPV) level	Description	Magnitude of impact
0.3 to < 1 mm/s	Vibration might be just perceptible in residential environments.	Low
0.14 to < 0.3 mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.	Very low

- 8.3.31 For residential receptors and other high sensitivity receptors, the LOAEL is defined as a PPV of 0.3mm/s (millimetres per second), this being the point at which construction vibration is likely to become perceptible. The SOAEL is defined as a PPV of 1.0mm/s, this being the level at which construction vibration can be tolerated with prior warning.
- 8.3.32 At receptors above the SOAEL, further consideration of whether an effect is significant is undertaken using professional judgement, taking account of the duration and frequency of the effect, as well as the time of evening/night that the effect would be experienced.
- 8.3.33 In the absence of specific information on likely construction activities and plant, a qualitative assessment based upon professional judgement has been undertaken at this stage. Given the significant distance to residential receptors, this qualitative judgement made is that no significant vibration (medium or high magnitude impacts) is expected to result at residential NSRs from the proposed construction and therefore further assessment is scoped out. However, further consideration is given to the occupants of adjacent buildings associated with WBA and WBB within the West Burton Power Station Site.

**Effects on Buildings**

- 8.3.34 In addition to human annoyance, building structures may be damaged by high levels of vibration. The levels of vibration that may cause building damage are far in excess of those that may cause annoyance. Consequently, if vibration levels are controlled to those relating to annoyance (i.e. 1.0mm/s), then it is highly unlikely that buildings will be damaged by construction vibration levels.
- 8.3.35 The criteria used in this assessment relate to the potential for cosmetic damage, not structural damage. The principal concern is generally transient vibration, for example due to piling.
- 8.3.36 BS 7385-2: 1993 'Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from groundborne vibration' (Ref 8-19) provides guidance on vibration levels likely to result in cosmetic damage and is referenced in BS 5228-2: 2009+A1:2014. Guide values for transient vibration, above which cosmetic damage could occur, are given in **Table 8-11**.

**Table 8-11: Transient vibration guide values for cosmetic damage**

Type of building	Peak component particle velocity in frequency range of predominant pulse	
	4 Hz to 15 Hz	15 Hz and above
Reinforced or framed structures Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	

Type of building	Peak component particle velocity in frequency range of predominant pulse	
Unreinforced or light framed structures Residential or light commercial buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above
<p>NOTE 1: Values referred to are at the base of the building.</p> <p>NOTE 2: For un-reinforced or light framed structures and residential or light commercial buildings, a maximum displacement of 0.6 mm (zero to peak) is not to be exceeded</p>		

8.3.37 BS 7385-2:1993 states that the probability of building damage tends to zero for transient vibration levels less than 12.5 mm/s PPV. For continuous vibration, such as from vibratory rollers, the threshold is around half this value.

8.3.38 It is also noted that these values refer to the likelihood of cosmetic damage. ISO 4866:2010 defines three different categories of building damage:

- cosmetic – formation of hairline cracks in plaster or drywall surfaces and in mortar joints of brick/concrete block constructions;
- minor – formation of large cracks or loosening and falling of plaster or drywall surfaces or cracks through brick/block; and
- major – damage to structural elements, cracks in support columns, loosening of joints, splaying of masonry cracks.

8.3.39 BS 7385-2:1993 defines that minor damage occurs at a vibration level twice that of cosmetic damage and major damage occurs at a vibration twice that of minor damage. Therefore, this guidance can be used to define the magnitude of impact identified in **Table 8.12**.

**Table 8-12: Magnitude of impact – construction vibration building damage**

Magnitude of impact	Damage risk	Continuous vibration level ppv mm/s
High	Major	30
Medium	Minor	15
Low	Cosmetic	6
Very low	Negligible	<6

8.3.40 In the absence of specific information on likely construction activities and plant, a qualitative assessment based upon professional judgement has been undertaken. The qualitative judgement made at this stage, again given the significant distance to residential receptors, is that no significant vibration is expected to result from the proposed construction activities at nearby residential buildings and therefore further assessment of the effects of vibration on such buildings is scoped out. However, further consideration is given to the adjacent buildings within the West Burton Power Station Site.

### Assessment of Operational Noise

8.3.41 The assessment of operational sound levels has been based upon calculations using plant emissions data available at this stage. The data currently available includes: proposed plant equipment (provided by each technology supplier), Sound Power Levels (SWL) relating to the proposed plant, distance between the proposed plant and NSRs and the acoustic screening offered by the existing landscape and existing power station buildings.

- 8.3.42 Based upon the predicted sound levels, an assessment of potential impact at nearby NSRs has been undertaken using the guidance in BS 4142: 2014 *'Methods for rating and assessing industrial and commercial sound'* (Ref 8-20).
- 8.3.43 A key aspect of the BS 4142:2014 assessment procedure is a comparison between the Background Sound Level in the vicinity of residential locations and the Rating Level of the sound source under consideration. The relevant parameters in this instance are as follows:
- background Sound Level –  $L_{A90,T}$  – defined in the Standard as the *'A-weighted sound pressure level that is exceeded by the residual sound for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels'*;
  - specific Sound Level –  $L_s (L_{Aeq,Tr})$  – the *'equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, Tr'*; and
  - rating Level –  $L_{Ar,Tr}$  – the *'specific sound level plus any adjustment made for the characteristic features of the sound'*.
- 8.3.44 Whereas the previous version of BS 4142:1997 allowed for a single correction of +5dB to be made to the Specific Noise Level if one or more of the distinguishable, impulsive or irregular features were considered to be present, BS 4142:2014 allows for corrections to be applied based upon the presence or expected presence of the following:
- tonality: up to +6dB penalty;
  - impulsivity: up to +9dB penalty (this can be summed with tonality penalty); and
  - other sound characteristics (neither tonal or impulsive but still distinctive): + 3dB penalty.
- 8.3.45 Once any adjustments have been made, the Background Sound Level and the Rating Level are compared. The standard states that:
- "typically, the greater the difference, the greater the magnitude of impact.*
- a difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending upon the context.*
- a difference of around +5 dB is likely to be an indication of an adverse impact, depending upon the context.*
- the lower the Rating Level is to the measured Background Sound Level, the less likely it is that the specific sound will have an adverse impact or a significant adverse impact. Where the Rating Level does not exceed the Background Sound Level, this is an indication of the specific sound source having a low impact, depending upon the context."* (Section 11)
- 8.3.46 Importantly, as suggested above, BS 4142:2014 requires that the Rating Level of the noise source under assessment be considered in the context of the environment when defining the overall significance of the impact.
- 8.3.47 BS 4142:2014 suggests that a one hour assessment period is considered during the day and a 15-minute assessment period at night.
- 8.3.48 **Table 8-13** illustrates the adopted magnitude of impact scale used in this assessment based upon the numerical level difference. For BS 4142 assessment purposes the SOAEL is set at a rating level above the background sound level of +10dB, and the LOAEL at +5dB, although it should be remembered that the context assessment (including the absolute level of the sound under consideration) can vary the overall classification of effects.

**Table 8-13: Magnitude of impact for industrial noise including building services**

Magnitude of impact	BS 4142 descriptor	Excess of Rating Level over Background Sound Level (dB)
High	No BS 4142 descriptor for this magnitude level	>15
Medium	Indication of a significant adverse effect, depending upon context	+10 approx.
Low	Indication of an adverse effect, depending upon context	+5 approx.
Very low	Indication of low impact, depending upon context	≤ 0

### Assessment of Operational Vibration

8.3.49 No causes of significant vibration associated with the Proposed Development are known, therefore further assessment of operational vibration is scoped out of this assessment.

### Significance Criteria

8.3.50 Effects are classified based on the magnitude of the impact and the sensitivity or value of the affected receptor. The criteria for assigning the magnitude of impacts are outlined for the various potential impacts during construction, operation and decommissioning, and these are followed by a scale of receptor sensitivity in **Table 8-14** and overall classification of effects matrix in **Table 8-15**.

### Receptor Sensitivity

8.3.51 In accordance with the principles of EIA, the sensitivity of existing receptors to noise (or vibration) impacts during either construction or operational periods has been defined in **Table 8-14**.

**Table 8-14: Sensitivity/value of receptors**

Sensitivity/ value of resource/ receptor	Description	Examples of receptor usage
Very high	Receptors where noise or vibration will significantly affect the function of a receptor	Auditoria/ studios Specialist medical/teaching centres, or laboratories with highly sensitive equipment
High	Receptors where people or operations are particularly susceptible to noise or vibration. Sensitive ecological receptors known to be vulnerable to the effects of noise or vibration	Residential Quiet outdoor areas used for recreation Conference facilities Schools/ educational facilities in the daytime Hospitals/ residential care homes Libraries Ecologically sensitive areas for example Special Protection Areas (SPAs)
Medium	Receptors moderately sensitive to noise or vibration where it may cause some distraction or disturbance	Offices Restaurants/ retail Sports grounds when spectator or noise is not a normal part of the event and where quiet conditions are necessary (e.g. tennis,

Sensitivity/ value of resource/ receptor	Description	Examples of receptor usage
		golf)
Low	Receptors where distraction or disturbance of people from noise or vibration is minimal	Residences and other buildings not occupied during working hours Factories and working environments with existing high noise levels Sports grounds when spectator or noise is a normal part of the event

### Significance of Effects

8.3.55 The following terminology has been used in the assessment to define effects:

- adverse – detrimental or negative effects to an environmental resource or receptor;
- neutral – effects to an environmental resource or receptor that are neither adverse nor beneficial; or
- beneficial – advantageous or positive effect to an environmental resource or receptor.

8.3.56 The effect resulting from each individual potential impact type above is classified according to the magnitude of the impact and the sensitivity or value of the affected receptor using the matrix presented in **Table 8.15**, but where necessary also considering the context of the acoustic environment.

**Table 8-15: Classification of effects**

Sensitivity/ value of resource/ receptor	Magnitude of impact			
	High	Medium	Low	Very low
Very high	Major	Major	Moderate	Minor
High	Major	Moderate	Minor	Negligible
Medium	Moderate	Minor	Negligible	Negligible
Low	Minor	Negligible	Negligible	Negligible

8.3.57 For the purposes of this assessment, negligible and minor effects are not considered to be significant, whereas moderate and major effects are considered to be significant.

### Extent of Study Area

8.3.58 The extent of the study area has been defined to include the nearest receptors/communities in each direction from the Site and alongside the transport corridors that may be affected by changes in road traffic flows during the construction and operational phases of the Proposed Development. Representative NSRs within this study area in all directions from the Site have been identified for the purposes of assessment, to ensure all effects are appropriately considered.

### Sources of Information/ Data

8.3.59 The following sources of information that define the Proposed Development have been reviewed and form the basis of the assessment of likely significant effects of noise and vibration:

- construction plant and equipment from similar power station projects;

- initial estimates of numbers of construction plant and equipment from EDF;
- construction noise data referenced from BS 5228;
- indicative concept layout plans for the Proposed Power Plant Site (see **Figures 4.1a** and **4.1b** in PEI Report Volume III) and the implications of the application of the Rochdale Envelope;
- schedule of buildings and plant for the Proposed Development, including Sound Power Level data (SWLs) and internal reverberant sound pressure levels, provided by Original Equipment Manufacturers (OEMs) and also sourced from similar representative projects;
- AAWT traffic data from the Transport Assessment (TA) for the Proposed Development (see **Appendix 7A**, PEI Report Volume II);
- ordnance Survey mapping of the Site and surrounding area; and
- aerial photography.

## 8.4 Baseline Conditions

### Existing Baseline

#### Sound Survey Results

8.4.1 The processed results from each long-term sound survey position are provided in **Table 8-16** to **Table 8-22**. The  $L_{A90}$  values presented represent the lowest 10<sup>th</sup> percentile of all 15-minute measurements within the time period. Observations regarding the general baseline sound environment at each monitoring location are detailed after the tables.

**Table 8-16: Baseline Sound Levels at ML1 – 4 North Street, Sturton le Steeple**

Date (2017)	Time period	$L_{Aeq,T}$ dB	Highest $L_{Amax,T}$ dB	$L_{A90,T}$ dB
Monday 17th July	15:30 – 23:00*	46	78	39
	23:00 – 07:00	47	72	29
Tuesday 18th July	07:00 – 23:00	50	78	32
	23:00 – 07:00	47	79	29
Wednesday 19th July	07:00 – 23:00	48	80	27
	23:00 – 07:00	47	78	20
Thursday 20th July	07:00 – 23:00	49	76	26
	23:00 – 07:00	43	74	20
Friday 21st July	07:00 – 23:00	53	74	34
	23:00 – 07:00	48	70	25
Saturday 22nd July	07:00 – 23:00	50	89	26
	23:00 – 07:00	43	74	21
Sunday 23rd July	07:00 – 23:00	48	86	29
	23:00 – 07:00	46	71	34
Monday 24 <sup>th</sup> July	07:00 – 13:00*	50	83	35

\* Note – this period does not cover the full 16-hr day period and is therefore may not be directly comparable with other complete time periods.

**Table 8-17: Baseline Sound Levels at ML2 – Gatekeepers House, West Burton**

Date (2017)	Time period	$L_{Aeq,T}$ dB	Highest $L_{Amax,T}$ dB	$L_{A90,T}$ dB
Friday 14th July	15:00 – 23:00*	54	84	45
	23:00 – 07:00	53	86	33
Saturday 15th July	07:00 – 23:00	54	84	38
	23:00 – 07:00	55	91	35
Sunday 16th July	07:00 – 23:00	54	88	39
	23:00 – 07:00	48	77	26
Monday 17th July	07:00 – 23:00	57	90	30
	23:00 – 07:00	48	83	28
Tuesday 18th July	07:00 – 23:00	57	88	38
	23:00 – 07:00	51	78	33
Wednesday 19th July	07:00 – 23:00	53	80	30
	23:00 – 07:00	46	77	27
Thursday 20th July	07:00 – 23:00	52	89	31
	23:00 – 07:00	50	77	35
Friday 21st July	07:00 – 23:00	56	79	44
	23:00 – 07:00	54	84	45
Saturday 22nd July	07:00 – 23:00	53	86	33
	23:00 – 07:00	54	84	38
Sunday 23rd July	07:00 – 23:00	55	91	35
	23:00 – 07:00	54	88	39
Monday 24 <sup>th</sup> July	07:00 – 13:00*	48	77	26

\* Note – this period does not cover the full 16-hr day period and therefore may not be directly comparable with other complete time periods.

**Table 8-18: Baseline Sound Levels at ML3 – Mill House Farm, West Burton**

Date (2017)	Time period	$L_{Aeq,T}$ dB	Highest $L_{Amax,T}$ dB	$L_{A90,T}$ dB
Friday 14th July	16:30 – 23:00*	49	75	34
	23:00 – 07:00	40	68	30
Saturday 15th July	07:00 – 23:00	48	73	35
	23:00 – 07:00	41	73	31

Date (2017)	Time period	$L_{Aeq,T}$ dB	Highest $L_{Amax,T}$ dB	$L_{A90,T}$ dB
Sunday 16th July	07:00 – 23:00	47	76	33
	23:00 – 07:00	43	68	28
Monday 17th July	07:00 – 23:00	51	91	34
	23:00 – 07:00	43	61	34
Tuesday 18th July	07:00 – 23:00	55	84	38
	23:00 – 07:00	41	60	34
Wednesday 19th July	07:00 – 23:00	49	75	38
	23:00 – 07:00	44	75	33
Thursday 20th July	07:00 – 23:00	52	74	34
	23:00 – 07:00	41	60	34
Friday 21st July	07:00 – 23:00	48	72	39
	23:00 – 07:00	47	70	38
Saturday 22nd July	07:00 – 23:00	47	71	34
	23:00 – 07:00	40	69	31
Sunday 23rd July	07:00 – 23:00	46	67	32
	23:00 – 07:00	45	65	30
Monday 24 <sup>th</sup> July	07:00 – 12:45*	51	73	40

\* Note – this period does not cover the full 16-hr day period and therefore may not be directly comparable with other complete time periods.

**Table 8-19: Baseline Sound Levels at ML4 – Manor Cottage, East Street, Bole**

Date (2017)	Time period	$L_{Aeq,T}$ dB	Highest $L_{Amax,T}$ dB	$L_{A90,T}$ dB
Friday 14th July	17:30 – 23:00*	44	88	34
	23:00 – 07:00	42	76	34
Saturday 15th July	07:00 – 23:00	49	88	38
	23:00 – 07:00	41	65	34
Sunday 16th July	07:00 – 23:00	45	79	34
	23:00 – 07:00	43	77	28
Monday 17th July	07:00 – 23:00	45	78	32
	23:00 – 07:00	46	84	36
Tuesday 18th July	07:00 – 23:00	52	86	38
	23:00 – 07:00	46	78	33

Date (2017)	Time period	$L_{Aeq,T}$ dB	Highest $L_{Amax,T}$ dB	$L_{A90,T}$ dB
Wednesday 19th July	07:00 – 23:00	48	86	39
	23:00 – 07:00	44	78	36
Thursday 20th July	07:00 – 23:00	48	80	37
	23:00 – 07:00	45	68	36
Friday 21st July	07:00 – 23:00	52	80	40
	23:00 – 07:00	50	79	38
Saturday 22nd July	07:00 – 23:00	49	79	36
	23:00 – 07:00	47	78	33
Sunday 23rd July	07:00 – 20:15*	48	81	34

\* Note – this period does not cover the full 16-hr day period and therefore may not be directly comparable with other complete time periods.

**Table 8-20: Baseline Sound Levels at ML5 – 194 Lea Road, Gainsborough**

Date (2017)	Time period	$L_{Aeq,T}$ dB	Highest $L_{Amax,T}$ dB	$L_{A90,T}$ dB
Monday 17th July	13:00 – 23:00*	48	89	36
	23:00 – 07:00	40	66	29
Tuesday 18th July	07:00 – 23:00	46	82	37
	23:00 – 07:00	39	78	27
Wednesday 19th July	07:00 – 23:00	51	88	35
	23:00 – 07:00	43	80	29
Thursday 20th July	07:00 – 11:00*	48	76	41

\* Note – this period does not cover the full 16-hr day period and therefore may not be directly comparable with other complete time periods.

**Table 8-21: Baseline Sound Levels at ML6 – Green Lane, Lea**

Date (2017)	Time period	$L_{Aeq,T}$ dB	Highest $L_{Amax,T}$ dB	$L_{A90,T}$ dB
Friday 14th July	16:30 – 23:00*	47	89	36
	23:00 – 07:00	41	72	30
Saturday 15th July	07:00 – 23:00	47	82	35
	23:00 – 07:00	40	82	31
Sunday 16th July	07:00 – 23:00	45	75	35
	23:00 – 07:00	45	83	33

Date (2017)	Time period	$L_{Aeq,T}$ dB	Highest $L_{Amax,T}$ dB	$L_{A90,T}$ dB
Monday 17th July	07:00 – 23:00	45	82	36
	23:00 – 07:00	42	79	26
Tuesday 18th July	07:00 – 23:00	46	80	35
	23:00 – 07:00	42	76	26
Wednesday 19th July	07:00 – 23:00	45	80	34
	23:00 – 07:00	43	74	30
Thursday 20th July	07:00 – 23:00	51	86	35
	23:00 – 07:00	41	79	30
Friday 21st July	07:00 – 23:00	48	82	37
	23:00 – 07:00	45	80	27
Saturday 22nd July	07:00 – 23:00	56	84	31
	23:00 – 07:00	41	75	27
Sunday 23rd July	07:00 – 23:00	46	84	35
	23:00 – 07:00	45	80	31
Monday 24 <sup>th</sup> July	07:00 – 11:45*	50	77	43

\* Note – this period does not cover the full 16-hr day period and therefore may not be directly comparable with other complete time periods.

**Table 8-22: Baseline Sound Levels at ML7 – Knaith Hall, Knaith**

Date (2017)	Time period	$L_{Aeq,T}$ dB	Highest $L_{Amax,T}$ dB	$L_{A90,T}$ dB
Monday 17th July	15:30 – 23:00*	49	77	33
	23:00 – 07:00	44	65	21
Tuesday 18th July	07:00 – 23:00	48	73	39
	23:00 – 07:00	42	60	24
Wednesday 19th July	07:00 – 23:00	53	89	38
	23:00 – 07:00	41	61	29
Thursday 20th July	07:00 – 23:00	51	87	38
	23:00 – 07:00	44	68	30
Friday 21st July	07:00 – 23:00	51	74	42
	23:00 – 07:00	45	67	27
Saturday 22nd July	07:00 – 23:00	47	78	35
	23:00 – 07:00	39	60	20

Date (2017)	Time period	$L_{Aeq,T}$ dB	Highest $L_{Amax,T}$ dB	$L_{A90,T}$ dB
Sunday 23rd July	07:00 – 23:00	44	78	34
	23:00 – 07:00	43	65	32
Monday 24 <sup>th</sup> July	07:00 – 13:00*	48	63	44

\* Note – this period does not cover the full 16-hr day period and therefore may not be directly comparable with other complete time periods.

### Observations of General Baseline Sound Environment

#### North Street, Sturton le Steeple (ML1)

- 8.4.2 The dominant sound source at this location during the daytime was noted to be road traffic noise from Cross Street, Station Road and Gainsborough Road. Some additional (low level) noise was audible, although the source could not be identified it was potentially attributed to the maintenance of WBB.

#### Gatekeepers House, West Burton (ML2)

- 8.4.3 The dominant sound source at this location during the daytime was noted to be road traffic noise from Gainsborough Road (west).

#### Mill House Farm, West Burton (ML3)

- 8.4.4 The dominant sound source at this location during the daytime was noted to be road traffic noise from Gainsborough Road. In addition, electrical sound from the nearby electricity pylons was audible.

#### Manor Cottage, East Street, Bole (ML4)

- 8.4.5 The dominant sound source at this location during the daytime was noted to be road traffic noise from Sturton Road.

#### 194 Lea Road, Gainsborough (ML5)

- 8.4.6 The dominant sound source at this location during the daytime was noted to be road traffic noise from Lea Road. Occasional dog barking was also noted at the neighbouring property.

#### Green Lane, Lea (ML6)

- 8.4.7 The dominant sound source at this location during the daytime was noted to be road traffic noise from Gainsborough Road (east).

#### Knaith Hall, Knaith (ML7)

- 8.4.8 The dominant sound source at this location during the daytime was noted to be road traffic noise from Gainsborough Road (east). During the setup of equipment, a gardener was present (using power tools).

### Representative Background Sound Levels

- 8.4.9 Representative background sound levels have been established for daytime and night-time periods based upon review and comparison of the modal and lowest 10<sup>th</sup> percentile of all 15-minute interval results throughout the daytime and night-time periods surveyed. Wind direction information has

also been taken into account. The range of background sound levels at each monitoring location has been provided based upon a summary of the 15-minute interval data when the wind is blowing in the direction from the power station to the NSR and based upon a summary with no data excluded due to wind direction.

8.4.10 **Table 8-23** summarises the defined representative background sound levels taken forward for the NSR adjacent to each monitoring location within the BS 4142 assessment.

**Table 8-23: Representative Background Sound Levels**

Receptor	ML1	ML2	ML3	ML4	ML5	ML6	ML7
Daytime $L_{A90}$ dB (07:00-23:00)	29-31	32-34	35-37	35-37	35-36	34-35	34-36
Night-time $L_{A90}$ dB (23:00-07:00)	21-26	28-33	30-34	33-34	28-29	27-29	23-24

### Future Baseline

8.4.11 In the absence of the Proposed Development, future baseline sound levels at NSRs will depend largely on traffic flows on surrounding road/rail networks and the future operations at other industrial and commercial premises in the area. The existing coal-fired power station is expected to cease operation by 2025, potentially resulting in a reduction in future baseline at properties within the vicinity, compared with current periods when the existing coal-fired power station is in operation. WBB is assumed to remain operational in the future baseline scenario.

## 8.5 Development Design and Impact Avoidance

### Construction Noise

8.5.1 Construction activities are likely to be undertaken typically during weekday daytime and Saturday mornings, although some works may take place outside of normal working hours provided they do not cause any noise disturbance. Measures to mitigate noise will be implemented during the construction phase of the Proposed Development in order to minimise impacts at local residential NSRs, particularly with respect to activities required outside of normal working hours. The appointed contractor(s) will produce a Construction Environmental Management Plan (CEMP) that would provide details of proposed environmental control measures, including measures related to noise. The CEMP would include the impact avoidance measures as outlined in this section. A framework CEMP will be included in the ES to support the Application and the commitment to prepare a detailed CEMP will be secured through Requirement of the DCO.

8.5.2 Mitigation measures for inclusion within the CEMP would include, but not be limited to (subject to confirmation):

- abiding by construction noise limits at nearby NSRs;
- ensuring that all processes are in place to minimise noise before works begin and ensuring that BPM are being achieved throughout the construction programme, including the use of localised screening around significant noise producing plant and activities;
- ensuring that modern plant is used, complying with the latest European noise emission requirements. Selection of inherently quiet plant where possible;
- hydraulic techniques for breaking to be used in preference to percussive techniques where practical;

- use of lower noise piling (such as rotary bored or hydraulic jacking) rather than driven piling techniques (if required), where possible;
- off-site pre-fabrication, where practical;
- all plant and equipment being used for the works to be properly maintained, silenced where appropriate, operated to prevent excessive noise, and switched off when not in use;
- all contractors to be made familiar with current legislation and the guidance in BS 5228 (Parts 1 and 2), which should form a prerequisite of their appointment;
- loading and unloading of vehicles, dismantling of site equipment such as scaffolding or moving equipment or materials around the Site, to be conducted in such a manner as to minimise noise generation;
- appropriate routing of construction traffic on public roads and along access tracks (see **Chapter 7: Traffic and Transportation**);
- consultation with BDC and local residents to advise of potential noisy works that are due to take place; and
- monitoring of noise complaints, and reporting to the contractor for immediate investigation.

8.5.3 Method statements regarding construction management, traffic management, and overall site management will be prepared in accordance with best practice and relevant British Standards, to help to minimise impacts of construction works. One of the key aims of such method statements would be to minimise noise disruption to local residents during the construction period.

8.5.4 Consultation and communication with the local community throughout the construction period would also serve to publicise the works schedule, giving notification to residents regarding periods when higher levels of noise may occur during specific operations, and providing lines of communication where complaints can be addressed. This would be secured by a Requirement of the DCO.

8.5.5 A detailed noise assessment will be carried out once the contractor is appointed and further details of construction methods are known, in order to identify specific mitigation measures for the Proposed Development (including construction traffic). A Requirement for the control of noise during construction would be included within the DCO, to ensure that noise impacts relating to construction activities are minimised through appropriate mitigation.

8.5.6 In addition, it is proposed that the contractor will be a member of the '*Considerate Constructors Scheme*' which is an initiative open to all contractors undertaking building work.

### Operational Noise

8.5.7 The selection of the proposed power plant site area and development of the indicative concept layout have already included consideration of potential noise effects and proximity to NSRs, with plant being located as close to WBB as possible in order to increase the distance between plant and the NSRs. However, during the detailed design stage, options to mitigate potential significant residual noise effects by design will be further explored.

8.5.8 Several options for configuration and suppliers of the generation equipment are under consideration within the Rochdale Envelope being assessed. Preliminary modelling has shown that options are available that are capable of meeting the threshold noise levels.

8.5.9 The Proposed Development would be operated in accordance with an Environmental Permit issued and regulated by the Environment Agency. This would require operational noise from the generating station to be controlled through the use of BAT, which would be determined through the Environmental Permit application. Operational noise would also be controlled via a Requirement of the DCO.

## 8.6 Likely Impacts and Effects

### Construction Noise and Vibration

- 8.6.1 This section discusses the potential noise and vibration effects on sensitive receptors arising during the construction period.
- 8.6.2 Noise levels experienced by local receptors during such works depend upon a number of variables, the most significant of which are:
- the noise generated by plant or equipment used on site, generally expressed as Sound Power Levels ( $L_w$ ) or the vibration generated by the plant;
  - the periods of use of the plant on site, known as its on-time;
  - the distance between the noise/vibration source and the receptor;
  - the noise attenuation due to ground absorption, air absorption and barrier effects;
  - in some instances, the reflection of noise due to the presence of hard surfaces such as the sides of buildings; and
  - the time of day or night the works are undertaken.
- 8.6.3 Residential NSRs are located at distance in different directions around the Site. The closest residential NSRs to the West Burton Power Station Site, include Manor Cottage, East Street, Bole, located approximately 0.9km to the west, and Mill House Farm located approximately 1.1km to the west of the proposed power plant site area.
- 8.6.4 Predicted noise levels during construction of the Proposed Development have been based upon construction methods used for other power stations in the UK, and supplemented by information provided by the Applicant. As a conservative approach, it is assumed that all plant and activities are taking place at the closest point to each NSR, whereas in reality, this would not occur for any significant duration, if at all. Also no screening provided by buildings within the West Burton Power Station Site or soft ground attenuation have been taken into account.
- 8.6.5 The predicted levels apply to normal weekday daytime (07:00 – 19:00) working, although they could approximate to other time periods, where working at the same rate and intensity is proposed.
- 8.6.6 A summary of noise predictions at NSR locations around the Site (using the closest NSR to the Proposed Development construction works in the vicinity of the baseline sound survey locations) are presented in **Table 8-24**. Facade noise levels have been predicted to allow subsequent comparison with Construction Noise SOAEL and LOAEL for residential receptors as detailed in **Table 8-7**.
- 8.6.7 As advised by BS 5228, noise levels predicted at distances over 300m (of which all NSR are significantly greater than) should be treated with caution due to the increasing importance of meteorological effects.

**Table 8-24: Construction noise predictions for the Proposed Development at nearby NSRs**

Receptor	Predicted free-field noise level for daytime construction activity dB $L_{Aeq,12h}$					
	Electrical & Gas connection enabling works	Site Preparation	Piling and foundation	Building & General Site Activities	Fit out	Landscaping

Receptor	Predicted free-field noise level for daytime construction activity dB $L_{Aeq,12h}$					
	Electrical & Gas connection enabling works	Site Preparation	Piling and foundation	Building & General Site Activities	Fit out	Landscaping
North Street, Sturton-le-Steeple – to east of ML1	54	52	53	52	51	33
ML2 - Gatekeepers House, West Burton	55	52	53	54	51	33
ML3 - Mill House Farm	55	55	56	57	54	36
ML4 - Manor Cottage, East Street, Bole	56	57	58	59	56	38
Causeway Lane to south of MI5	51	51	52	53	50	32
ML6 - Green Lane, Lea	51	51	52	53	50	32
ML7 - Knaith Hall, Knaith	49	49	49	50	47	29

### Construction Noise Effects

8.6.8 The effects of the predicted daytime construction noise levels (as presented in **Table 8-23**) have been compared against the absolute construction noise limit values in **Table 8-7**, and using the semantic scales in **Table 8.8**. The significance of effects are summarised in **Table 8-25**.

**Table 8-25: Predicted Significance of Effect on NSRs Resulting from Construction of the Proposed Development**

Receptor	Significance of Effect - Construction of the Proposed Development					
	Electrical & Gas connection enabling works	Site Preparation	Piling and foundation	Building & General Site Activities	Fit out	Landscaping
North Street, Sturton le Steeple – to east of ML1	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
ML2 - Gatekeepers House, West Burton	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
ML3 - Mill House Farm	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
ML4 - Manor Cottage, East Street, Bole	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
Causeway Lane to south of MI5	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
ML6 - Green Lane, Lea	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
ML7 - Knaith Hall, Knaith	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible

- 8.6.9 Construction noise effects at all receptors during construction of the Proposed Development are predicted to be negligible (not significant) during the daytime period due largely to the distances between the works and NSRs.
- 8.6.10 It may be necessary for some construction activities to take place continuously over day, evening and night periods during peak construction times of the Proposed Development, although the exact nature of the works is unknown. SOAEL and LOAEL threshold values during non-weekday daytime periods have been defined in **Table 8.7**. Comparison of the predicted daytime noise levels against the lower limit values for evening, weekend and particularly night-time working indicate potential minor/moderate adverse (significant) effects could occur at some NSRs during these times if the same intensity of working as for the daytime is assumed. Therefore, construction activities taking place outside normal working hours would be planned, managed and mitigated appropriately, so as not to exceed the SOAEL threshold values and reduce levels towards the LOAEL (or less) where practical. Provided the SOAEL threshold values are not exceeded, construction activities outside of normal working hours can be considered as having a minor adverse effect or less (not significant). Potential measures to ensure that appropriate mitigation is in place during the works have already been discussed in **Section 8.5**.

### Construction Traffic Noise

- 8.6.11 For the purposes of assessment, it is assumed that HGV construction traffic access to the construction laydown area and proposed power plant site would be via the A631, Gainsborough Road (A620) and Sturton Road. Data have been provided from the Transport Assessment (see **Appendix 7A**, PEI Report Volume II) for the assumed typical traffic flows associated with construction.
- 8.6.12 2025 is expected to be the year with the peak traffic flows related to the construction of the Proposed Development. **Table 8-26** presents the predicted 2025 Baseline and Committed Development Traffic Flows, and **Table 8-27** presents 2025 Baseline, Committed Development and Construction Traffic Flows combined.

**Table 8-26: Scenario 1 - 2025 Baseline and Committed Development Traffic Flows**

Location		Total Vehicles (AAWT)	Total HGVs	Percentage HGV	Average Speed
Gainsborough Road (South of Power Station Entrance)	Total 2-Way	2,981	475	15.9%	64kph
Sturton Road (North of Power Station Entrance)	Total 2-Way	3,449	498	14.4%	82kph
A620 Gainsborough Road	Total 2-Way	5,508	754	13.7%	80kph
A620 Saundby Road	Total 2-Way	8,605	1,145	13.3%	71kph

**Table 8-27: Scenario 2 - 2025 Baseline, Committed Development and Construction Traffic Flows**

Location		Total Vehicles (AAWT)	Total HGVs	Percentage HGV	Average Speed
Gainsborough Road (South of Power Station Entrance)	Total 2-Way	3,004	475	15.8%	64kph
Sturton Road (North of Power Station Entrance)	Total 2-Way	3,764	610	16.2%	82kph
A620 Gainsborough Road	Total 2-Way	5,531	754	13.6%	80kph
A620 Saundby Road	Total 2-Way	8,902	1,257	14.1%	71kph

- 8.6.13 The potential changes in road traffic noise along these roads as a result of construction traffic relating to the Proposed Development have been considered by calculating the BNL at 10m from the road and comparing the change. **Table 8-28** presents the results of the BNL change assessment.

**Table 8-28: Changes in BNL as a result of the Proposed Development construction traffic**

Link	Predicted BNL, $L_{A10, 18hr}$ dB		Change in BNL, dB (Scenario 2 minus Scenario 1)	Magnitude of Impact
	Scenario 1 2025 Baseline and Committed Development	Scenario 2 2025 Baseline, Committed Development and Construction Traffic		
Gainsborough Road (South of Power Station Entrance)	65.2	65.2	0	No change
Sturton Road (North of Power Station Entrance)	67	67.6	+0.6	Very low
A620 Gainsborough Road	68.7	68.7	0	No change
A620 Saundby Road	69.9	70.2	+0.3	Very low

- 8.6.14 The above predictions assume that all roads are laid with impervious bitumen (such as hot rolled asphalt) with a 2mm texture depth and that the road surface remains unchanged with and without construction traffic.
- 8.6.15 **Table 8-27** shows either no change or very low magnitude of noise impact is expected due to changes in traffic flows along all the assessed routes during construction. This would result in no change or negligible adverse effects (not significant) at local residential NSRs. Based upon the above, no further specific mitigation measures are proposed in addition to those listed in **Section 8.5**.
- 8.6.16 The construction noise management measures listed within **Section 8.5**, will be further developed as the Project progresses and more details of the construction activities are known. This will assist in minimising the potential for adverse effects at nearby NSRs.

## Construction Vibration

- 8.6.17 The level of impact at different receptors would be dependent upon a number of factors, including distance between the works and receptors, ground conditions, the nature and method of works required close to receptors and the specific activities being undertaken at any given time.
- 8.6.18 There are no residential receptors in close proximity to the Proposed Development to be significantly affected by construction vibration. However, there is the potential for some vibration impacts upon buildings/structures within the West Burton Power Station Site. Whilst it is considered unlikely that most typical construction working routines would generate levels of vibration above which building damage would be expected to be sustained (subject to final plant and working requirements), there is the potential that vibration impacts could cause annoyance to occupants and exceed the LOAEL and SOAEL set out in **Section 8.3**. The need for piling, and the type of any piling potentially required is not yet confirmed.
- 8.6.19 Where piling, heavy earthworks, vibratory rollers or other significant vibration producing operations are proposed in close proximity to any existing sensitive buildings, further consideration will be given to potential impacts, once the contractor is appointed and the construction methods requirements are developed. As the construction of the Proposed Development and the use of many of the existing buildings within the West Burton Power Station Site are both within the control of the Applicant, any identified issues can be effectively managed by the Applicant and their contractor(s). Potential measures to ensure that appropriate mitigation is in place during the works are detailed in **Section 8.5**.

## Operational Noise

- 8.6.20 The preferred configuration and suppliers of the Proposed Development, including Proposed Power Plant is yet to be decided. Therefore, operational noise modelling has been undertaken for 10 different scenarios of plant configuration (from a total of three different suppliers) in order to give a view of the range of noise levels that could be produced by various unmitigated and mitigated options. The locations of the equipment were taken from the following drawings:
- PEI Report Volume III **Figure 4.1a**; and
  - PEI Report Volume II **Figure 4.1b**.
- 8.6.21 Input SWL data was either provided by the potential suppliers or has been taken from AECOMs archive of data for similar installations. The sound power level data was provided for various source components. The typical source components included the following, although there were some minor differences in the data provided by each supplier:
- gas turbine enclosure;
  - diffuser enclosure;
  - generator enclosure;
  - auxiliaries enclosure;
  - air duct;
  - air intake inlet;
  - air intake body;
  - stack body upstream silencer;
  - stack body downstream silencer; and
  - stack outlet.

8.6.22 The 10 configurations modelled comprised:

- a single OCGT without a building using data provided by an equipment supplier for two of their units, with the worst-case unit assessed;
- a single OCGT without a building using data provided by a second supplier;
- a single OCGT unit using data from a third supplier in the form of a range of potential values for each source component, with predictions were made for:
  - worst-case; and
  - best case.
- a single OCGT with the generating equipment located inside a composite cladding building, with the remaining source components (fin fan cooler, air inlet, stack, transformers and gas station) continued to be modelled outside the building;
- a single OCGT with the generating equipment located inside a composite cladding building, with sound power levels for some of the external equipment taken from the best case values from other equipment supplier data, to illustrate what might be achievable with extra mitigation of the base option;
- five aero-derivative OCGTs without a building, based on a range of sound power levels for one of the manufacturer's turbine sets, with predictions were made for:
  - worst-case; and
  - best case.
- five aero-derivative OCGTs with the generating equipment operating inside a composite cladding building, with the remaining source components (fin fan cooler, air inlet, stack, transformers and gas station) continued to be modelled outside the building.

8.6.23 The assessment described sets out the predicted impacts and effects associated with operation of the Proposed Development in isolation (the operational assessment scenario which would be long-term).

8.6.24 The following assumptions have been made when undertaking the operational noise modelling:

- the Proposed Development would operate continually at full load, 24-hours a day (a conservative assumption for the purposes of the noise assessment and would not occur in practice);
- noise levels provided by manufacturers for all principal noise emitting buildings/elements (air inlet filters, electrical buildings, transformers, workshops etc.) are understood to be external radiated SWL;
- prediction methodologies have been based on ISO 9613:2;
- corrections for tonality, impulsivity, and intermittency have not been applied on the assumption that these potential features would be designed out of the Proposed Development during the detailed design phase by the selection of appropriate plant, building cladding louvres and silencers/attenuators. However, a +3dB correction has been applied to the specific noise levels predicted from the proposed power plant site on the basis that the noise emissions may be distinctive above the residual acoustic environment. This is considered conservative in the context of the prevailing noise environment, which includes road traffic noise and some noise from WBA and WBB.

8.6.25 It is currently understood that the operation of the plant would be driven by the dynamics of the energy market; as a result the plant could run for short or longer periods, at any time of day, up to the maximum allowed under its Environmental Permit, which is currently anticipated to be up to 1,500 hours/year.

- 8.6.26 The plant would be expected to operate during periods of peak demand for relatively short periods, typically 2 to 3 hours. However, it is not stated what the maximum operating period could be or how many periods could occur during a single day. Therefore, to inform a worst-case assessment, continual operation has currently been assumed. In accordance with BS 4142:2014 the daytime assessment considers a 1-hour period and the night-time assessment considers a 15-minute period.
- 8.6.27 The predicted free-field operational specific sound levels at the NSRs around the proposed power plant site, for the 10 scenarios, are presented in **Table 8-29**.

**Table 8-29: Predicted Operational Specific Sound levels  $L_{Aeq,T}$  – Proposed Power Plant Site**

Location		Gas Turbines									
		Single							Aero		
		Supplier 1	Supplier 2	Supplier 3 (worst)	Supplier 3 (best)	Supplier 1 (building)	Supplier 2 (Building)	Supplier 1 (building and reduced noise auxiliaries)	Supplier 1 (worst)	Supplier 1 (best)	Supplier 1 (building)
Kent House, North Street, Sturton-le-Steeple	ML1	35	37	36	21	34	35	31	41	34	31
Gatekeepers House, West Burton	ML2	37	38	37	23	35	37	33	42	35	33
Mill House Farm	ML3	42	43	42	28	40	42	38	47	40	38
Manor Cottage, Bole	ML4	44	46	45	31	43	44	40	50	43	41
194 Lea Road, Gainsborough	ML5	34	35	34	20	33	34	30	39	33	30
Green Lane, Lea	ML6	35	37	36	21	34	35	31	41	34	31
Knaith Hall, Knaith	ML7	31	32	32	17	30	31	27	37	30	27

- 8.6.28 The daytime BS 4142 assessments results for receptors ML1 - ML7 are presented in **Table 8-30**. The values are the differences between the range of representative Background Sound Level at each NSR and the predicted Rating Level (the Specific Sound Level  $L_{Aeq,T}$  plus a +3dB correction for a potentially distinctive character). Positive values in the table indicate an excess of the Rating Level over the Background Sound Level and negative levels indicate that the Rating Level is lower than the Background Sound Level.
- 8.6.29 The night-time BS 4142 assessment results for ML1 – ML7 are presented in **Table 8-31**.

**Table 8-30: BS 4142 Daytime Excess of Rating Over Background Sound Level**

Location		Gas Turbines									
		Single							Aero		
		Supplier 1	Supplier 2	Supplier 3 (worst)	Supplier 3 (best)	Supplier 1 (building)	Supplier 2 (Building)	Supplier 1 (building and reduced noise auxiliaries)	Supplier 1 (worst)	Supplier 1 (best)	Supplier 1 (building)
Kent House, North Street, Sturton-le-Steeple	ML1	7 to 9	9 to 11	8 to 10	-7 to -5	6 to 8	7 to 9	3 to 5	13 to 15	6 to 8	3 to 5
Gatekeepers House, West Burton	ML2	6 to 8	7 to 9	6 to 8	-8 to -6	4 to 6	6 to 8	2 to 4	11 to 13	4 to 6	2 to 4
Mill House Farm	ML3	8 to 10	9 to 11	8 to 10	-6 to -4	6 to 8	8 to 10	4 to 6	13 to 15	6 to 8	4 to 6
Manor Cottage, Bole	ML4	10 to 12	12 to 14	11 to 13	-3 to -1	9 to 11	10 to 12	6 to 8	16 to 18	9 to 11	7 to 9
194 Lea Road, Gainsborough	ML5	1 to 2	2 to 3	1 to 2	-13 to -12	0 to 1	1 to 2	-2 to -3	6 to 7	0 to 1	-3 to -2
Green Lane, Lea	ML6	3 to 4	4 to 6	4 to 5	-11 to -10	2 to 3	3 to 4	-1 to -0	9 to 10	2 to 3	-1 to 0
Knaith Hall, Knaith	ML7	-2 to 0	-1 to 1	-1 to 1	-16 to -14	-3 to 1	-2 to 0	-6 to 4	4 to 6	-3 to -1	-6 to -4

Where excess values are given as negative this indicates that the predicted rating level was below the relevant background sound level.

Uncertainty: Given the large extent of sound level data obtained during the surveys, significantly different ‘representative’ background sound level values can be obtained using different statistical analysis methods. The example analysis used in BS 4142:2014 is the ‘mode’. However, in this assessment the mode has been considered alongside the 10<sup>th</sup> percentile of the measured  $L_{A90,15mins}$  values. As a result, background sound levels equal to or lower than the mode have been assigned as ‘representative’ in this assessment. Therefore, conservative (‘worst-case’) assessment results are provided.

**Table 8-31: BS 4142 Night-time Excess of Rating over Background Sound Level**

Location		Gas Turbines									
		Single							Aero		
		Supplier 1	Supplier 2	Supplier 3 (worst)	Supplier 3 (best)	Supplier 1 (building)	Supplier 2 (Building)	Supplier 1 (building and reduced noise auxiliaries)	Supplier 1 (worst)	Supplier 1 (best)	Supplier 1 (building)
Kent House, North Street, Sturton-le-Steeple	ML1	12 to 17	14 to 19	13 to 18	-3 to -2	11 to 16	12 to 17	8 to 13	18 to 23	11 to 16	8 to 13
Gatekeepers House, West Burton	ML2	7 to 12	8 to 13	7 to 12	-7 to -2	5 to 10	7 to 12	3 to 8	12 to 17	5 to 10	3 to 8
Mill House Farm	ML3	11 to 15	12 to 16	11 to 15	-3 to 1	9 to 13	11 to 15	7 to 11	16 to 20	9 to 13	7 to 11
Manor Cottage, Bole	ML4	13 to 14	15 to 16	14 to 15	0 to 1	12 to 13	13 to 14	9 to 10	19 to 20	12 to 13	10 to 11
194 Lea Road, Gainsborough	ML5	8 to 9	9 to 10	8 to 9	-6 to -5	7 to 8	8 to 9	4 to 5	13 to 14	7 to 8	4 to 5
Green Lane, Lea	ML6	9 to 11	11 to 13	10 to 12	-5 to -3	8 to 10	9 to 11	5 to 7	15 to 17	8 to 10	5 to 7
Knaith Hall, Knaith	ML7	10 to 11	11 to 12	11 to 12	-4 to -3	9 to 10	10 to 11	6 to 7	16 to 17	9 to 10	6 to 7

Where excess values are given as negative this indicates that the predicted rating level was below the relevant background sound level.

Uncertainty: Given the large extent of sound level data obtained during the surveys, significantly different 'representative' background sound level values can be obtained using different statistical analysis methods. The example analysis used in BS 4142:2014 is the 'mode'. However, in this assessment the mode has been considered alongside the 10<sup>th</sup> percentile of the measured  $L_{A90,15mins}$  values. As a result, background sound levels equal to or lower than the mode have been assigned as 'representative' in this assessment. Therefore, conservative ('worst-case') assessment results are provided.

8.6.30 In accordance with **Table 8-13** above, the values in **Table 8-30** and **Table 8-31** for the 10 different scenarios produce a range of impact magnitudes from very low to high adverse at the seven receptor locations. This would result in effects between negligible (not significant) to major adverse (significant) in accordance with **Table 8-14** and **Table 8.15**. However the results do indicate that a low/very low magnitude of impact is possible at all locations using the lowest operational noise data which would result in a negligible/minor effect (not significant). However, it is important to note that the higher end of the range of predicted exceedances in **Table 8-30** and **Table 8-31** are potentially demonstrating an exaggerated worst-case at receptors represented by ML1, ML2 and ML3 and ML4, when the prevailing wind direction from the existing WBA and WBB power stations towards the receptor would have resulted in higher background sound levels. and therefore a lower excess between the rating level and background sound levels. Nevertheless, the ranges have been provided for completeness and as a conservative approach.

8.6.31 However, on the basis of the above results for some of the options and a desire to reduce noise levels to the LOAEL (no greater than +5dB excess of rating level over background sound level), potential mitigation options to reduce noise levels are discussed in **Section 8.7**.

### Rochdale Envelope

8.6.32 The noise and vibration assessment has been undertaken with reference to the Rochdale Envelope (i.e. the maximum parameters for the Proposed Development and in particular its main buildings and structures). It is considered that the potential variation in building locations and dimensions presented in **Chapter 4: The Proposed Development** is unlikely to adversely affect the overall conclusions regarding the significance of residual noise effects, for reasons described below.

8.6.33 The assessment of construction related effects has been based on the worst-case assumption of activities occurring at the closest part of the Site to each receptor.

**Table 8-32: Worst and Best Predictions of Night-time Excess of Rating over Background Sound Level**

Location		Gas Turbines			
		Single OCGT		Aero	
		Worst prediction	Best prediction	Worst prediction	Best prediction
Kent House, North Street, Sturton-le-Steeple	ML1	19 (major adverse)	-3 (negligible)	23 (major adverse)	8 (Minor/Moderate adverse)
Gatekeepers House, West Burton	ML2	13 (moderate adverse)	-7 (negligible)	17 (major adverse)	3 (minor adverse)
Mill House Farm	ML3	16 (major adverse)	-3 (negligible)	20 (major adverse)	7 (Minor/Moderate adverse)
Manor Cottage, East Street, Bole	ML4	16 (major adverse)	0 (negligible)	20 (major adverse)	10 moderate adverse)
194 Lea Road, Gainsborough	ML5	10 (moderate adverse)	-6 (negligible)	14 (moderate adverse)	4 (minor adverse)

Location		Gas Turbines			
		Single OCGT		Aero	
		Worst prediction	Best prediction	Worst prediction	Best prediction
Green Lane, Lea	ML6	13 (major adverse)	-5 (negligible)	17 (major adverse)	5 (minor adverse)
Knaith Hall, Knaith	ML7	12 (major adverse)	-4 (negligible)	17 (major adverse)	6 (minor adverse)

8.6.34 The assessment of operational effects is based on the limits of deviation defined in **Chapter 4: The Proposed Development**, which constrain the design parameters of each element of the Proposed Development. As for construction, in any event mitigation would be integrated into the detailed design, where necessary, in order to meet agreed noise limits at the nearest receptors, in accordance with a Requirement of the DCO.

### Decommissioning

8.6.35 The potential impacts and effects would require further consideration at the decommissioning stage of the Proposed Development, but potential measures to ensure that appropriate mitigation is in place during the works have already been discussed in **Section 8.5**.

## 8.7 Mitigation and Enhancement Measures

### Construction

8.7.1 It is currently predicted that there is the potential for no more than negligible adverse noise effects at residential NSRs during construction works. Therefore, no further specific mitigation measures have been identified at this stage. However, there is the potential for some vibration effects at buildings, primarily at the existing buildings within the West Burton Power Station Site, during construction of the Proposed Development depending upon the requirement for, and nature of, piling and other vibration emitting activities.

8.7.2 As mentioned in **Section 8.6**, a more detailed assessment will be undertaken for inclusion in the ES if additional information becomes available. Notwithstanding, a Requirement to control construction noise and vibration will be included in the DCO.

8.7.3 The preferred approach for controlling construction noise and vibration is to reduce levels at source where possible, but with due regard to practicality. Sometimes a greater noise or vibration level may be acceptable if the overall construction time, and therefore length of disruption, is reduced.

8.7.4 The list of noise control measures presented within **Section 8.5** provides a detailed, but not exhaustive list of construction noise and vibration management measures that will be considered in the framework CEMP produced to accompany the Application.

8.7.5 Residual effects after mitigation are described in **Section 8.9**.

## Operational Noise

- 8.7.6 The assessment has assumed that potential noise of a tonal, impulsive or intermittent nature would be designed out of the Proposed Development during the detailed design phase by the selection of appropriate plant, building cladding, louvres and silencers/ attenuators as necessary. However, a +3dB correction has been applied to the Specific Noise Levels predicted from the Proposed Development, on the basis that the noise emissions have the potential to be distinctive above the residual acoustic environment.
- 8.7.7 Without further mitigation, it is predicted that one of the 10 proposed plant configurations is able to achieve operational noise levels below the SOAEL and LOAEL at all assessed NSRs.
- 8.7.8 **Table 8-33** and **Table 8-34** outline the overall attenuation required for each of the configurations to achieve the daytime and night-time LOAEL criteria of no greater than +5dB above the defined representative Background Sound Level at each NSR.

**Table 8-33: Required Attenuation (dB) to Achieve Daytime Operational LOAEL Criteria**

Location		Gas Turbines									
		Single							Aero		
		Supplier 1	Supplier 2	Supplier 3 (worst)	Supplier 3 (best)	Supplier 1 (building)	Supplier 2 (Building)	Supplier 1 (building and reduced noise auxiliaries)	Supplier 1 (worst)	Supplier 1 (best)	Supplier 1 (building)
Kent House, North Street, Sturton-le-Steeple	ML1	2 – 4	4 – 6	3 – 5	0	1 – 3	2 – 4	0	8 – 10	1 – 3	0
Gatekeepers House, West Burton	ML2	1 – 3	2 – 4	1 – 3	0	0 – 1	1 – 3	0	6 – 8	0 – 1	0
Mill House Farm	ML3	3 – 5	4 – 6	3 – 5	0	1 – 3	3 – 5	0 – 1	8 – 10	1 – 3	0 – 1
Manor Cottage, East Street, Bole	ML4	5 – 7	7 – 9	6 – 8	0	4 – 6	5 – 7	1 – 3	11 – 13	4 – 6	2 – 4
194 Lea Road, Gainsborough	ML5	0	0	0	0	0	0	0	1 – 2	0	0
Green Lane, Lea	ML6	0	0 – 1	0	0	0	0	0	4 – 5	0	0
Knaith Hall, Knaith	ML7	0	0	0	0	0	0	0	0 – 1	0	0

**Table 8-34: Required Attenuation (dB) to Achieve Night-time Operational LOAEL Criteria**

Location		Gas Turbines									
		Single							Aero		
		Supplier 1	Supplier 2	Supplier 3 (worst)	Supplier 3 (best)	Supplier 1 (building)	Supplier 2 (Building)	Supplier 1 (building and reduced noise auxiliaries)	Supplier 1 (worst)	Supplier 1 (best)	Supplier 1 (building)
Kent House, North Street, Sturton-le-Steeple	ML1	7 – 12	9 – 14	8 – 13	0	6 – 11	7 – 12	3 – 8	13 – 18	6 – 11	3 – 8
Gatekeepers House, West Burton	ML2	2 – 7	3 – 8	2 – 7	0	0 – 5	2 – 7	0	7 – 12	0 – 5	0 – 3
Mill House Farm	ML3	6 – 10	7 – 11	6 – 10	0	4 – 8	6 – 10	2 – 6	11 – 15	4 – 8	2 – 7
Manor Cottage, East Street, Bole	ML4	8 – 9	10 – 11	9 – 10	0	7 – 8	8 – 9	4 – 5	14 – 15	7 – 8	5 – 6
194 Lea Road, Gainsborough	ML5	3 – 4	4 – 5	3 – 4	0	2 – 3	3 – 4	0	8 – 9	2 – 3	0
Green Lane, Lea	ML6	4 – 6	6 – 8	5 – 7	0	3 – 5	4 – 6	0 – 2	10 – 12	3 – 5	0 – 2
Knaith Hall, Knaith	ML7	5 – 6	6 – 7	6 – 7	0	4 – 5	5 – 6	1 – 2	11 – 12	4 – 5	1 – 2

- 8.7.9 The plant selection and detailed design processes are yet to take place, however, it is considered probable that, most if not all of those options which are currently predicted to exceed the LOAEL criteria, could be mitigated by a combination of the following:
- reducing the breakout noise from the gas turbine, generator and accessory enclosures by containing them within a building;
  - reducing the air inlet noise emissions by addition of further in-line attenuation;
  - reducing the stack outlet noise emissions by addition of further in-line attenuation;
  - reducing fin fan cooler noise emissions by screening, re-sizing, fitting low noise fans or attenuation; or
  - screening or enclosing the transformers.
- 8.7.10 As the design progresses to the detailed design stage, the existing noise model will be refined and additional acoustic assessment will be undertaken in consultation with the designers, to determine the most appropriate mitigation options. The findings of the further assessment will inform the design to ensure that Rating Levels meet with a target of no greater than +5dB above the representative Background Sound Level at each NSR, resulting in a low magnitude of impact and a minor adverse effect (not significant). Operational noise is likely to be controlled via a Requirement of the DCO, by agreement with the Environmental Health Officers at BDC/WLDC.
- 8.7.11 Residual effects after mitigation are described in **Section 8.9**, and are not considered to be significant.

## 8.8 Limitation or Difficulties

### Construction

- 8.8.1 Detailed construction information is not yet available (because the contractor has not yet been appointed). Therefore, this assessment draws upon the experience and assessments undertaken for other similar projects. The assessment is therefore indicative, but is considered to be robust. Construction noise thresholds (limit values) have been provided in **Table 8-7**, which are to be applied at local NSRs, and further assessment has been identified as required, to ensure that appropriate mitigation is developed to achieve the threshold values, once the contractor is appointed. This and the other mitigation measures detailed in **Section 8.7**, which are likely to be secured by a Requirement of the DCO, would ensure that construction noise and vibration is minimised, although it is inevitable, as with most construction projects, that some temporary adverse effects may be experienced.

### Operation

- 8.8.2 Lists of assumptions made during the noise modelling and assessment of the Proposed Development are as presented in **Section 8.6**. Further uncertainties are detailed in **Table 8-30** with respect to the defining of representative background sound levels. However, it is considered that the assumptions made will have led to a conservative assessment. Further assessment will be undertaken at the detailed design stage to ensure that appropriate noise limits are achieved at sensitive receptors. Boundary noise limits are likely to be agreed in accordance with a Requirement of the DCO on the control of noise during operation, based on the noise limits required at the NSRs.

## 8.9 Residual Effects and Conclusions

- 8.9.1 A summary of the residual effects, assuming the implementation of all appropriate mitigation to reduce noise and vibration during construction, operation and decommissioning periods, is presented in **Table 8-35**.

**Table 8-35: Residual effects summary table**

Predicted Impact	Duration	Mitigation	Residual Effect
Noise impact during construction of the Proposed Development	Short-term (3 - 6 years)	Further detailed assessment and preparation of a construction noise control scheme (including agreed noise limits) once contractor appointed in accordance with a DCO Requirement.	Negligible adverse at the nearest residential NSRs (not significant).
Noise impacts due to construction traffic on public highways	Short-term (3 - 6 years)	No further mitigation considered necessary unless number of proposed construction traffic flow changes, or unless further traffic assessment shows localised access routes potentially affecting nearby NSRs.	Negligible adverse (not significant) during 'worst-case' period of construction traffic (unless further traffic assessment shows localised potential effects).
Operation of the Proposed Power Plant	Long-term	Reduction of SWL/breakout noise from key plant/buildings. Further assessment as design progresses and preparation of operational noise control scheme (including agreed noise limits) in accordance with a DCO Requirement.	Negligible – minor adverse daytime and night-time (not significant) assuming that the threshold BS 4142 criterion of no greater than +5 is achieved with the chosen site layout and technology.
Noise impacts during decommissioning of the WBC power station	Short-term	Further detailed assessment and DEMP, particularly regarding working outside of daytime working hours, in accordance with a draft DCO Requirement.	Further assessment would need to confirm the potential level of effect at NSRs, although they may be expected to be similar to those during construction.

## 8.10 References

- Ref 8-1 Her Majesty's Stationary Office (1990) *Environmental Protection Act 1990*.
- Ref 8-2 Her Majesty's Stationary Office (1974) *Control of Pollution Act 1974*.
- Ref 8-3 Her Majesty's Stationary Office (2016) *Environmental Permitting (England and Wales) Regulations 2016*.
- Ref 8-4 Environment Agency (2002a) *Integrated Pollution Prevention and Control (IPPC) H3 document Horizontal Guidance for Noise Part 2 - Noise assessment and Control*.
- Ref 8-5 Environment Agency (2002b) *Integrated Pollution Prevention and Control (IPPC) H3 document Horizontal Guidance for Noise Part 1 – Regulation and Permitting*.
- Ref 8-6 Department of Energy & Climate Change (2011) *Overarching National Policy Statement for Energy*.
- Ref 8-7 Department of Energy & Climate Change (2011) *National Policy Statement for Fossil Fuel Electricity Generating infrastructure*.
- Ref 8-8 Department for Communities and Local Government (2012) *National Planning Policy Framework*.
- Ref 8-9 Office of the Deputy Prime Minister (1994) *Planning Policy Guidance (PPG) 24 - Planning and Noise*.
- Ref 8-10 Department for Environment, Food & Rural Affairs (2010) *Noise Policy Statement for England (NPSE)*.
- Ref 8-11 Department for Communities and Local Government (DCLG) (2014) *Planning Practice Guidance*.
- Ref 8-12 Bassetlaw District Council (2011), The Bassetlaw District Council – Local Development Framework.
- Ref 8-13 West Lindsey District Council (2017) *Central Lincolnshire Local Plan*.
- Ref 8-14 British Standards Institute (2003) *BS 7445-1 – Description and measurement of environmental noise. Guide to quantities and procedures*.
- Ref 8-15 British Standards Institute (1991) *BS 7445-2 – Description and measurement of environmental noise. Guide to the acquisition of data pertinent to land use*.
- Ref 8-16 British Standards Institute (2014) *BS 5228-1:2009+A1:2014 – Code of practice for noise and vibration control on construction and open sites. Part 1: Noise*.
- Ref 8-17 British Standards Institute (2014) *BS 5228-2:2009+A1:2014 – 'Code of practice for Noise and Vibration control on construction and open sites. Part 2:Vibration.'*
- Ref 8-18 British Standards Institute (2008) *BS 6472-1 – Guide to evaluation of human exposure to vibration in buildings. Vibration sources other than blasting*.
- Ref 8-19 British Standards Institute (1993) *BS 7385-2 – Evaluation and measurement for vibration in buildings. Guide to damage levels from groundborne vibration*.

- Ref 8-20 British Standards Institute (2014) *BS 4142 – Methods for rating and assessing industrial and commercial sound.*
- Ref 8-21 World Health Organisation (1999) *Guidelines for Community Noise.*
- Ref 8-22 World Health Organisation (2009) *Night Noise Guidelines for Europe*
- Ref 8-23 Department of Transport/ Welsh Office (1998) *Calculation of Road Traffic Noise (CRTN).*
- Ref 8-24 Highways Agency (2011) *Design Manual for Road and Bridges Volume 11 Section 3 Part 7 HD213/11 (Revision 1) Traffic Noise and Vibration.*
- Ref 8-25 International Standards Organisation (1996) *ISO 9613-2 – Attenuation of Sound during Propagation Outdoors, Part 2: General Method of Calculation.*
- Ref 8-26 International Standards Organisation (2010) *ISO 4866:2010 – Vibration of Fixed Structures – Guidelines for the Measurement of Vibrations and Evaluation of Their Effects on Structures.*

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## 9. Ecology

### 9.1 Introduction

- 9.1.1 This chapter of the Preliminary Environmental Information (PEI) Report addresses the potential effects of the Proposed Development on ecology.
- 9.1.2 This chapter is supported by the following technical appendices and accompanying figures, PEI Report Volume II and III respectively:
- **Appendix 9A** – Legislation and Planning Policy;
  - **Appendix 9B** – Ecological Impact Assessment Methodology;
  - **Appendix 9C** – Preliminary Ecological Appraisal (PEA) Report; and
  - **Figure 9.1** – Areas Under Consideration for Ecological Mitigation.

### 9.2 Legislation, Planning Policy and Guidance

- 9.2.1 The initial ecological impact assessment (EclA) presented in this chapter has been undertaken within the context of relevant planning policies, guidance documents and legislative instruments. A summary is provided below and further details are provided in **Appendix 9A** (PEI Report Volume II).

#### Legislative Background

- 9.2.2 The following legislation is considered relevant to the Proposed Development:
- Wildlife and Countryside Act (WCA) 1981 (as amended) (Ref 9-1);
  - Countryside and Rights of Way (CRoW) Act 2000 (as amended) (Ref 9-2);
  - Natural Environment and Rural Communities (NERC) Act 2006 (as amended) (Ref 9-3);
  - The Conservation of Habitats and Species Regulations 2010 (as amended) (the Habitats Regulations) (Ref 9-4);
  - Protection of Badgers Act 1992 (as amended) (Ref 9-5);
  - The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (WFD) (Ref 9-6);
  - Salmon & Freshwater Fisheries Act 1975 (as amended) (Ref 9-7); and
  - Animal Welfare Act 2006 (Ref 9-8).

#### Planning Policy Context

- 9.2.3 The overarching National Policy Statement (NPS) for Energy (EN-1) (Ref 9-9) sets out national policy for energy infrastructure. Those parts of the NPS relevant to biodiversity are detailed in

9.2.4 **Table** 9-1, which includes cross references to where the issues have been addressed in the chapter.

**Table 9-1: Summary of NPS advice relevant to biodiversity**

Summary of NPS	Consideration within the Chapter
Paragraph 5.3.3 states: <i>“Where the development is subject to EIA the applicant should ensure that the ES clearly sets out any effects on internationally, nationally and locally designated sites of ecological or geological conservation importance, on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity.”</i>	<b>Section 9.6</b>
Paragraph 5.3.4 states: <i>“The applicant should show how the project has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests.”</i>	<b>Sections 9.5 and 9.7</b>
Paragraph 5.3.7 states: <i>“As a general principle, and subject to the specific policies below, development should aim to avoid significant harm to biodiversity and geological conservation interests, including through mitigation and consideration of reasonable alternatives (as set out in Section 4.4 above); where significant harm cannot be avoided, then appropriate compensation measures should be sought.”</i>	<b>Sections 9.5 and 9.7</b>
Paragraph 5.3.18 states: <i>“The applicant should include appropriate mitigation measures as an integral part of the proposed development. In particular, the applicant should demonstrate that:</i> <ul style="list-style-type: none"> <li>- <i>during construction, they will seek to ensure that activities will be confined to the minimum areas required for the works;</i></li> <li>- <i>during construction and operation best practice will be followed to ensure that risk of disturbance or damage to species or habitats is minimised, including as a consequence of transport access arrangements;</i></li> <li>- <i>habitats will, where practicable, be restored after construction works have finished; and</i></li> <li>- <i>opportunities will be taken to enhance existing habitats and, where practicable, to create new habitats of value within the site landscaping proposals.”</i></li> </ul>	<b>Sections 9.5 and 9.7</b>

9.2.5 The UK Government has committed to halting the overall decline in biodiversity. Planning requirements in support of this are specified in the National Planning Policy Framework (NPPF) published on 27th March 2012 (Ref 9-10). The NPPF specifies the obligations that Local Authorities and the UK Government have regarding statutory designated sites and protected species under UK and international legislation, and how this is to be delivered in the planning system.

9.2.6 Local planning policy relevant to ecology and nature conservation is set out in the following documents:

- Bassetlaw Core Strategy and Development Management Policies Development Plan Document (DPD) (Ref 9-11) – policy DM9 sets out the district’s approach to assessing planning applications to ensure that development proposals safeguard habitats and species populations, and support the Council’s strategic approach to the delivery, protection and enhancement of multi-functional Green Infrastructure.

## Other Guidance

- 9.2.7 In July 2012, the UK Post-2010 Biodiversity Framework was published (Ref 9-12). This covers the period 2011 - 2020 and forms the UK Government's response to the UN Convention on Biological Diversity held in Nagoya in 2010. Following publication of the Framework, most of the strategic biodiversity work previously enacted under the UK Biodiversity Action Plan (Ref 9-13) was delegated to each of the four countries comprising the United Kingdom of Great Britain and Northern Ireland. The Framework shows how the work of the four UK countries joins up to achieve the international biodiversity targets agreed under the UN Convention, as well those required under the European Union biodiversity strategy. In England, the strategic approach to be taken in biodiversity planning over the period 2010 to 2020 is set out in '*Biodiversity 2020, A strategy for England's wildlife and ecosystem services*' (Ref 9-14). These country strategies replace the UK Biodiversity Action Plan, with the associated lists of priority habitats and species carried over into the newly defined lists of habitats and species of principal importance for nature conservation in England contained within Section 41 of the NERC Act. This latter list encompasses 56 habitats and 943 species.
- 9.2.8 The Local Biodiversity Action Plan (LBAP) for Nottinghamshire (Ref 9-15) is a nature conservation strategy identifying threats to habitats and species within the county and setting out the actions necessary to conserve them through a series of Habitat Action Plans (HAPs) and Species Action Plans (SAPs). See **Appendix 9A** (PEI Report Volume II) for further details, and screening of priority habitats and species of potential relevance to the Proposed Development.
- 9.2.9 Standing advice has been published by Natural England and Defra to guide decision-makers on the determination of proposals with the potential to affect designated sites, species and habitats. The guidance sets out responsibilities and minimum requirements for survey and mitigation, including the need to engage with objectives for no net loss of biodiversity and provision of biodiversity net gain.

## 9.3 Assessment Methodology and Significance Criteria

### Consultation

- 9.3.1 Consultation was undertaken through the formal EIA Scoping stage. A summary of consultation comments relating to ecology, and how these have been addressed, is provided as **Table 9-2**.

**Table 9-2: Consultation summary table**

Consultee or organisation approached	Date (method)	Summary of consultee comments	Summary of response
Natural England	19 <sup>th</sup> May 2017 (email response to consultation on EIA Scoping Report)	General advice confirming the requirement to consider impacts on statutory and non-statutory nature conservation designations, and protected and notable habitats and species. The assessment should be undertaken in accordance with published best practice guidance.	The assessment has been completed in line with these recommendations.
Nottinghamshire County Council	9 <sup>th</sup> May 2017 (email response to consultation on EIA Scoping Report)	Satisfied with the overall scope of the EIA from an ecological perspective.	Comment only, no response required.
		Assessments of indirect impacts, such as noise, air quality and artificial lighting, should consider non-statutory designations (i.e. Local Wildlife Sites) as well as statutory designations (Sites of Special Scientific Interest).	The assessment includes consideration of indirect impacts on non-statutory and statutory designations.
		The Defra biodiversity offsetting metric should be used to calculate direct habitat loss arising from the development, so that requirements for onsite mitigation (and potentially offsite compensation) can be determined objectively and transparently, with the aim of delivering no net loss (and ideally net gain) of habitat.	The Defra offsetting metric has been used to quantify the loss of biodiversity as a result of the Proposed Development and to determine the requirement for habitat restoration / creation to ensure no net loss and net gain of biodiversity.
Marine Management Organisation	24 <sup>th</sup> May 2017 (email response to consultation on EIA Scoping Report)	All impacts of the construction of the cooling water infrastructure, along with any other activities within the UK marine area, on marine ecology should be taken into account.	The proposed outfall options are for surface water discharge, rather than cooling water. The potential impacts resulting from the construction of the outfall and from the discharge of surface water to the River Trent on marine ecology have been considered.

Consultee or organisation approached	Date (method)	Summary of consultee comments	Summary of response
Environment Agency	25 <sup>th</sup> May (letter response to consultation on EIA Scoping Report)	It might be beneficial for a Preliminary Ecological Appraisal to be submitted rather than or alongside the Phase 1 Habitat Survey.	A Preliminary Ecological Appraisal of the Site has been completed (see <b>Appendix 9C</b> , PEI Report Volume II).
		We would recommend the applicant also looks into whether a Water Framework Directive assessment is required for the proposed development.	Screening to determine the need for WFD assessment has been undertaken (see <b>Appendix 12B</b> , PEI Report Volume II).
Bassetlaw District Council	5 <sup>th</sup> June 2017 (email response to consultation on EIA Scoping Report)	No comments.	No response required.
West Lindsey District Council	24 <sup>th</sup> May 2017 (letter response to consultation on EIA Scoping Report)	All regionally and locally important sites (including non-statutory sites) and Section 41 (NERC Act 2006) Habitats and Species of Principal Importance within 2km of the site should be assessed. Consideration should also be given to species and habitats within any relevant Local Biodiversity Action Plan (BAP).	Statutory and non-statutory nature conservations and protected and notable species within 2km of the Site have been considered in the assessment. LBAP habitats and species have also been considered where relevant.
		Mitigation should consider opportunities for biodiversity creation and enhancement.	Proposals for biodiversity creation and enhancement are included in <b>Section 9.7</b> and illustrated on <b>Figure 9.1</b> (PEI Report Volume III).

## Assessment Methods

9.3.2 The EclA detailed in this chapter has been undertaken in accordance with best practice guidance issued by the Chartered Institute of Ecology and Environmental Management (Ref 9-16). Full details of the approach applied are provided in **Appendix 9B** (PEI Report Volume II), with an abridged over-view provided below. The aims of the ecology assessment are to:

- identify relevant ecological features (i.e. designated sites, habitats, species or ecosystems) which may be impacted;
- provide a scientifically rigorous and transparent assessment of the likely ecological impacts and resultant effects of the Proposed Development, which may be beneficial (i.e. positive) or adverse (i.e. negative);
- facilitate scientifically rigorous and transparent determination of the consequences of the Proposed Development in terms of national, regional and local policies relevant to nature conservation and biodiversity, where the level of detail provided is proportionate to the scale of the development and the complexity of its potential impacts; and
- set out what steps would be taken to adhere to legal requirements relating to the relevant ecological features concerned.

9.3.3 The principal steps involved in the CIEEM approach can be summarised as:

- ecological features that are both present and might be affected by the Proposed Development are identified (both those likely to be present at the time works begin, and for the sake of comparison, those predicted to be present at a set time in the future) through a combination of targeted desk-based study and field survey work to determine the relevant baseline conditions;
- the importance of the identified ecological features is evaluated to place their relative biodiversity and nature conservation value into geographic context, and this is used to define the relevant ecological features that need to be considered further within the EclA process;
- the changes or perturbations predicted to result as a consequence of the Proposed Development (i.e. the potential impacts), and which could potentially affect relevant ecological features are identified and their nature described. Established best-practice, legislative requirements or other incorporated design measures to minimise or avoid impacts are also described and are taken into account;
- the likely effects (beneficial or adverse) on relevant ecological features are then assessed, and where possible quantified;
- measures to avoid or reduce any predicted significant effects, if possible, are then developed in conjunction with other elements of the design (including mitigation for other environmental disciplines). If necessary, measures to compensate for effects on features of nature conservation importance are also included;
- any residual effects of the Proposed Development are reported; and
- scope for ecological enhancement is considered.

9.3.4 It is not necessary in the assessment to address all habitats and species with potential to occur in the zone of influence of a proposed development, and instead the focus should be on those that are '*relevant*'. CIEEM guidance (Ref 9-16) makes it clear that there is no need to 'carry out detailed assessment of ecological features that are sufficiently widespread, unthreatened and resilient to project impacts and will remain viable and sustainable'. This does not mean that efforts should not be made to safeguard wider biodiversity, and requirements for this have been considered. National policy documents emphasise the need to achieve no net loss of biodiversity and enhancement of biodiversity.

- 9.3.5 To support focussed EclA there is a need to determine the scale at which the ecological features identified through the desk studies and field surveys undertaken for the Proposed Development are of value. The value of each ecological feature has been defined with reference to the geographical level at which it matters, and the results of this assessment have been used to identify the relevant features requiring impact assessment. The frames of reference used for this assessment, and based on CIEEM guidance (Ref 9-16), are:
- International (generally this is within a European context, reflecting the general availability of good data to allow cross-comparison);
  - National (Great Britain, but considering the potential for certain ecological features to be more notable (of higher value) in an England context relative to Great Britain as a whole);
  - Regional (East Midlands);
  - County (Nottinghamshire);
  - District (Bassetlaw);
  - Local (has value at the Site level); and
  - Negligible (common and widespread ecological features that have very low value at the Site level and which do not require retention or mitigation at the relevant location to otherwise maintain a favourable nature conservation status, or to deliver wider relevant biodiversity objectives).
- 9.3.6 All ecological features of Local value and above have been taken forward to impact assessment, and are the '*relevant ecological features*' for the purposes of impact assessment.
- 9.3.7 In line with the CIEEM guidelines the terminology used within the EclA draws a clear distinction between the terms '*impact*' and '*effect*'. For the purposes of the EclA these terms are defined as follows:
- impact – actions resulting in changes to an ecological feature. For example, demolition activities leading to the removal of a building utilised as a bat roost; and
  - effect – outcome resulting from an impact acting upon the conservation status or structure and function of an ecological feature. For example, killing/injury of bats and reducing the availability of breeding habitat as a result of the loss of a bat roost may lead to an adverse effect on the conservation status of the population concerned.
- 9.3.8 When describing potential impacts (and where relevant the resultant effects) consideration is given to the following characteristics likely to influence this:
- beneficial/adverse (i.e. is the change likely to be in accordance with nature conservation objectives and policy):
    - beneficial (i.e. positive) - a change that improves the quality of the environment, or halts or slows an existing decline in quality (e.g. increasing the extent of a habitat of conservation value); or
    - adverse (i.e. negative) - a change that reduces the quality of the environment (e.g. destruction of habitat or increased noise disturbance).
  - magnitude - the '*size*', '*amount*' or '*intensity*' of an impact - this is described on a quantitative basis where possible;
  - spatial extent - the spatial or geographical area or distance over which the impact/effect occurs;
  - duration - the time over which an impact is expected to last prior to recovery or replacement of the resource or feature. Consideration has been given to how this duration relates to relevant

ecological characteristics such as a species' lifecycle. However, it is not always appropriate to report the duration of impacts in these terms. The duration of an effect may be longer than the duration of an activity or impact;

- reversibility (i.e. is the impact temporary or permanent). A temporary impact is one from which recovery is possible or for which effective mitigation is both possible and enforceable. A permanent effect is one from which recovery is either not possible, or cannot be achieved within a reasonable timescale (in the context of the feature being assessed); and
- timing and frequency (i.e. consideration of the point at which the impact occurs in relation to critical life-stages or seasons).

### Significance Criteria

9.3.9 For each ecological feature only those characteristics relevant to understanding the ecological effect and determining the significance are described. The determination of the significance of effects has been made based on the predicted effect on the structure and function, or conservation status, of relevant ecological features, as follows:

- not significant - no effect on structure and function, or conservation status; and
- significant - structure and function, or conservation status is affected.

9.3.10 For significant effects (both adverse and beneficial) this is qualified with reference to the geographic scale at which the effect is significant (e.g. an adverse effect significant at a national level).

9.3.11 The CIEEM approach described in **Appendix 9B** (PEI Report Volume II) broadly accords with the EIA methodology described in **Chapter 2: Assessment Methodology**. However, the matrix has not been used to classify effects as this deviates from CIEEM guidance. In order to provide consistency of terminology in the final assessment, the findings of the CIEEM assessment have been translated into the classification of effects scale used in other chapters of the PEI Report as outlined in **Table 9-3**.

**Table 9-3: Relating CIEEM assessment terms to those used in other PEI Report chapters**

Effect classification terminology used in other PEI Report chapters		Equivalent CIEEM assessment
Significant (beneficial)	Major beneficial	Beneficial effect on structure/function or conservation status at regional, national or international level
	Moderate beneficial	Beneficial effect on structure/function or conservation status at District or County level
Non-significant	Minor beneficial	Beneficial effect on structure/function or conservation status at Site or Local level
Non-significant	Neutral	No effect on structure/function or conservation status
Non-significant	Minor adverse	Adverse effect on structure/function or conservation status at Site or Local level
Significant (adverse)	Moderate adverse	Adverse effect on structure/function or conservation status at District or County level

Effect classification terminology used in other PEI Report chapters		Equivalent CIEEM assessment
	Major adverse	Adverse effect on structure/function or conservation status at Regional, National or International level

### Extent of Study Area

- 9.3.12 The study areas used in this assessment were defined with reference to the likely zone of influence over which the Proposed Development may have potential to result in significant effects on relevant ecological features.
- 9.3.13 It is important to recognise that the potential zone of influence of the Proposed Development may vary over time (e.g. the construction zone of influence may differ from the operational zone of influence) and/or depending on the individual sensitivities of different ecological features.
- 9.3.14 This was taken into account when defining study areas, and these are sufficient to address the potential worst case zone of influence of the Proposed Development on the relevant ecological features concerned.
- 9.3.15 The extent of the study areas applied during the desk study and field surveys are detailed within **Table 9-4** and **Table 9-5**.

### Sources of Information

- 9.3.16 The ecological baseline has been determined through a combination of desk study and field survey, as summarised below.

#### Desk Study

- 9.3.17 A desk study was carried out to identify nature conservation designations and protected and notable habitats and species potentially relevant to the Proposed Development. The desk study was carried out using the data sources detailed in **Table 9-4** and is reported in detail in the Preliminary Ecological Appraisal (PEA) report in **Appendix 9C** (PEI Report Volume II).
- 9.3.18 Protected and notable habitats and species include those listed under Schedules 1, 5 and 8 of the WCA (Ref 9-1), Schedules 2 and 4 of The Habitats Regulations (Ref 9-4), and species and habitats of principal importance for nature conservation in England listed under Section 41 (S41) of the NERC Act (Ref 9-3). Other notable habitats and species have also been considered and assessed on a case by case basis (e.g. those included in national Red Data Books and Lists and within the LBAP (Ref 9-15), but not protected by legislation). This is consistent with the requirements of relevant planning policy.

**Table 9-4: Desk study area and data sources**

Ecological Feature	Study Area	Data Sources	Date Accessed
International statutory nature conservation designations (e.g. Special Area of Conservation (SAC), Special Protection Area (SPA), Ramsar site)	10km	Multi-Agency Geographic Information for the Countryside (MAGIC) website	February 2017

Ecological Feature	Study Area	Data Sources	Date Accessed
National statutory nature conservation designations (e.g. Site of Special Scientific Interest (SSSI))	2km	MAGIC website Natural England website	February 2017
Local non-statutory nature conservation designations (e.g. Local Wildlife Sites (LWS))	2km	Nottinghamshire Biological and Geological Record Centre Lincolnshire Environmental Records Centre	February 2017
Protected and notable habitats and species	2km	Nottinghamshire Biological and Geological Record Centre Lincolnshire Environmental Records Centre	February 2017
Ponds	500m	1:25,000 Ordnance Survey maps Aerial photographs (Google Earth) MAGIC website	February 2017

### Field Surveys

- 9.3.19 The scope of habitat and protected species survey work considered necessary to inform the EclA is summarised in **Table 9-5**. This was determined through a PEA of the Site, as detailed within **Appendix 9C** (PEI Report, Volume II), which also includes the rationale applied when scoping out surveys for certain species or species groups.
- 9.3.20 The assessment within this chapter is based upon the survey information gathered to date. Some field surveys have not been completed, or have only been partially completed, at the time of writing this PEI Report (as detailed in **Table 9-5**) due to their seasonal requirements. A precautionary approach has been applied when making the impact assessment. Where all relevant survey information is not yet available and there remains uncertainty over the potential impacts and effects, the assessment reflects the worst case potential outcome.

**Table 9-5: Scope of ecological field survey work**

Ecological Survey	Study Area	Survey Period	Survey Complete?*
Phase 1 Habitat survey	Habitats within 50m of the Site	February – June 2017	Yes
Badger survey	Suitable habitat for badger within 100m of the Site	March 2017	Yes
Great crested newt survey	All ponds within 500m of the Site	April – June 2017	Yes
Reptile survey	Suitable habitat for reptiles within the Site	April – June 2017	Yes
Preliminary bat	All buildings and trees within 50m of the	February 2017	Yes

Ecological Survey	Study Area	Survey Period	Survey Complete?*
roost assessment – buildings and trees	Site that have the potential to be directly impacted (demolition / felling) or indirectly impacted (significant noise/light disturbance) by the Proposed Development.		
Bat roost emergence / re-entry survey	All trees identified as having suitability for roosting bats as a result of the preliminary bat roost assessment.	July - August 2017	Partial
Bat activity survey	Suitable bat foraging and commuting habitat within and immediately adjacent to the Site that might be directly or indirectly impacted by the Proposed Development	May – September 2017	Partial
Breeding bird survey	Suitable habitat for breeding birds within 100m of the Site	April – July 2017	Yes
Otter and water vole survey	Suitable riparian and terrestrial habitat within 100m of the Site.	March – October 2017	Partial
Fish survey	River Trent upstream and downstream of the proposed outfall points. Desk study followed by full fish survey if necessary	All year round	No
<p>* Yes = full scope of survey work completed                      Partial = scope of survey work partially completed. Further surveys to be completed in 2017 to fully define baseline conditions                      No = survey has not yet been completed</p>			

## 9.4 Baseline Conditions

### Existing Baseline

- 9.4.1 The ecological baseline relevant to the Proposed Development is summarised below. Further details of the findings of desk and field based studies, including evaluation of the relative nature conservation value of identified ecological features, is provided in **Appendix 9C** (PEI Report Volume II).

### *Statutory International Nature Conservation Designations within 10km*

- 9.4.2 There are no international nature conservation designations within a 10km radius of the Site, which is the worst-case zone of influence defined in **Table 9-4**. This search radius is sufficient to identify all designations relevant to the assessment of potential air quality impacts. The nearest international designation is Hatfield Moor Special Area of Conservation (SAC), located approximately 19.5km to the north-west of the Site. Given there is no potential for effects on international statutory designations the Proposed Development does not require Habitats Regulations Assessment (HRA).

### *Statutory National Nature Conservation Designations within 2km*

- 9.4.3 Lea Marsh SSSI, an important area of unimproved floodplain meadow and wet pasture adjacent to the River Trent, is located 1km to the north-east and downstream of the Site. This is of national nature conservation value.
- 9.4.4 There are no further national nature conservation designations within 2km of the Site.

### *Non-statutory Nature Conservation Designations within 2km*

- 9.4.5 Eleven non-statutory designations (Local Wildlife Sites (LWSs)) are located within 2km of the Site, as listed below. These are all of County nature conservation value.
- West Burton Power Station LWS - an area of mature flooded gravel pits and associated woodland with zoological interest for water beetles and water bugs, moths, amphibians and reptiles. Located partially within the Site;
  - West Burton Reedbed LWS - an extensive reedbed and associated carr woodland of botanical interest, located approximately 50m to the south-east;
  - Burton Round Ditch LWS, approximately 100m to the south;
  - Bole Ings LWS approximately, 400m to the north;
  - Bole Ings Drains LWS, approximately 400m to the north;
  - Mother Drain, Upper Ings LWS, approximately 1.1km to the east;
  - West Burton Meadow LWS, approximately 1.2km to the south-west;
  - Bole Ings Flood Pasture LWS, approximately 1.4km to the north-east;
  - Saundby Ponds LWS, approximately 1.6km to the north;
  - Saundby Marsh Drains LWS, approximately 1.7km to the north; and
  - Lea Meadow LWS, approximately 1.8km to the north-east.

### *Habitats*

- 9.4.6 The habitats associated with the Site are summarised below. Full results of the Phase 1 Habitat survey, including a habitat plan, are provided in the PEA report (**Appendix 9C**, PEI Report Volume II).
- 9.4.7 The proposed power plant site area would be located on the former construction laydown area for West Burton B (WBB) power station, which now comprises a landscaped area of seeded semi-improved neutral grassland and young planted scrub and trees. Several artificial amphibian hibernacula (large piles of logs, soil and turf) have also been constructed in this area. These habitats were established as part of the agreed habitat compensation for the loss of great crested newt habitat associated with the construction of the WBB power station. At the northern tip of the proposed power plant site there is a band of semi-mature broad-leaved woodland, comprising predominantly non-native tree species.
- 9.4.8 The construction laydown area would be located on a landscaped mound to the north of the proposed power plant site area. The mound has blocks of planted scrub interspersed with seeded semi-improved neutral grassland and colonising tall ruderal vegetation and scattered scrub.
- 9.4.9 Habitats along the electricity connection route largely comprise semi-improved neutral grassland in landscaped areas around the periphery of the WBB power station, with adjacent blocks of young and semi-mature plantation broad-leaved woodland.

- 9.4.10 The northern outfall option is located along an existing access track that runs through the northern part of West Burton Power Station LWS. The proposed outfall route encompasses habitats on the edge of the track within the LWS, including dense scrub, wet woodland and a small area of reedbed swamp. Habitats along the southern outfall option include semi-improved neutral grassland, hard standing and scattered semi-mature trees, as well as dense scrub, wet woodland and part of a wet drainage ditch within West Burton Power Station LWS.
- 9.4.11 Riparian habitat along the western bank of the River Trent, which would be affected by both the northern and southern outfall options, is characterised by a narrow band of scattered scrub and associated tall ruderal vegetation along the bank tops, with managed species-poor semi-improved grassland on the landward side. The lower river bank faces are largely bare silt and no macrophytes are present at the margins or within the channel of the river, which is turbid with suspended sediment.
- 9.4.12 The Site includes operational areas of the WBB power station, which comprise modern operational buildings and plant, associated infrastructure and areas of hardstanding.
- 9.4.13 Other notable habitats that occur outside the Site boundary, but in close proximity, include flooded gravel pits and associated wet woodland within West Burton Power Station LWS, as well as reedbeds and wet woodland within West Burton Reedbed LWS. To the north and west of the construction laydown area there are a series of ash lagoons, which comprise areas of open water and swamp (reedbed), fringed by scrub.
- 9.4.14 The following habitats associated with the Site are considered to be of Local value (as defined in **Section 9.3**) and will be taken forward to the impact assessment. This does not include those habitats that occur solely within LWS boundaries as these will be considered as part of the assessment of impacts on these sites.
- semi-improved neutral grassland;
  - swamp (reedbed) associated with ash lagoons; and
  - the River Trent.
- 9.4.15 All other habitats associated with the Site, outside of LWS boundaries, are considered to have negligible value (as defined in **Section 9.3**) and will not be assessed further.

#### *Protected and Notable Species*

- 9.4.16 The following relevant protected and notable faunal species have been identified as present, or potentially present, in association with the Site:
- great crested newt;
  - bats;
  - badger;
  - grass snake;
  - breeding birds;
  - otter;
  - brown hare; and
  - fish.
- 9.4.17 No protected, rare or notable plant species were identified within the Site during Phase 1 Habitat surveys, and none would be expected given the landscaped and managed nature of the majority of habitats present.

9.4.18 No invasive, non-native plant species were identified within or directly adjacent to the Site.

#### Great Crested Newt

9.4.19 Small and medium sized populations of great crested newt were found in association with several ponds adjacent to the Site, including the ash lagoons to the north-west, Bole Ings pond to the north and reedbeds within West Burton Reedbed LWS to the south-east. The Proposed Development would not directly impact on any ponds, but terrestrial habitat within the Site that would be affected, including semi-improved neutral grassland, scrub and plantation woodland, provides suitable terrestrial habitat for great crested newt within the typical terrestrial range of the species around breeding ponds.

9.4.20 The great crested newt populations present are assessed as being of County nature conservation value.

#### Bats

9.4.21 At least seven bat species have been recorded foraging at the Site to date, including common, soprano and Nathusius' pipistrelles (*Pipistrellus pipistrellus*, *P. pygmaeus* and *P. nathusii*), noctule (*Nyctalus noctula*), Leisler's bat (*Nyctalus leisleri*), Daubenton's bat (*Myotis daubentonii*) and an unidentified bat in the *Myotis* genus.

9.4.22 The vast majority of bat activity recorded has been by common and soprano pipistrelle bats, though levels of activity by both species have been low. Foraging activity is centred around areas of woodland and scrub habitat. A very low level of activity (only single or small numbers of passes) by the other five species has been recorded, all of which to date has been associated with the woodland and wetland habitats within West Burton Power Station LWS. Levels of activity within the LWS are likely to be higher than that which has been recorded, as the interior of the LWS has not been sampled.

9.4.23 Very few potential roosting features in buildings or trees have been identified and no bat roosting activity has been found. No commuting activity has been found in association with habitats within the Site.

9.4.24 The populations of all of the bat species present at the Site are assessed as being of Local nature conservation value.

#### Badger

9.4.25 Information on the status and distribution of badgers at the Site has not been included within this report in accordance with best practice as badgers are potentially vulnerable to persecution. Baseline information on badger will be presented within a confidential appendix that will be provided to bona fide parties on request.

#### Grass Snake

9.4.26 Habitats within the Site support a small, transient population of grass snakes of Local nature conservation value.

#### Breeding Birds

9.4.27 Cetti's warbler, a bird species listed on Schedule 1 of the WCA but that is not currently considered threatened, was recorded breeding in habitats adjacent to the Site (1 to 2 singing males). This species is an uncommon breeding species in Britain, having only established a breeding population in the 1970's. It is limited in distribution to the milder areas of Britain, but it is also still expanding and consolidating its range and is responding to climate change which has allowed a gradual

spread northwards. It is rare in Nottinghamshire, which is towards the north of its current range, and the population at the Site is assessed as being of Regional nature conservation value.

9.4.28 A number of Red and Amber list bird species of conservation concern (Ref 9-17) were recorded at the Site and showed evidence of breeding, as outlined below. These species are generally common and widespread within Nottinghamshire, and are therefore considered to be of Local nature conservation value.

- Red list passerines associated with scrub and woodland habitat - cuckoo, song thrush, tree sparrow and linnet;
- Amber list passerines associated with scrub and woodland habitat - bullfinch, dunnock and willow warbler; and
- Amber list species associated with wetland habitat - reed bunting and mute swan.

9.4.29 A number of other common bird species were confirmed or likely to be breeding within or adjacent to the Site. These are of Negligible nature conservation value and will not be taken forward in the impact assessment.

#### Otter

9.4.30 There are desk study records of otter within the vicinity of the Site and the River Trent adjacent to the Proposed Development is likely to form part of an otter territory.

9.4.31 No evidence of otter was found within accessible riparian and terrestrial habitats associated with the River Trent within 100m of the Site. Otters are considered unlikely to use habitats in association with the Site for breeding and any activity associated with the Site is likely to be very transitory, given that otters typically have large home ranges, in the order of 11 to 18 km of a main river and its associated tributaries.

9.4.32 It is very unlikely that the River Trent coinciding with the Site is used by any more than a single otter or a single family group. On this basis, it is considered that any otter population associated with the Site would be of District nature conservation value.

#### Brown Hare

9.4.33 Brown hare were recorded in association with areas of bare ground (ash roads), grassland and scrub habitats around the construction laydown area in the north of the Site.

9.4.34 The population of brown hare at the Site is considered to be of Local nature conservation value.

#### Fish

9.4.35 No fish surveys have been completed to date, but the section of the River Trent coinciding with the Site is likely to support an assemblage of fish typical of the wider upstream and downstream sections of the river. The River Trent at this location is within the tidal reach and as such brackish or saltwater species may also be present. Water quality improvements and the removal of barriers to fish migration on the river in recent decades mean that Atlantic salmon may use the river on their passage to upstream tributary breeding streams (Ref 9-15). Eels have been recorded in drainage ditches to the south of the Site and are likely to be present in the river.

9.4.36 The in-channel habitat at the northern and southern outfall options is unlikely to be of specific value to fish in the context of the wider habitat resource available to fish along this and adjacent sections of river. On this basis, the fish assemblage associated with the Site is not likely to be of more than Local nature conservation value.

## Future Baseline

### *No Development (2019/Q2 2020)*

- 9.4.37 The ecological baseline in 2019/ Q1 2020 is likely to be very similar to the existing baseline. The majority of habitats within the Site are within landscaped areas that are subject to an established management regime and this would likely continue. Therefore their extent, composition and structure is unlikely to change markedly. In less managed areas, or if management ceased, minor changes to habitats might occur through ecological succession (e.g. scrub encroachment in grassland and wetland habitats). Young plantings of trees will continue to mature and their relative ecological value may increase but not substantively. As a result of the likely absence of change in habitats, the status and distribution of species is also unlikely to undergo significant change.

## 9.5 Development Design and Impact Avoidance

- 9.5.1 The design process for the Proposed Development has included consideration of ecological constraints and has incorporated, where possible, measures to reduce the potential for adverse ecological effects in accordance with the 'mitigation hierarchy' and relevant planning policy. The measures identified and adopted include those that are inherent to the design of the Proposed Development, and those that can realistically be expected to be applied as part of construction environmental best practice, or as a result of legislative requirements.
- 9.5.2 The development design and impact avoidance measures have been, or would be, adopted during the construction, operation and decommissioning phases of the Proposed Development. These are set out in the remainder of the section.

### Construction

- 9.5.3 Compliance with industry good practice and environmental protection legislation during construction in relation to prevention of surface and ground water pollution, fugitive dust management and noise prevention or amelioration.
- 9.5.4 In support of the above, the construction contractor would prepare and implement a Construction Environmental Management Plan (CEMP) detailing all requirements for environmental protection and legal compliance. The CEMP would be secured through a Requirement of the DCO, to be prepared by the construction contractor(s). A framework CEMP would accompany the ES to support the Application.
- 9.5.5 The Proposed Development would avoid, as far as possible, areas of high quality habitat, such as mature trees and woodland/wetland habitats associated with LWSs to the east of the Site.
- 9.5.6 Retained trees would be protected by clearly defined root protection zones to prevent damage/compaction of roots by plant and other machinery.
- 9.5.7 A great crested newt European Protected Species Mitigation (EPSM) licence would be required to permit construction works in the vicinity of breeding ponds. Mitigation would include measures to avoid killing/injury of newts during construction, including the erection of appropriate exclusion fencing and trapping of areas of suitable terrestrial habitat to be impacted within 250m of breeding ponds, prior to vegetation clearance operations. Newts recovered during the trapping period would be placed in suitable terrestrial habitat adjacent to the Site within the West Burton Power Station Site, away from construction areas. Fencing would be left in place as necessary for the duration of the construction phase to prevent newts dispersing into construction areas. The details of mitigation required would be agreed with Natural England prior to submission of the Application.
- 9.5.8 The measures outlined above to prevent killing/injury of great crested newt would also serve to prevent direct impacts on grass snakes present within the same areas. Refugia would be placed

within fenced areas in order to attract grass snakes and permit their recovery and translocation into suitable adjacent habitat. Reasonable avoidance measures would be used during clearance of habitat suitable for grass snake in any areas outside newt risk zones to minimise the risk of direct impacts. These would include phased clearance of vegetation to gradually reduce its suitability for grass snake, thereby encouraging animals to move away from affected areas.

- 9.5.9 To ensure legislative compliance in relation to nesting birds, all clearance of suitable vegetation during site preparation would be undertaken outside the breeding season (typically March-August inclusive for most species), where possible. In situations where this is not possible, an ecologist would check the working area for nests before works commence. If nests were discovered, appropriate mitigation would be implemented to ensure that they are not disturbed or destroyed before any works can commence in that area. This would include imposing exclusion zones between the works and nest(s) and suspending vegetation clearance works within the area until any young had fledged.
- 9.5.10 If the southern outfall option is taken forward, measures would be implemented during construction to avoid disturbance to Cetti's warbler within the nearby West Burton Reedbed LWS. Construction works would be timed outside the breeding season, which runs from March to August inclusive.
- 9.5.11 Precautionary measures would be implemented to prevent trapping wildlife in construction excavations in order to ensure compliance with animal welfare legislation. Any excavations deeper than 1m would be covered overnight, or where this is not practicable, a means of escape would be fitted (e.g. battered soil slope or scaffold plank), to allow animals (e.g. badger or otter) to vacate excavations should they fall in.
- 9.5.12 Construction temporary lighting would be arranged so that glare is minimised outside the construction site. An indicative Lighting Strategy would be prepared to support the Application, with full details secured through a Requirement in the DCO.
- 9.5.13 All habitats subject to temporary impacts during construction, such as those within the construction laydown area, electricity connection route and northern/southern outfall options, would be reinstated on at least a like-for-like basis at the same location following construction.
- 9.5.14 Appropriate silt control measures (silt curtains) would be used during construction of the surface water outfall structure in the River Trent, if this option is taken forward.
- 9.5.15 The welfare of fish would be taken into account during works to construct a coffer dam in the River Trent. Any fish trapped behind the coffer dam during draw down would be returned to the main channel of the river.
- 9.5.16 Updated surveys would be completed prior to the commencement of construction as necessary to gain up to date information on relevant protected or notable species whose status or distribution may have changed since baseline surveys were completed (e.g. badger). This would be required to inform protected species licence applications (where necessary), or otherwise to determine appropriate mitigation requirements.

## Operation

- 9.5.17 Appropriate interceptors and separators would be used within the design of the surface water drainage system to prevent pollutants being discharged into the River Trent during operation.
- 9.5.18 Lighting impacts on sensitive ecological features (e.g. West Burton Power Station LWS) would be minimised as far as possible, for example by directing lighting away from adjacent habitats. The lighting design would be detailed in the indicative Lighting Strategy submitted as part of the Application.

## Decommissioning

- 9.5.19 Further site investigations would be undertaken in advance of the commencement of decommissioning works to determine the presence/absence of protected species and to evaluate the habitats present that may be impacted. Relevant avoidance and mitigation measures would be specified and implemented with reference to the findings of the above investigations.
- 9.5.20 The following measures would be implemented as appropriate:
- survey findings and associated mitigation requirements would be discussed and agreed with stakeholders as required prior to commencement of works;
  - relevant stand-off working distances would be identified by the project ecologist and implemented to avoid effects, where practicable;
  - all necessary protected species licences would be obtained to derogate unavoidable impacts on relevant protected species. mitigation and monitoring would be implemented in accordance with the requirements of the relevant licences;
  - works would be planned to avoid key risk periods (seasons) where appropriate and practicable; and
  - relevant works would be undertaken under the supervision of an Ecological Clerk of Works to deliver compliance with relevant legislation and approved mitigation.

## 9.6 Likely Impacts and Effects

### Construction

- 9.6.1 This section describes the impacts and potential effects during the construction phase of the Proposed Development on relevant ecological features in the absence of any mitigation over and above that which is inherent to the design (as described in **Section 9.5**).
- 9.6.2 To enable a focussed impact assessment, an initial screening exercise has been completed (**Table 9-6**) to identify the potential impacts of the construction phase that are likely to result in adverse or beneficial effects on relevant ecological features and that require further impact assessment. The relevant impacts are taken forward in the more detailed impact assessment that follows. Those impacts that are considered unlikely to result in effects are scoped out and not considered further.
- 9.6.3 The following broad categories of impact and their potential effects on ecological features have been used for the purposes of the screening exercise.
- clearance or damage of habitat to facilitate construction - resulting in temporary or permanent reduction in habitat extent and potential direct and indirect effects on associated species; and
  - increased levels of disturbance (noise, vibration, construction lighting) – potentially resulting in adverse effects on protected and notable species.

**Table 9-6: Screening of impacts during construction to determine potential effects on ecological features**

Ecological feature	Value	Potential effect on ecological feature as a result of impacts during construction		Scoped into EclA?
		Habitat loss	Disturbance (noise, vibration, artificial light)	
Lea Marsh SSSI	National	No - The Proposed Development is outside the designation boundary. The habitats within the Site will not be of functional importance to faunal groups associated with the SSSI, such as breeding waders.	No - Designation is too distant from the Site to be susceptible to disturbance impacts.	No
West Burton Power Station LWS	County	Yes - Part of the Site overlaps the LWS boundary.	Yes - Construction would occur within and directly adjacent to the LWS.	Yes
West Burton Reedbed LWS	County	No - The Proposed Development is outside the LWS boundary.	No - The LWS is designated for its botanical interest, which would not be affected by disturbance impacts. The effects of disturbance on fauna present will be assessed within the individual species impact assessments.	No
Burton Round Ditch LWS Bole Ings LWS Bole Ings Drains LWS Mother Drain, Upper Ings LWS West Burton Meadow LWS Bole Ings Flood Pasture LWS Saundby Ponds LWS Saundby Marsh Drains LWS Lea Meadow LWS	County	No - The Proposed Development is outside the boundary of these LWSs.	No - None of these LWS would be affected by disturbance impacts as they are either too distant from the Site, or are separated by buffers to disturbance, such as dense scrub/ woodland habitat.	No
Semi-improved neutral grassland	Local	Yes - The Proposed Development would result in loss of grassland habitat.	n/a	Yes

Ecological feature	Value	Potential effect on ecological feature as a result of impacts during construction		Scoped into EclA?
		Habitat loss	Disturbance (noise, vibration, artificial light)	
Swamp (reedbed) associated with ash lagoons	Local	No - The ash lagoons are located outside the Site.	n/a	No
River Trent	Local	Yes - Construction of an outfall to the River Trent would require land take within the river.	n/a	Yes
Great crested newt	County	Yes - The Proposed Development would result in loss of terrestrial habitat suitable for great crested newt and potential killing / injury of animals.	Unlikely - This species is less susceptible to indirect disturbance impacts.	Yes
Bats	Local	Yes - The Proposed Development would result in the loss of habitats used by foraging bats.	Yes - The Proposed Development would result in disturbance of adjacent habitats used by foraging bats.	Yes
Badger	The assessment of impacts and effects on badger during the construction phase is included within a separate confidential appendix.			
Grass snake	Local	Yes - The Proposed Development would result in the loss of habitats used by grass snake.	Yes - The Proposed Development would result in disturbance of adjacent habitats used by grass snake.	Yes
Cetti's warbler	Regional	No - This species was recorded in habitats outside of the Site.	Unlikely - Effect unlikely with appropriate measures taken to avoid disturbance.	No
Red and amber list passerines associated with scrub and woodland habitat: Cuckoo, song thrush, tree sparrow, linnet, bullfinch, dunnoek, willow warbler	Local	Yes - The Proposed Development would result in the loss of habitats used by breeding birds.	Yes - The Proposed Development would result in disturbance of adjacent habitats used by breeding birds.	Yes

Ecological feature	Value	Potential effect on ecological feature as a result of impacts during construction		Scoped into EclA?
		Habitat loss	Disturbance (noise, vibration, artificial light)	
Amber list species associated with wetland habitat: Reed bunting Mute swan	Local	No - The Proposed Development would not result in any loss of wetland habitat used by these species.	Yes - The Proposed Development would result in disturbance of adjacent habitats used by wetland birds.	Yes
Otter	District	Yes - The Proposed Development would result in the loss of habitats that may be used by otter	Yes - The Proposed Development would result in disturbance of habitats that may be used by otter	Yes
Brown hare	Local	Yes - The Proposed Development would result in the loss of habitats used by brown hare.	Yes - The Proposed Development would result in disturbance of habitats used by brown hare.	Yes
Fish	Local	Yes - Construction works affecting the River Trent would result in temporary loss of in-channel habitat.	Yes - Construction works within the River Trent would result in disturbance of the river channel.	Yes
<p>Key:</p> <p>n/a = impact is not applicable to the ecological feature, for example noise impacts on habitat features</p> <p>No = no pathway for the impact to result in an effect on the ecological feature</p> <p>Unlikely = impact pathway exists, but there is no reasonable likelihood that it would result in an effect on the ecological feature following the implementation of development design and impact avoidance measures</p> <p>Yes = impact has the potential to result in an effect on the ecological feature</p>				

- 9.6.4 Impacts during the construction period that have potential to result in significant effects on relevant ecological features are considered further below.

#### *West Burton Power Station LWS*

- 9.6.5 Construction of the northern or southern outfall options would require some vegetation clearance and ground disturbance within the boundary of the LWS. This would occur regardless of the final outfall option chosen. The impact on habitats would be temporary, as habitats would be reinstated over the pipeline upon the completion of works. So there would be no permanent land take from the LWS. The flooded gravel pits and associated secondary wet woodland, which are the habitats that support the ecological features for which the LWS is designated (water beetles and bugs, moths, amphibians and reptiles), would not be directly or indirectly affected during outfall construction.
- 9.6.6 The northern outfall option would be constructed along an existing access track that passes through the northern part of the LWS. This may require removal of scrub at the edge of the track, affecting a worst case area of up to 0.25ha. Trees on the edge of the woodland and a small area of swamp (reedbed) may also be affected, but impacts on these habitats would be avoided where possible, for example by establishing root protection areas around trees, as outlined in **Section 9.5**.
- 9.6.7 The southern outfall option would be located along the southern boundary of the LWS and would require removal of habitat, mainly comprising scrub and scattered semi-mature trees, up to a worst case area of 0.5ha. Part of an existing drainage ditch may also be impacted during construction works, though the extent and nature of the impact on this feature is unknown at this stage. No impact on the hydrology of the flooded gravel pits would be expected as a result of works to the drainage ditch as there is no direct connection between these features.
- 9.6.8 The maximum area of temporary habitat loss from the LWS is therefore 0.5ha, which comprises only a small proportion of the LWS, which covers an area of approximately 16ha. All habitats would be re-instated following construction, which is likely to last for 1 year or less. The time taken to re-establish existing baseline conditions would depend on the habitat, but for the main habitat to be affected, scrub, it is likely to be 5-10 years.
- 9.6.9 Clearance of habitat may result in localised impacts on fauna associated with the LWS. However, the temporary nature of the required land take and its focus on peripheral areas that do not represent the primary habitat for species of interest (amphibians, grass snake, aquatic invertebrates) would limit the potential for an adverse effect on their conservation status. Essential mitigation to minimise impacts on protected species would further reduce potential for an effect on conservation status (see **Section 9.5**). Any residual impacts on the designated faunal interest would be localised and would have a negligible effect on their conservation status. No adverse impacts, beyond those very small scale localised temporary impacts in working areas, on fauna contributing to the WFD status of waterbodies within the LWS are anticipated.
- 9.6.10 The small scale and temporary loss of habitats that would be required during construction of the chosen outfall option would be unlikely to compromise the structure or function of LWS habitats. The required works would be of short duration and habitats would be reinstated after works to a condition comparable to or better than the existing baseline. For these reasons, and because the habitats that are the main reasons for designation would be retained and protected during works, no adverse effects on the conservation status of the faunal groups for which the LWS are likely. The predicted effect on the LWS of County value is therefore neutral and not significant.

#### *Semi-improved Neutral Grassland*

- 9.6.11 Construction of the Proposed Development would require permanent and temporary losses of semi-improved neutral grassland. The majority of grassland that would be affected is associated with landscaped areas of the Site and is of relatively recent sown origin. Therefore, it currently is of

relatively low ecological value (Local value) and it comprises types that can be readily substituted to deliver habitats of comparable or higher ecological structure and function. The grassland is subject to an ongoing programme of management.

- 9.6.12 Construction of the proposed power plant would result in the permanent loss of approximately 2.5ha of semi-improved neutral grassland. Comparable grassland occurs extensively in areas adjacent to the Site and in the wider area, in particular to the north within Bole Ings. This reduces the relative ecological consequences of the required loss of 2.5ha.
- 9.6.13 A further approximately 2ha of semi-improved neutral grassland in other parts of the Site, such as the construction laydown area and electricity connection route, would be temporarily lost or damaged during construction. These areas would be re-instated following construction, which is expected to last up to 6 years, and would likely re-establish to a comparable or better condition relative to the existing baseline within 5 years of reinstatement.
- 9.6.14 For the above reasons, the temporary and permanent losses of grassland that would be required for construction of the Proposed Development would be unlikely to adversely affect the structure or function of the wider grassland resource associated with the Site or the surrounding landscape. The predicted effect on semi-improved neutral grassland of Local value is therefore neutral and not significant.

#### *River Trent*

- 9.6.15 Construction of either the northern or southern outfall options would require works on the banks of the River Trent and localised small-scale permanent habitat loss, with some associated temporary habitat disturbance also. Up to 120m of river bank may be impacted by construction, mainly comprising scattered scrub, tall ruderal herbs and managed species-poor grassland habitats, could be lost or damaged during construction. The majority of the affected river bank habitats would be re-instated or would re-establish naturally following construction and existing baseline conditions are likely to be restored within 5-10 years. A small section of river bank habitat would be permanently lost to the built outfall structure.
- 9.6.16 Temporary in-channel works would also be required during construction. A cofferdam may be required to create a temporary dry working area in the river channel in order to construct the outfall structure. This would temporarily alter channel form and function at a very local scale through diversion of flows around the cofferdam and exposure of sediments within the cofferdam, but would not impact the wider structure and function of the river. Once re-wetted, channel form and function would be reinstated to the baseline conditions. Therefore, the temporary impact would be insignificant in the context of this large river and the wider extent of comparable river channel habitats.
- 9.6.17 The temporary and permanent impacts on the River Trent that would result from construction of an outfall would be very small scale in the context of the river system and would be very unlikely to affect the structure or function of the River Trent at this location or more widely. The predicted effect on river habitats of Local value is therefore neutral and not significant.

#### *Great Crested Newt*

- 9.6.18 The Proposed Development would impact great crested newt through temporary and permanent losses of foraging habitat, obstruction of access to key foraging habitats, or through killing or injury of individual newts. There would be no loss of breeding habitat as a consequence of the Proposed Development.
- 9.6.19 Construction of the proposed power plant would result in the permanent loss of approximately 3ha of terrestrial habitat suitable for great crested newts (grassland, plantation woodland and artificial hibernaculae) located 100 - 450m from the nearest great crested newt breeding site within the series of ash lagoons to the north of the Site.

- 9.6.20 A further approximately 1ha of suitable terrestrial habitat (grassland and scrub) within the Proposed construction laydown area, located 20 - 150m from the ash lagoons, would be temporarily lost during construction, which could last up to 6 years. Habitats in this area would be fully re-instated following construction, but it would take several years for them to establish to a comparable structure and function for great crested newt. The temporary habitat loss would therefore likely last for up to 10 years, encompassing the period from initial habitat removal to reinstatement of comparable structure and function. Without mitigation, there would be an associated impact on the conservation status of great crested newts over this period. However, mitigation would be delivered as it is necessary to comply with legislation, so an adverse impact on conservation status is highly unlikely even though temporary habitat loss would render the construction laydown area unsuitable for great crested newts.
- 9.6.21 The total extent of temporary and permanent habitat loss (approximately 4ha) in the vicinity of the ash lagoons amounts to approximately 5% of the available terrestrial habitat suitable for great crested newt within 500m of the ash lagoons. There is an abundance of suitable terrestrial habitat contiguous with the ash lagoons to the north, including grassland, scrub, woodland and wetland habitats. The loss of habitat to the construction laydown area may prevent or limit newt dispersal into habitats to the south-east of the ash lagoons, but dispersal into extensive areas of habitat to the north-west and north-east would not be affected and connectivity with other wetland habitats in the wider power station site would remain.
- 9.6.22 Construction of the Southern Outfall Option and Proposed Electricity Connection would result in the temporary loss of up to 2ha of terrestrial habitat located 50 – 100m to the north and west of the reedbeds associated with West Burton Reedbed LWS, which were also found to support breeding great crested newts. The habitats to be affected mostly comprise semi-improved neutral grassland, but also some scrub and semi-mature plantation broad leaved woodland. These would be re-instated following construction but the impact on great crested newt from habitat loss could last for 10 years for grassland habitat, and longer for scrub and plantation. Despite the proximity of these habitats to the reedbed ponds, they are unlikely to be integral to the maintenance of the population of great crested newts in the area as there are optimal terrestrial habitats such as wet woodland and scrub/rank grassland mosaics in closer proximity to the reedbeds. The majority of habitat to be affected comprises managed grassland, which is likely to provide only limited opportunities for foraging and shelter in comparison.
- 9.6.23 While in theory there is potential for site clearance works for the Proposed Development to result in death or injury of great crested newts, in practice compliance with legislation would require implementation of mandatory mitigation that substantively limits this risk and by so doing maintain the conservation status of the great crested newt population associated with the Site. The measures that would be employed prior to and during the construction period to minimise the risk of killing/injury of great crested newts in accordance with legal requirements is outlined in **Section 9.5**. These would be enforced by the terms of the European Protected Species Mitigation Licence that would be obtained to permit the relevant works for the Proposed Development.
- 9.6.24 The impact of temporary and permanent habitat loss during construction is not considered likely to have an adverse effect on the conservation status of the great crested newt population at the Site due to the continued availability of suitable terrestrial habitat connected to breeding ponds, and the avoidance of direct impacts on breeding habitat. The predicted effect on the great crested newt population of County value is therefore neutral and not significant.

### **Bats**

- 9.6.25 The Proposed Development only has potential to affect foraging bats, as no bat roosting habitat would be affected by the Proposed Development.
- 9.6.26 Construction of the proposed power plant would result in the permanent loss of approximately 0.5ha of semi-mature plantation broad-leaved woodland. Construction of the construction laydown area would lead to the temporary loss of approximately 1ha of habitat comprising a mosaic of scrub

and grassland, which would be re-instated following construction and would then take 5-10 years to re-establish to baseline conditions. A low level of foraging activity by common and soprano pipistrelle bats has been found in association with these habitats. Their loss would not affect habitat connectivity for bats in the landscape and there are large areas of optimal foraging habitat, including woodland and wetland, in adjacent areas. The loss of bat foraging habitat during construction is therefore not likely to adversely affect the conservation status of local populations of common and soprano pipistrelle bats.

- 9.6.27 Depending on the chosen outfall option (if any, depending on the drainage solution chosen), construction may lead to the temporary loss of up to 0.5ha of mainly scrub habitat at the periphery of West Burton Power Station LWS. This would be re-instated following construction and would be expected to return to existing baseline conditions within approximately 5-10 years. Very low levels of foraging activity by a further five bat species (in addition to common and soprano pipistrelle), some of which are considered to be scarce or rare in Nottinghamshire, have been found in association with LWS habitats, though levels of activity by these species are likely to be higher than that recorded. The temporary habitat loss that may be required during construction of the northern/southern outfall options would affect a very small percentage (less than 5%) of the total area of the LWS and would result in no loss of connectivity within the site. High quality foraging habitats, such as the flooded gravel pits and associated wet woodland, would not be affected. The impact of temporary habitat loss within the LWS would not have an adverse effect on the conservation status of any of the bat species recorded at the site.
- 9.6.28 Foraging bats would experience an increase in levels of noise, vibration and artificial light during construction. Light disturbance would be minimised as lighting would be directed into working areas only, and would be designed so as not to illuminate foraging habitats adjacent to the Site, such as areas of woodland. The effect on bats of any minor residual light spill from working areas would differ between species, for example pipistrelle bats and *Nyctalus* species are more tolerant of artificial light than *Myotis* species, but any localised impacts would be unlikely to significantly affect the use of adjacent habitats by foraging bats. There is sufficient alternate habitat in the wider area to accommodate any localised small scale displacement of bats from habitats abutting illuminated working areas, given the low level of bat activity recorded.
- 9.6.29 The loss of habitat and increased level of disturbance that would result during the construction phase is unlikely to have an adverse effect on the conservation status of any of the bat species recorded at the Site. The predicted effect on all bat species of Local value is therefore neutral and not significant.

### Grass Snake

- 9.6.30 Construction of the proposed power plant would result in the permanent loss of approximately 3ha of semi-improved neutral grassland, young plantation and semi-mature plantation broad leaved woodland. These habitats support a small population of grass snake.
- 9.6.31 The loss of these habitats would lead to a reduction in the availability of habitat for foraging, basking and shelter. However, such opportunities are relatively limited within this area (with the exception of the artificial hibernaculae present) due to the landscaped nature and relative uniformity of the habitats present. Grass snakes typically have large home ranges of several hectares or more and their presence in this area is likely to be transitory, as animals disperse between more optimal habitats outside the Site, such as the ash lagoons to the north-west and the wetland habitats associated with West Burton Power Station LWS to the east. The habitat to be lost provides connectivity between these areas of more optimal habitat, but habitat connectivity would remain to the north of the Site where there are extensive areas of suitable grassland, scrub, woodland and wetland habitats.
- 9.6.32 The Proposed Development would also result in the temporary loss of grassland and scrub habitat within the construction laydown area, electricity connection route and northern/southern outfall options. Up to 3ha would be lost during construction, but would be re-instated afterwards and

existing baseline conditions would be restored within 5-10 years. These areas are also likely to be used on a transient basis by grass snake.

- 9.6.33 The loss of habitat used by grass snake is unlikely to have an adverse effect on the conservation status of the species in the local area given that the areas to be affected are only likely to be used on a transient basis and represents only a small proportion of the total area of habitat suitable for grass snake in the surrounding area. The predicted effect on the grass snake population of Local value is therefore neutral and not significant.

#### *Red and Amber List Passerine Birds Associated with Scrub and Woodland Habitat*

- 9.6.34 Construction of the proposed power plant would result in the permanent loss of approximately 0.5ha of semi-mature plantation broad-leaved woodland.
- 9.6.35 Up to 1.5ha of scrub habitat would also be temporarily lost to facilitate construction works within the construction laydown area, electricity connection route and northern/southern outfall options. These areas of scrub would be re-instated following construction and existing baseline conditions would likely be restored in 5-10 years.
- 9.6.36 The area of woodland and scrub that would be impacted during construction represents only a very small proportion of the habitat resource available locally. Competition for resources in surrounding areas may increase slightly as a result of the reduction in habitat, but the effect is unlikely to compromise the conservation status of the relevant bird species.
- 9.6.37 Increases in levels of noise, vibration and artificial light during construction works in spring and summer may have an adverse effect on the breeding success of birds in adjacent habitats. The effects of disturbance on birds are little understood, but disturbances could result in reduced usage of adjacent habitats by breeding birds, or possibly abandonment of nests. However, these impacts would be localised and given the quantity of suitable habitat in the surrounding area, any effects on local bird populations are considered unlikely to be significant.
- 9.6.38 In view of the above, habitat loss and disturbance impacts during construction are considered unlikely to have an adverse effect on the conservation status of local populations of red and amber list bird species associated with scrub and woodland. The predicted effect on these bird populations of Local value is therefore neutral and not significant.

#### *Amber List Bird Species Associated with Wetland Habitat*

- 9.6.39 Increased levels of disturbance during construction in the spring and summer have the potential to adversely affect the breeding success of birds associated with wetland habitat adjacent to the Site. However, even if a localised effect was realised, this is unlikely to have an adverse effect on the conservation status of local populations of the species concerned, given their common and widespread status in the county. The predicted effect on wetland bird populations of Local value is therefore neutral and not significant.

#### *Otter*

- 9.6.40 Construction of the northern or southern outfall option (if this drainage solution were to proceed) would affect river and riparian habitats of potential value to otter for foraging and movement. However, in the context of a typical otter territory size of 11 to 18km of main river, plus connected tributaries, any habitat impact would be very small and localised.
- 9.6.41 The surveys undertaken for the Proposed Development have identified no high risk habitats suitable for otter holts or refuges, so habitat use in the vicinity of the Site will be largely transitory in nature. The required construction works would not obstruct the river, and would only affect localised stretches of the southern bank, so there would be no impact on the ability of otter to use the river as a movement corridor.

- 9.6.42 Disturbance of otters using the river is unlikely, as this species is largely nocturnal so would be active largely at times when it would not coincide with construction works for the proposed outfall. The proposed power plant is too distant from the river for construction works here to be likely to disturb otter, regardless of the timing of these works. So the construction works would not restrict otter movement or prevent them from accessing favoured foraging areas. Even if there was a minor deterrent effect from the construction works on otter, this would likely be of short duration, localised and temporary, and therefore would not impact the favourable conservation status of the species or the individual otters concerned.
- 9.6.43 On the basis of the above, the impact of habitat loss and disturbance is very unlikely to have an adverse effect on the conservation status of the local otter population of District value and the predicted effect is neutral and not significant.

#### **Brown Hare**

- 9.6.44 Use of the construction laydown area would result in the temporary loss of approximately 1ha of grassland and planted scrub habitat. These habitats would be re-instated following construction and would re-establish in 5-10 years; with a construction period of 6 years, the duration of the impact would be 10-15 years.
- 9.6.45 Hares occupy large home ranges and there is an abundance of suitable habitat to the north of the Site. The effect of the temporary loss of this small area of habitat on the local hare population would therefore be negligible. Increased levels of disturbance during construction may cause localised displacement of hares in adjacent habitats, but hares currently occupy parts of the Site that are subject to regular disturbance from ash handling operations, and therefore the effect would be negligible.
- 9.6.46 The impact of habitat loss and disturbance during construction would not adversely affect the conservation status of the local hare population of Local value and the predicted effect is neutral and not significant.

#### **Fish**

- 9.6.47 The construction of a cofferdam in the River Trent in order to construct an outfall structure (if this drainage solution was chosen) would result in the temporary loss of in-channel habitat, though the small area to be affected would be trivial within such a large river. The in-channel and marginal habitats at both outfall option locations do not contain any features likely to be of specific importance for fish, and they are typical of habitats in the wider river.
- 9.6.48 The cofferdam is unlikely to significantly affect the flow dynamics within the river, and as such the movements of fish would be unlikely to be obstructed or otherwise restricted. Works within the coffer dam may cause some noise and vibration within the river channel, but any significant disturbances are likely to be short term, infrequent and given the size of the river would be unlikely to significantly affect fish movements or behaviour.
- 9.6.49 In view of the above, any required in-channel works in the River Trent are very unlikely to have an adverse effect on fish movements in the river or the conservation status of local fish populations. The predicted effect on the fish assemblage in the River Trent, likely to be of Local value, is therefore neutral and not significant.

#### **Opening**

- 9.6.50 The impacts and potential effects on ecological features at opening would be the same as those at operation, which are considered below.

## Operation

- 9.6.51 This section describes the impacts and potential effects during the operational phase of the Proposed Development on relevant ecological features in the absence of any mitigation over and above that which is inherent to the design (as described in **Section 9.5**).
- 9.6.52 To enable a focussed impact assessment, an initial screening exercise has been completed (**Table 9-7**) to determine which of the potential impacts during the operation phase are likely to result in effects on ecological features, following the implementation of development design and impact avoidance measures. These are taken forward in the more detailed impact assessment that follows. Those impacts that are considered unlikely to result in effects are scoped out and not considered further.
- 9.6.53 Potential impacts during the operation phase that could result in effects on ecological features are as follows:
- air pollution from emissions - potentially leading to adverse effects on sensitive habitats through increased nitrogen and acid deposition; and
  - increased levels of disturbance (noise, vibration, artificial lighting) - potentially resulting in adverse effects on ecological features.

**Table 9-7: Screening of impacts during operation to determine potential effects on ecological features**

Ecological feature	Value	Potential effect on ecological feature as a result of impacts during operation		Scoped into EclA?
		Air quality impacts	Disturbance impacts (noise, vibration, artificial light)	
Lea Marsh SSSI	National	Yes	No - Designation is too distant from the Site to be susceptible to disturbance impacts.	Yes
West Burton Power Station LWS	County	Yes	Unlikely - The main faunal interest feature of the LWS is water beetles and water bugs, which are unlikely to be adversely affected by increased levels of disturbance during operation of the Proposed Development. The flooded gravel pits are located approximately 75m from the Site boundary and are separated by areas of dense scrub which would also act as a buffer to disturbance. Potential effects on other fauna associated with the LWS are considered below.	Yes
West Burton Reedbed LWS	County	Yes	No - The LWS is located approximately 200m to the south of the Proposed Power Plant Site and is already subject to operational disturbance associated with WBB located approximately 100m to the west.	Yes
Burton Round Ditch LWS Bole Ings LWS Bole Ings Drains LWS Mother Drain, Upper Ings LWS West Burton Meadow LWS Bole Ings Flood Pasture LWS	County	Yes	No - None of these LWS would be affected by disturbance impacts as they are either too distant from the Site, or are separated by buffers to disturbance, such as dense scrub/woodland habitat.	Yes

Ecological feature	Value	Potential effect on ecological feature as a result of impacts during operation		Scoped into EclA?
		Air quality impacts	Disturbance impacts (noise, vibration, artificial light)	
Saundby Ponds LWS Saundby Marsh Drains LWS Lea Meadow LWS				
Semi-improved neutral grassland	Local	Unlikely There are no screening assessment criteria available.	n/a	No
Swamp (reedbed) associated with ash lagoons	Local	Unlikely There are no screening assessment criteria available. Wetland habitats are less susceptible to air quality impacts.	n/a	No
River Trent	Local	Unlikely There are no screening assessment criteria available. Wetland habitats are less susceptible to air quality impacts.	n/a	No
Great crested newt	County	n/a	Unlikely - This species is less susceptible to indirect disturbance impacts.	No
Bats	Local	n/a	Yes	Yes
Badger	The assessment of impacts and effects on badger during the operation phase is included within a separate confidential appendix.			
Grass snake	Local	n/a	Unlikely - There is no reasonable likelihood that localised disturbances during operation would have an adverse effect on the conservation status of grass snake in the local area.	No

Ecological feature	Value	Potential effect on ecological feature as a result of impacts during operation		Scoped into EclA?
		Air quality impacts	Disturbance impacts (noise, vibration, artificial light)	
Cetti's warbler	Regional	n/a	No - This species was found with West Burton Reedbed LWS, which is located approximately 200m to the south of the Proposed Power Plant Site and is already subject to operational disturbance associated with WBB power station, located approximately 100m to the west.	No
Red and amber list passerines associated with scrub and woodland habitat: Cuckoo, song thrush, tree sparrow, linnnet, bullfinch, dunnoek, willow warbler	Local	n/a	Unlikely - Power stations do not typically emit loud, unexpected, startling noise that can cause adverse disturbance to birds. Maintenance works associated with the operational phase may cause localised and temporary disturbance to breeding birds, but this would not adversely affect the conservation status of local bird populations, especially as the birds present are already habituated to a similar level of disturbance from the existing operational power station.	No

Ecological feature	Value	Potential effect on ecological feature as a result of impacts during operation		Scoped into EclA?
		Air quality impacts	Disturbance impacts (noise, vibration, artificial light)	
Amber list species associated with wetland habitat: Reed bunting Mute swan	Local	n/a	Unlikely - Power stations do not typically emit loud, unexpected, startling noise that can cause adverse disturbance to birds. Maintenance works associated with the operational phase may cause localised and temporary disturbance to breeding birds, but this would not adversely affect the conservation status of local bird populations, especially as the birds present are already habituated to a similar level of disturbance from the existing operational power station.	No
Otter	District	n/a	No - The Proposed Power Plant Site would be located approximately 150 – 200m from the River Trent and any disturbance would be buffered by the woodland habitats associated with West Burton Power Station LWS.	No
Brown hare	Local	n/a	Unlikely - There is no reasonable likelihood that localised disturbances during operation would have an adverse effect on the conservation status of brown hare in the local area, especially given that the animals using the Site are already habituated to disturbance from existing operations.	No
Fish	Local	n/a	No - There would be no disturbance of in-channel habitat in the River Trent during operation.	No

Ecological feature	Value	Potential effect on ecological feature as a result of impacts during operation		Scoped into EclA?
		Air quality impacts	Disturbance impacts (noise, vibration, artificial light)	

Key:  
 n/a = impact is not applicable to the ecological feature, for example noise impacts on habitat features  
 No = no pathway for the impact to result in an effect on the ecological feature  
 Unlikely = impact pathway exists, but there is no reasonable likelihood that it would result in an effect on the ecological feature following the implementation of development design and impact avoidance measures  
 Yes = impact has the potential to result in an effect on the ecological feature

9.6.54 The potential impacts and resultant effects during the operation phase of the Proposed Development on those ecological features that have been scoped in to the impact assessment are considered further below.

#### *Lea Marsh SSSI*

9.6.55 The potential impacts of air quality on Lea Marsh SSSI are assessed within **Chapter 6: Air Quality** and its accompanying **Appendix 6A** (see PEI Report Volume II).

9.6.56 The annual mean NO<sub>x</sub> process contribution has been compared with the annual mean Critical Level at the designation. The maximum process contribution of NO<sub>x</sub> from any of the operational scenarios results in a very low magnitude of change in the annual mean concentration at the designation (<1%).

9.6.57 The maximum process contribution of nutrient nitrogen deposition at the designation is less than 1% of the critical load published for the most sensitive habitat type. The maximum nitrogen deposition process contribution to acid deposition at the ecological receptor is less than 0.1% of the critical load published for the most sensitive habitat type. The process contribution of sulphur deposition is expected to be negligible as the emissions of SO<sub>2</sub> from natural gas combustion are trivial. Therefore, the effect of nutrient nitrogen and acid deposition from the Proposed Development at this designation would be negligible.

9.6.58 Air quality impacts during operation of the Proposed Development are therefore not likely to have an adverse effect on the structure or function of habitats associated with the designation. The predicted effect on Lea Marsh SSSI of National nature conservation value is neutral and not significant.

#### *Local Wildlife Sites*

9.6.59 The potential effects of air quality impacts on worst case LWSs are assessed within **Chapter 6: Air Quality**.

9.6.60 The maximum process contributions from any of the operational scenarios would be less than the annual mean objective at the worst case LWS. Therefore, operational emissions would not result in an adverse effect on the structure or function of habitats associated with LWSs of County value and the predicted effect is neutral and not significant.

#### *Bats*

9.6.61 Operation of the Proposed Development would result in an increase in levels of background noise and artificial light within the Proposed Power Plant Site. The impact of disturbance on adjacent habitats, such as woodland associated with West Burton Power Station LWS, would be minimised as far as possible, for example through sensitive lighting design, though a degree of disturbance would remain.

9.6.62 As for construction, the effect on bats of any residual light spill would differ between species and may result in reduced usage of affected habitats by light sensitive species, such as *Myotis* bats. However, given the amount of optimal woodland and wetland foraging habitat in the surrounding area, any localised displacement of bats in the vicinity of the Proposed Power Plant is unlikely to have an adverse effect on the conservation status of any of the bat populations present.

9.6.63 The predicted effect on all bat species of Local value is therefore neutral and not significant.

## Rochdale Envelope

- 9.6.64 For the purposes of the ecological impact assessment it is assumed that the majority of the Site would be cleared, no matter what the final sizing and layout of the buildings and structures is. The Rochdale Envelope parameters (i.e. the maximum parameters for the Proposed Development and in particular its main buildings and structures) therefore do not alter the parameters of the assessment of construction impacts on ecology, as they are by definition worst case.
- 9.6.65 During operation, given that a worst case is assessed in terms of building/structure dimensions, and the CCGT stack height is fixed (in m AOD), the limits of deviation for each part of the Proposed Development are relatively constrained and the outcome of assessment is unlikely to differ substantially even where certain design and operation parameters are not fixed.
- 9.6.66 Given the above, no further discussion of the Rochdale Envelope parameters is provided in this chapter.

## Decommissioning

- 9.6.67 Impacts associated with the decommissioning phase of the Proposed Development are likely to be of a similar nature to those associated with the construction phase and as a result the potential effects on ecological features are not anticipated to differ significantly from those predicted at construction. The extent of habitat loss that is likely to be required during decommissioning is likely to be much less than at construction, and the resulting effects on ecological features are therefore likely to be reduced.

## 9.7 Mitigation and Enhancement Measures

- 9.7.1 No significant adverse effects (i.e. major or moderate adverse effects) are predicted during the construction, operation or decommissioning periods of the Proposed Development, so there is no requirement for specific mitigation. All mitigation measures that would be necessary to ensure compliance with protected species legislation, as well as good practice measures to safeguard animal welfare, are included within the development design and impact avoidance measures, detailed in **Section 9.5**.
- 9.7.2 Proposals for ecological enhancement are summarised below; the areas of the Site to which these apply are shown on **Figure 9.1** (PEI Report Volume III). The proposals have been designed to ensure no net loss of biodiversity as a result of the Proposed Development, as calculated using the Defra offsetting metric (Ref 9-18). The proposals would also deliver compensatory habitat provision for great crested newt to meet EPS licensing requirements. They include the following:
- management of existing habitats to the north of the Site to maintain a mosaic of scrub, grassland and wetland habitats, as well as creating habitat piles in these areas;
  - re-instatement of habitats within the construction laydown area following construction to restore a mosaic of scrub and grassland habitats, as well as habitat pile creation;
  - management of existing areas of scrub to the north of Wheatley Beck to improve their diversity and wildlife value. To include scrub thinning, management and diversification, creation of glades with species-rich grassland and habitat pile creation; and
  - botanical enhancement of landscaped areas of grassland within Bole Round to the north of the Site. This is likely to require scarification of soil and followed by seeding with a diverse wildflower grassland mix and subsequent appropriate management.

## 9.8 Limitation or Difficulties

- 9.8.1 This EclA has been undertaken based upon the survey information gathered to date. For those ecological features for which full surveys have been completed, sufficient data has been collected to inform a robust assessment of the likely impacts and effects of the Proposed Development. Where surveys have only been partially completed, or not completed at all, a precautionary approach has been taken to the assessment to account for this limitation. The assessment presented in the ES will be updated in light of the findings of ongoing and future ecological surveys, but these are not expected to alter the overall conclusions.

## 9.9 Residual Effects and Conclusions

- 9.9.1 The residual effects are those that would remain after the implementation of mitigation measures. As no significant adverse effects have been predicted in relation to the construction, operation or decommissioning periods of the Proposed Development, there are no requirements for specific mitigation. Accordingly, no significant residual effects on ecological features are predicted.

## 9.10 References

- Ref 9-1 Wildlife and Countryside Act 1981 (as amended).
- Ref 9-2 Countryside and Rights of Way Act 2000 (as amended).
- Ref 9-3 Natural Environment and Rural Communities Act 2006 (as amended).
- Ref 9-4 The Conservation of Habitats and Species Regulations 2010 (as amended).
- Ref 9-5 Protection of Badgers Act 1992 (as amended).
- Ref 9-6 The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003.
- Ref 9-7 Salmon & Freshwater Fisheries Act 1975 (as amended).
- Ref 9-8 Animal Welfare Act 2006.
- Ref 9-9 Department for Energy and Climate Change (2011) *National Policy Statement for Energy (EN-1)*.
- Ref 9-10 Department for Communities and Local Government (2012) *National Planning Policy Framework*.
- Ref 9-11 The Bassetlaw District Council (2011) *Core Strategy and Development Management Policies Development Plan Document for Bassetlaw*.
- Ref 9-12 Joint Nature Conservation Committee and Defra (2012) *UK Post-2010 Biodiversity Framework*.
- Ref 9-13 Joint Nature Conservation Committee (1994) *UK Biodiversity Action Plan*.
- Ref 9-14 Department for Environment, Food and Rural Affairs (2011) *Biodiversity 2020, A Strategy for England's Wildlife and Ecosystem Services*.
- Ref 9-15 Nottinghamshire Biodiversity Action Group. Taylor, J.K. (ed). (1998). *Local Biodiversity Action Plan for Nottinghamshire*. Nottinghamshire County Council.

- Ref 9-16 CIEEM (2016) *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, second Edition*. Chartered Institute of Ecology and Environmental Management, Winchester.
- Ref 9-17 Eaton, M., Aebischer, N., Brown, A., Hearn, R., Lock, L. Musgrove, A., Noble, D., Stroud, D. and Gregory, R. (2015). *Birds of Conservation Concern 4: the population status of birds in the UK, Channel Islands and Isle of Man*. British Birds 108. December 2015. 708-746.
- Ref 9-18 Defra (2012) *Biodiversity Offsetting Pilots – Technical Paper: the metric for the biodiversity offsetting pilot in England*. Defra, London.

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## 10. Landscape and Visual Amenity

### 10.1 Introduction

- 10.1.1 This chapter of the Preliminary Environmental Information (PEI) Report addresses the potential effects of the Proposed Development on landscape character (as a resource in its own right) and visual amenity.
- 10.1.2 This chapter is supported by **Appendices 10A** and **10B** (PEI Report Volume II) and **Figures 10.1-10.18** (PEI Report Volume III).

### 10.2 Legislation, Planning Policy and Guidance

#### Legislative Background

- 10.2.1 The Landscape and Visual Impact Assessment (LVIA) takes account of the legislation relevant to landscape and visual issues, including the European Landscape Convention and Reference Documents (Ref 10-1).

#### Planning Policy Context

- 10.2.2 The Overarching National Policy Statement (NPS) for Energy EN-1 (Ref: 10-2), includes a number of statements pertinent to the potential landscape (including Green Infrastructure (GI)) and visual impacts of energy infrastructure in general.
- 10.2.3 Section 5.9 of EN-1 sets out the requirements for assessing and mitigating landscape and visual impacts of proposed nationally significant energy infrastructure projects. The scope of the assessment should include construction phase effects as well as the effects of the completed facility and its operation and eventual decommissioning on landscape components, landscape character and views and visual amenity.
- 10.2.4 In terms of mitigation, EN-1 encourages the reduction in scale of the buildings taking into consideration function, appropriate siting, design including colours and materials, and landscaping schemes to mitigate adverse landscape and visual impacts.
- 10.2.5 The NPS for Fossil Fuel Electricity Generating Infrastructure (EN-2) (Ref: 10-3) includes the following relevant to potential landscape and visual impacts:

*“The applicant should include a landscape and visual impact assessment as part of the ES, as set out in Section 4.2 of EN-1.”* (paragraph 2.6.3)

*“The applicant should also consider the design of the plant, including the materials to be used, and the visual impact of the stack, as set out in Section 5.9 of EN-1 in the context of the local landscape.”* (paragraph 2.6.4)

- 10.2.6 The NPS also includes the following paragraphs (pages 15 and 16) which relate to the decision making process:

*“It is not possible to eliminate the visual impacts associated with a fossil fuel generating station. Mitigation is therefore to reduce the visual intrusion of the buildings in the landscape and minimise impact on visual amenity as far as reasonably practicable.”* (paragraph 2.6.5)

*“For the reason given in paragraph 2.6.5 above if, having regard to the considerations in respect of other impacts set out in EN-1 and this NPS, the [the decision maker] is satisfied that the location is appropriate for the project, and that it has been designed sensitively (given the various siting,*

*operational and other relevant constraints) to minimise harm to landscape and visual amenity, the visibility of a fossil fuel generating station should be given limited weight.” (paragraph 2.6.10)*

10.2.7 **Table 10-1** summarises the NPS advice relating to this chapter and signposts to where policies are considered.

**Table 10-1: Summary of relevant NPS advice regarding Land Use including open space, green infrastructure and Green Belt**

Summary of NPS	Consideration within the Chapter
<b>NPS EN-1</b>	
<p>Paragraph 5.10.5 states: <i>“The ES (see Section 4.2) should identify existing and proposed land uses near the project, any effects of replacing an existing development or use of the site with the proposed project or preventing a development or use on a neighbouring site from continuing. Applicants should also assess any effects of precluding a new development or use proposed in the development plan.”</i></p>	<p>Existing land uses near the Proposed Development are noted in <b>Section 10.4</b> Baseline Conditions.</p> <p>Effects resulting from the Proposed Development are identified in <b>Section 10.6</b> Likely Impacts and Effects.</p>
<p>Paragraph 5.10.6 states: <i>“Applicants will need to consult the local community on their proposals to build on open space, sports or recreational buildings and land. Taking account of the consultations, applicants should consider providing new or additional open space including green infrastructure, sport or recreation facilities, to substitute for any losses as a result of their proposal. Applicants should use any up-to-date local authority assessment or, if there is none, provide an independent assessment to show whether the existing open space, sports and recreational buildings and land is surplus to requirements.”</i></p>	<p>Relevant local policies are identified in <b>Section 10.2</b> Legislation, Planning Policy and Guidance and <b>Figure 10.2</b> Bassetlaw Planning Policies (PEI Report Volume III).</p>

### National Planning Policy

10.2.8 The National Planning Policy Framework (NPPF) (Ref: 10-4) requires local authorities’ design policies to maximise renewable development whilst ensuring that adverse landscape and visual impacts are addressed satisfactorily.

### Local Policy

10.2.9 Bassetlaw District Council’s Proposals Map Designations (Ref: 10-5) contain no policies relevant to landscape and visual amenity matters in relation to the Site and immediate surrounding area.

10.2.10 The Bassetlaw Core Strategy and Development Management Policies Development Plan Document for Bassetlaw (Ref: 10-6), defines several policies relevant to the assessment.

10.2.11 Policy DM9: Green Infrastructure; Biodiversity & Geodiversity; Landscape; Open Space and Sports Facilities states that *‘new development will need to integrate with the character of the surrounding area and take full account of landscape character at all stages in the planning and delivery process, recognising opportunities for habitat creation’*. Additionally, it states that new development

is also 'expected to enhance the distinctive qualities of the landscape character policy zone in which they would be situated, as identified in the Bassetlaw Landscape Character Assessment'.

### Other Guidance

- 10.2.12 The landscape and visual impact assessment has been undertaken in accordance with principles within the Guidelines for Landscape and Visual Impact Assessment, Third Edition (GLVIA3) (Ref: 10-7) and in line with guidance within An Approach to Landscape Character Assessment, Guidance for England and Scotland (Ref: 10-8).
- 10.2.13 Representative viewpoint photographs and photomontages have been prepared in accordance with Advice Note 01/11 Photography and photomontage in landscape and visual impact assessment (Ref: 10-9).

## 10.3 Assessment Methodology and Significance Criteria

- 10.3.1 Details of the assessment methodology are provided in **Appendix 10A: Landscape and Visual Impact Assessment Methodology** (PEI Report Volume II), and a summary is provided below.

### Consultation

- 10.3.2 **Table 10-2** summarises the consultation responses of relevance to landscape and visual amenity, including those received from the Scoping Opinion and discussions with the local authorities for the agreement of proposed viewpoint locations for the site assessment.

**Table 10-2: Consultation summary table**

Consultee or organisation approached	Date and nature of consultation	Method	Summary of Response
Secretary of State (SoS)	<p>Scoping Opinion June 2017</p> <p>The SoS considers that the Applicant should assess the landscape and visual effects of the Proposed Development in accordance with the Guidelines for Landscape and Visual Impact Assessment (Third Edition) (GLVIA3). Any departure from the methodology should be fully justified within the ES.</p>	Scoping Opinion	<p>See <b>Section 10.2</b> Legislation, Planning Policy and Guidance. The landscape and visual impact assessment has been undertaken in accordance with principles within the Guidelines for Landscape and Visual Impact Assessment, Third Edition (GLVIA3) (Ref: 10-7). Details of the landscape and visual impact assessment methodology are provided in <b>Appendix 10A: Landscape and Visual Impact Assessment Methodology</b> (PEI Report Volume II).</p>
	<p>The assessment baseline should consider relevant policy zones within the Bassetlaw Landscape Character Assessment Trent Washlands and Mid Nottinghamshire Farmlands. The Applicant's attention is drawn to NCC comments in this respect.</p>		<p><b>Section 10.4</b> Baseline Conditions considers policy zones within the study area and adjacent to the Site.</p>
	<p>The proposals will be for large structures. The SoS recommends that careful consideration should be given to the form, siting, and use of materials and colours in terms of minimising the adverse visual impact of these structures in accordance with NPS-EN2. The cumulative landscape and visual effect of massing due to WBA, WBB and WBC should be considered. The potential for visible plumes to occur should be addressed and justification that the technology adopted is Best Available Technique (BAT).</p>		<p><b>Section 10.6</b> Likely Impacts and Effects considers the effects of the Proposed Development in conjunction with WBA and WBB as part of the landscape and visual baseline.</p> <p><b>Section 10.7</b> considers the minimisation of visual effects in accordance with NPS EN2.</p> <p>Detail relating to form, siting, use of materials and colours is not yet available given the early stage of design, but some details will be included in the Application and assessed in the Environmental Statement (ES).</p>
	<p>Scoping Report paragraph 5.6.12 refers to the preparation of a Zone of Theoretical Visibility (ZTV). The SoS advises that the ES should describe the model used, provide information on the area covered and</p>		<p><b>Section 10.3</b> Assessment Methodology and Significance Criteria describes the model used, area covered, timing of survey work and methodology</p>

Consultee or organisation approached	Date and nature of consultation	Method	Summary of Response
	the timing of any survey work and the methodology used.		used. Details of the landscape and visual impact assessment methodology are provided in <b>Appendix 10A: Landscape and Visual Impact Assessment Methodology</b> (PEI Report Volume II).
	The visual impact of the stack or stacks to be erected as part of the Proposed Development will need to be considered. Given the relatively flat landscape, the ZTV should seek to ensure that all potentially sensitive receptors are considered and viewpoints are agreed with the relevant local authorities. This includes receptors on both the east and west banks of the River Trent.		<b>Section 10.3</b> Assessment Methodology and Significance Criteria records the status of discussions with relevant local authorities regarding representative viewpoints.
	The Applicant should liaise with BDC, WLDC and NCC to agree the number and location of accurate Visual Representations to be undertaken. Views from the PRow on the eastern side of the Scoping Opinion for West Burton C Power Station.		<b>Section 10.3</b> Assessment Methodology and Significance Criteria records the status of discussions with relevant local authorities regarding representative viewpoints.
	River Trent should be included as well as night time views.  The assessment of night-time lighting effects from the Proposed Development should consider the cumulative effect of lighting from WBA, WBB and WBC.		<b>Section 10.3</b> Assessment Methodology and Significance Criteria records the status of discussions with relevant local authorities regarding representative viewpoints located adjacent to the River Trent.  Night-time lighting effects resulting from the Proposed Development will be assessed in the ES, once the lighting strategy is completed.
	The Lincolnshire Wolds Area of Outstanding Natural Beauty (AONB) lies approximately 35km east of the Site.		The Lincolnshire Wolds Area of Outstanding Natural Beauty lies outside of the study area. No effects resulting from the Proposed Development are predicted.
	Scoping Report paragraph 5.6.15 refers to the potential need for mitigation as a result of significant effects on landscape character or		Cultural heritage is considered in <b>Chapter 14: Cultural Heritage</b> and <b>Appendix 14</b> . A detailed

Consultee or organisation approached	Date and nature of consultation	Method	Summary of Response
	<p>visual amenity. The Applicant also refers to a detailed landscaping strategy including green infrastructure to be prepared with the local authorities as a requirement of the DCO. This should be cross referenced to the cultural heritage chapter of the ES and consideration should be given to integrating the landscape masterplan with any proposed ecological mitigation.</p> <p>The species list for both Mid Nottinghamshire Farmlands and Trent Washlands Landscape Character Area should be referenced in developing the landscape strategy. When discussing mitigation requirements, the Applicant's assessment should also address the potential measures set out in NPS-EN1 and EN2.</p>		<p>landscaping strategy will be prepared for inclusion in the Application, cross referencing the cultural heritage chapter of the ES.</p> <p>The landscape masterplan will be integrated with proposed ecological mitigation scheme and take into account the species list for both Mid Nottinghamshire Farmlands and Trent Washlands Landscape Character Area, which will be referenced in developing the landscape strategy.</p>
Bassetlaw District Council	<p>9 March 2017 Seeking agreement on winter photography approach.</p> <p>July 6th 2017 (PEIR) Seeking agreement on selection of representative viewpoints to be used within the Landscape and Visual Impact Assessment chapter</p>	Email	<p>Winter photography undertaken in accordance with agreed viewpoints.</p> <p>No response received within timeframe of assessment. Therefore, viewpoints undertaken in accordance with those proposed.</p>
West Lindsey District Council	<p>Response to Scoping Opinion June 2017 The Landscape and Visual Impact Assessment (LVIA) should follow the guidance of the Landscape Institute 'Guidelines for Landscape and Visual Impact Assessment' 3rd Edition (2013), as proposed. An iterative approach, which guides the layout and scheme design should be followed.</p> <p>The effect on landscape character should be assessed with reference to The West Lindsey Landscape Character Assessment (1999) which can be found through the following link: <a href="https://www.west-lindsey.gov.uk/my-services/planning-and-building/planningpolicy/evidence-base-and-monitoring/landscape-character-assessment/">https://www.west-lindsey.gov.uk/my-services/planning-and-building/planningpolicy/evidence-base-and-monitoring/landscape-character-assessment/</a></p>	Scoping Opinion	<p>The LVIA was undertaken following guidance contained within GLVIA3.</p> <p>Assessment of effects on landscape character in <b>Section 10.6</b> Likely Impacts and Effects were undertaken with reference to The West Lindsey Landscape Character Assessment (1999).</p>

Consultee or organisation approached	Date and nature of consultation	Method	Summary of Response
	<p>Scoping Report Paragraph 5.6.13 states that <i>'the stacks will be a maximum of 30-45 metres high and a Zone of Theoretical Visibility (ZTV) has been suggested as having a study area of 5km'</i>. We consider this to be a reasonable study area.</p>		<p>A 5km study area was used throughout the assessment.</p>
	<p>Scoping Report Paragraph 5.6.14 states that <i>'The location of representative views and photomontages will be agreed in consultation with BDC, WLDC and Nottinghamshire County Council (NCC) as appropriate'</i>. The consultation with WLDC is welcomed, however it is considered that all viewpoints taken from the West Lindsey District are accompanied by a photomontage unless agreed with the West Lindsey Local Planning Authority in advance.</p>		<p>BDC, WLDC and NCC were consulted regarding the location of representative viewpoints. Further agreement will be sought regarding production of photomontages for viewpoints within West Lindsey District prior to production of the ES.</p>
	<p>There is not a list of identified viewpoints from the West Lindsey District in the Scoping Report. The viewpoints proposed shall be comprehensive and provide a good representation of the areas to be affected taking note of the downhill and uphill areas of Gainsborough plus the villages of Morton, Lea, Knaith Park and Marton and hamlets of Knaith and Gate Burton. All of these locations will be within or close to the 5km study area.</p>		<p>BDC, WLDC and NCC were consulted and viewpoints representative of visual receptors at Lea (Viewpoint 6), Knaith (Viewpoint 11), Knaith Park (Viewpoint 8) and Gainsborough (Viewpoint 3) have been included in the assessment presented in <b>Section 10.6</b>.</p>
	<p>The impact on residential amenity should be assessed within the ES. This should address the impact on all residential properties/communities within 1km (as a minimum) of the proposed development. The closest residential areas to the east of the application site are to the west of:</p> <ul style="list-style-type: none"> <li>• Gainsborough Road, Lea</li> <li>• Lea Road, Gainsborough</li> <li>• Bridge Street, Gainsborough</li> </ul>		<p>Noted. Viewpoints representative of visual receptors at these locations have been included in the assessment presented in <b>Section 10.6</b>.</p>
	<p>20 July 2017 response to AECOM email of 6 July 2017: <i>"I think a viewpoint from the Gate Burton/Marton area would be a</i></p>	<p>Email</p>	<p>Noted. Response received 20<sup>th</sup> July after summer photography completed on 18<sup>th</sup> July. Viewpoints representative of visual receptors at Gate</p>

Consultee or organisation approached	Date and nature of consultation	Method	Summary of Response
	<i>position we would recommend and maybe some from Gainsborough such as the Gainsborough Riverside Walk and uphill Gainsborough.”</i>		Burton/Marton and uphill Gainsborough have therefore not been assessed at this PEI stage, but will be considered for inclusion in the ES. Viewpoint from Whitton’s Mill apartments deemed representative of Gainsborough Riverside Walk and included in the assessment presented in <b>Section 10.6</b> .
Lincolnshire County Council	6 July 2017, seeking agreement on selection of representative viewpoints to be used within the Landscape and Visual Impact Assessment chapter.	Email	No response received within timeframe of assessment and therefore viewpoints undertaken in accordance with those proposed.
Via East Midlands Ltd	<p>July 14<sup>th</sup> 2017</p> <p>Confirmed that viewpoints proposed were acceptable. However, request for PROWs to be described using unique name and reference number.</p> <p>Queried need for a viewpoint from eastern edge of North and South Wheatley and requested an additional representative viewpoint from the southern and western edges of Gainsborough, in the area of Whitton’s Mill apartments on Bridge Street.</p> <p>Confirmed that the study area of 5km is accepted for the LVIA, based on a maximum height of 45 metres for the stacks.</p> <p>Noted that not been able to discuss/agree photomontages with Fiona Dunning at Bassetlaw District Council (more detailed knowledge of the area) and therefore provided advice on viewpoints to have photomontages produced, suggesting a total of 11 viewpoints</p>	Email	<p>Noted and actioned throughout chapter.</p> <p>Noted. Viewpoint 7 deemed representative of view from North/South Wheatley. Additional viewpoint from Whitton’s Mill apartments included in the assessment and presented in <b>Section 10.6</b>.</p> <p>Noted and use as the basis for assessment (see <b>Section 10.4</b>)</p> <p>Further agreement will be sought regarding production of photomontages following Stage 1 consultation on the PEI Report. A limited number of photomontages have been produced to inform the formal consultation using viewpoints 4 (Residents and PRoW at Bole) and 12 (PRoW, Long distance footpath a single residential property).</p>
Nottinghamshire County Council	Response to Scoping Opinion June 2017 The Landscape Character Assessment should refer to details of the	Scoping Opinion	<b>Section 10.4</b> references the Policy Zones requested (see <b>Table 10-4</b> ).

Consultee or organisation approached	Date and nature of consultation	Method	Summary of Response
	<p>following Policy Zones within the Bassetlaw Landscape Character Assessment Trent Washlands 23, 24, 25 and 49 and Mid Nottinghamshire Farmlands 02, 03 and 05, which are adjacent to the site. Landscape Character areas within the West Lindsey area of Lincolnshire will also be relevant.</p>		
	<p>The LVIA should refer to the Public Rights of Way with the appropriate reference number, so that it is clear exactly which PROW is being referred to.</p>		<p>Appropriate reference numbers for Public Rights of Way were used throughout the assessment.</p>
	<p>A 5km radius study area is accepted for the Landscape and Visual Impact Assessment  It is noted that the location of representative views and photomontages is to be agreed in advance with Bassetlaw District Council, West Lindsey District Council, and Nottinghamshire County Council.</p>		<p>A 5km study area was used throughout the assessment. BDC, WLDC and NCC were consulted regarding the location of representative viewpoints.</p>
	<p>It is noted that a landscape strategy is to be agreed In advance with Bassetlaw District Council, West Lindsey District Council, and Nottinghamshire County Council. This should make reference to the species list for both the Mid Nottinghamshire Farmlands and Trent Washlands Landscape Character Area.</p>		<p>A landscape strategy agreed with BDC, WLDC and NCC as described will be prepared to accompany the Application.</p>
	<p>The structure of the LVIA, as set out in Guidelines for Landscape and Visual Impact Assessment (GLIVA) Third Edition, published by the Landscape Institute and the Institute of Environmental Management and Assessment – 2013, should be as follows:</p> <ul style="list-style-type: none"> <li>• Introduction, including the planning and legal context relevant to landscape and visual impact matters.</li> <li>• The scope of the assessment, including a definition of the study area, definitions of sensitivity and magnitude, and significance of landscape and visual impacts.</li> <li>• Methodology, including the approach to the cumulative landscape and visual effects assessment.</li> </ul>		<p>The assessment was undertaken following the guidance contained within GLVIA3.</p>

Consultee or organisation approached	Date and nature of consultation	Method	Summary of Response
	<ul style="list-style-type: none"> <li>• Description of the components of the development that are of particular relevance to the assessment of landscape and visual effects.</li> <li>• An explanation of how landscape and visual impact considerations have contributed to the scheme design.</li> <li>• A description of baseline conditions, including a description of the landscape character of the study area.</li> <li>• Identification and description of the potential significant effects that are likely to occur.</li> <li>• An assessment of the significance of landscape impacts, both physical impacts and impacts on landscape character.</li> <li>• An assessment of the significance of visual impacts at the construction stage, at year 1 and 15 years after completion. As above Viewpoints should be agreed in advance with Bassetlaw District Council planning officers, West Lindsey District Council planning officers and Nottinghamshire County Council Landscape Architects (VIA East Midlands) to reflect potential views from adjacent residential properties, Public Rights of Way, and surrounding roads.</li> <li>• A description of the mitigation measures incorporated into the design.</li> <li>• A summary of the significant effects remaining after mitigation.</li> <li>• Conclusion.</li> </ul>		

## Assessment Methods

### Landscape

- 10.3.3 In assessing the predicted effects from any likely impacts to the landscape as a result of the Proposed Development, the following criteria have been considered:
- landscape character;
  - landscape quality;
  - landscape value;
  - landscape sensitivity;
  - magnitude of likely impacts that may affect the landscape; and
  - significance of landscape effects.
- 10.3.4 Landscape impacts are considered, including both the direct and indirect impacts of the Proposed Development upon landscape elements and features (or components), as well as the impact upon the general landscape character of the surrounding area.
- 10.3.5 The relationship between sensitivity and magnitude of impact allows an assessment of the significance of predicted landscape effects to be made.
- 10.3.6 The sensitivity of the landscape to change is the degree to which a particular Landscape Character Area (LCA) or feature can accommodate changes or new features without unacceptable detrimental effects to its essential characteristics.
- 10.3.7 The magnitude of a predicted landscape impact relates to the size, extent or degree of change likely to be experienced as a result of the Proposed Development (refer to **Table 10.3**). The magnitude takes into account whether there is a direct impact resulting in the loss of landscape components, or a change beyond the land take of the Proposed Development that might have an effect on the character of the area, and whether the impact is permanent or temporary.
- 10.3.8 **Table 10-23** provides a matrix used to describe this relationship, and to allow any predicted landscape effects to be categorised. Effects that are judged as being moderate or major are considered to be significant.

### Visual

- 10.3.9 The assessment of effects likely to result from visual impacts is structured by receptor groups (residents, users of recreational spaces, business users and motorists). Individual receptors are identified through the definition of the Zone of Theoretical Visibility (ZTV), within which views of the development are likely to be possible. Individuals are subsequently categorised into receptor groups within different areas. The sensitivity of each receptor group is then evaluated as being high, medium, low or very low dependent upon their susceptibility to changes in views and visual amenity and the value attached to particular views (in accordance with the criteria set by the Landscape Institute and Institute of Environmental Management and Assessment in the Guidelines for Landscape and Visual Impact Assessment (Ref 10-7)).
- 10.3.10 Views from each identified representative viewpoint as agreed with bodies identified in **Table 10-23** are photographed following current guidance. For each viewpoint a description of the view is recorded alongside the receptor types, location and direction of view.
- 10.3.11 The sensitivity of receptor is evaluated as being high, medium or low dependent upon its susceptibility to changes in the view and visual amenity, and the value attached to the view.

- 10.3.12 The magnitude of impact is evaluated as being high, medium or low dependant on the magnitude of change in relation to the baseline view resulting from the Proposed Development.
- 10.3.13 The sensitivity of receptor and the magnitude of impact are combined to establish the likely visual effect the Proposed Development has on the baseline view, as shown in **Table 10-3**. Effects that are judged as being moderate or major are considered to be significant.

#### Study Area

- 10.3.14 The extent of the study area is determined by the potential visibility of the Proposed Development in the surrounding landscape and is proportionate to its size and scale and the nature of the surrounding landscape. Current guidance (Landscape Institute and IEMA (Ref 10-7)) states that the Study Area should include *'the full extent of the wider landscape around it which the proposed development may influence in a significant manner'*.
- 10.3.15 For the purposes of this assessment the study area has been defined by a combination of producing a ZTV and professional judgement of the likely extents effects. Based upon the tallest element of the Proposed Development being the stack (with a maximum height of 45m Above Ground Level (AGL) it is considered that it is highly unlikely that significant effects would be possible from further than 5km from the centre of the stack. This 5km radius study area was agreed with relevant authorities (as listed in **Table 10-2**).

#### Zone of Theoretical Visibility

- 10.3.16 A computer generated ZTV was produced for the 5km study area (see **Figure 10.4** in PEI Report Volume III). The Ordnance Survey Terrain 5 Digital Terrain Model (DTM) was used. Screening effects of vegetation, buildings or other structures are not taken into account with this model. Consequently, for the production of this ZTV, OS Opendata has been incorporated into the DTM. Existing significant built structures located on the West Burton Power Station Site were modelled at their actual heights; other significant built form was modelled at 7.5m in height and large areas of woodland were modelled at 15m in height to provide a more accurate ZTV than a bare-ground scenario (which does not take into account localised screening effects of vegetation and built form). At present two OCGT technology options and associated layouts are being considered (see **Figure 4.1a** and **4.1b** (PEI Report Volume III)). Therefore to ensure all potential locations for the tallest elements (the stacks, at 45m) were assessed, as a worst-case the whole of the proposed power plant site was modelled at a height of 45m AGL. The ZTV identifies any point within 5km which has a view of any part of the modelled area.
- 10.3.17 Potential viewpoints and receptors were identified throughout this area. The potential receptors and their existing views are described in **Table 10-7** and shown on **Figure 10.5** (PEI Report Volume III).

#### Significance Criteria

- 10.3.18 Direct and indirect impacts upon landscape elements and features (or components), as well as impacts upon the general landscape character of the surrounding area resulting from construction of the Proposed Development are considered.
- 10.3.19 In line with GLVIA3 (Ref 10-7), significance of effects is assessed as resulting from the sensitivity of receptor (landscape or visual) and magnitude of impact.
- 10.3.20 **Table 10-3** provides a matrix used to describe this relationship, and to allow any predicted landscape effects to be categorised. Effects that are judged as being moderate or major are considered to be significant.

**Table 10-3: Classification of effects**

Magnitude of impact	Sensitivity/importance of receptor			
	High	Medium	Low	Very low
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Very low	Minor	Negligible	Negligible	Negligible

## 10.4 Baseline Conditions

### The Wider Landscape

#### *National Character*

- 10.4.1 The Study Area is located within NCA 48 – Trent and Belvoir Vales as defined by NCA Profile 48: Trent and Belvoir Vales (NE429) (Ref: 10-10). This NCA is characterised as low lying, open and wide, with power stations and associated overhead power lines located along the River Trent exerting a visible influence over a wide area. Descriptions for this NCA are provided in **Table 10-4**.
- 10.4.2 NCA 45 - Northern Lincolnshire Edge with Coversands as defined NCA Profile 45: Northern Lincolnshire Edge with Coversands (NE554) (Ref: 10-11) lies to the north at the outermost edge of the 5km study area. This NCA is characterised by a prominent ridge of limestone and scarp slope rising from adjacent low-lying land, with panoramic views, particularly to the west.

#### *Regional Character*

- 10.4.3 At a regional level the study area lies within two Regional Character Areas (RCA) as defined by the Bassetlaw Landscape Character Assessment (BLCA) (Ref: 10-12):
- Trent Washlands RCA; and
  - Mid Nottinghamshire Farmlands RCA.
- 10.4.4 Within the Trent Washlands RCA, the power stations of West Burton and Cottam and their associated overhead power lines are considered by the BLCA to be the most dominant and visually intrusive landscape features within this area.
- 10.4.5 The Mid Nottinghamshire Farmlands RCA is considered by the BLCA to be an undulating landscape of predominantly rural, agricultural character.
- 10.4.6 The study area lies within one LCA as defined by the West Lindsey Landscape Character Assessment (WLLCA) (Ref: 10-13) - Trent Valley LCA. Trent Valley LCA is described as low-lying and gently undulating with power stations along the River Trent and associated major transmission lines dominating views to the west.
- 10.4.7 Within the Trent Washlands and Mid Nottinghamshire Farmlands and the study area lies within several Policy Zones as defined by the BLCA. These are Trent Washlands 23, 24, 25 and 49 and Mid Nottinghamshire Farmlands 02, 03 and 05, which are adjacent to the Site.
- 10.4.8 Distinctive and defining characteristics of these landscape areas are provided in **Table 10-4**.

**Table 10-4: Landscape Character Area Key Characteristics**

Landscape Character Area	Distinctive & Defining Landscape Characteristics	Sensitivity
<p>Natural England  NCA 48 – Trent and Belvoir Vales (NE429)</p>	<p><i>“A gently undulating and low-lying landform in the main, with low ridges dividing shallow, broad river valleys, vales and flood plains. The mature, powerful river Trent flows north through the full length of the area, meandering across its broad flood plain and continuing to influence the physical and human geography of the area as it has done for thousands of years.</i></p> <p><i>Agriculture is the dominant land use, with most farmland being used for growing cereals, oilseeds and other arable crops. While much pasture has been converted to arable use over the years, grazing is still significant in places, such as along the Trent and around settlements.</i></p> <p><i>A regular pattern of medium to large fields enclosed by hawthorn hedgerows, and ditches in low-lying areas, dominates the landscape.</i></p> <p><i>Very little semi-natural habitat remains across the area; however, areas of flood plain grazing marsh are still found in places along the Trent.</i></p> <p><i>Extraction of sand and gravel deposits continues within the Trent flood plain and the area to the west of Lincoln. Many former sites of extraction have been flooded, introducing new waterbodies and new wetland habitats to the landscape.</i></p> <p><i>Extensive use of red bricks and pantiles in the 19th century has contributed to the consistent character of traditional architecture within villages and farmsteads across the area. Stone hewn from harder courses.</i></p> <p><i>A predominantly rural and sparsely settled area with small villages and dispersed farms linked by quiet lanes, contrasting with the busy market towns of Newark and Grantham, the cities of Nottingham and Lincoln, the major roads connecting them and the cross-country dual carriageways of the A1 and A46.</i></p> <p><i>Immense coal-fired power stations in the north exert a visual influence over a wide area, not just because of their structures but also the plumes that rise from them and the pylons and power lines that are linked to them. The same applies to the gas-fired power station and sugar beet factory near Newark, albeit on a slightly smaller scale.”</i></p>	<p>Medium</p>
<p>Bassetlaw District Council  Mid-Nottinghamshire Farmlands RCA</p>	<p><i>“Area of undulating landscape with a distinctively rural, agricultural character. Arable farming is the predominant land use on the clay soils, where mixed farming prevails.....</i></p> <p><i>The region is relatively remote from major population centres and has a well-defined and largely undeveloped rural character. Industry is of little significance save for the occasional clay quarry and brick works. A number of main highways cross the area, but typically roads are narrow country lanes linking the scattered nucleated settlements. The villages</i></p>	<p>High</p>

Landscape Character Area	Distinctive & Defining Landscape Characteristics	Sensitivity
	<p><i>are well integrated into the surrounding countryside with small-scale field patterns, unimproved pastures, species-rich hedgerows and remnant orchards forming common features along their edges.</i></p> <p><i>A characteristic of the Mid-Nottinghamshire Farmlands is the strong sense of enclosure which exists over most of the region. Field patterns have remained largely intact although they have become somewhat eroded in the most intensively farmed areas, especially to the north and east. Ancient hedgerows are scattered throughout, hedgerow trees are usually ash and oak and have a localised importance in the landscape.</i></p> <p><i>The landscape has a generally well-wooded character except over tracts of land to the far north and east. Woodlands tend to be mainly deciduous or mixed and are typically small to medium in size. A special feature of the area is the many ancient woodlands, often prominently sited on hilltops and rising ground.”</i></p>	
<p>Bassetlaw District Council Trent Washlands RCA</p>	<p><i>“A number of pressures have greatly affected the traditional character of the region including the impact of power stations and pylon lines, mineral extraction, urban encroachment, road and rail developments and agricultural intensification. Away from the urban areas settlement is characterised by a nucleated pattern of villages and isolated farmsteads. These have retained their distinctive vernacular character, being of red brick and pantile roof construction.</i></p> <p><i>Arable cultivation now dominates large areas of the river corridors, whereas previously it was confined to the river terraces. The meandering river channels are dominant components of the river corridor landscapes; however, along the Trent, high floodbanks often shield the river from view.”</i></p>	<p>Medium</p>
<p>West Lindsey District Council LCA Trent Valley</p>	<p><i>“Low-lying, gently undulating landform with higher terrain to east and south of Gainsborough.</i></p> <p><i>Significant blocks of deciduous woodland, good hedgerows and hedgerow trees create a relatively enclosed landscape.</i></p> <p><i>River Trent and its adjacent washlands are enclosed by steep flood embankments.</i></p> <p><i>Historic parkland landscapes including a medieval deer park, and landmarks such as the ruins of Torksey Castle.</i></p> <p><i>Main roads are significant features in the landscape; recent development concentrated along the main roads, bypassing original village centres.</i></p> <p><i>Views towards the west are dominated by the power stations along the river Trent.”</i></p>	<p>Medium</p>

## The Study Area

### Settlements

- 10.4.9 Gainsborough is the largest settlement within the study area and lies approximately 3.5km to the north-east. The settlement pattern in the rest of the study area comprises small and medium sized villages including Bole and Saundby to the north-west, South Wheatley to the west, North Leverton with Habbleshthorpe to the south-west, South Leverton to the south-west and Littleborough, Knaith, and Lea to the east. Isolated properties and farmsteads are scattered throughout the study area.

### Communications

- 10.4.10 A number of 'A' roads lie within the study area, linking Gainsborough in the north-east to larger settlements outside the Study Area: the A631, which runs east-west through the Study Area, the A620, which runs south-west/north-east and the A156 which extends southwards from Gainsborough. Other roads are made up of a network of B-class roads and smaller unclassified roads which link the network of villages.
- 10.4.11 The Lincoln to Sheffield Railway Line runs directly to the north-west of the West Burton Power Station Site.

### Landscape Designations

- 10.4.12 No Registered Parks and Gardens lie within the study area. The Deserted Medieval Village of West Burton, designated as a Scheduled Monument, lies immediately to the south of the West Burton Power Station Site.
- 10.4.13 Conservation Areas are located at Gainsborough, Saundby and North Wheatley.

### Recreation and Public Rights of Way (PRoW)

- 10.4.14 A number of PRoW, including footpaths, bridleways and Byways Open to All Traffic (BOATs) exist within the study area, linking nucleated settlements and farmsteads as illustrated on **Figure 10.3** (PEI Report Volume III). PRoW closest to Site include West Burton FP4 which runs along the west bank of the River Trent, Bole FP9 which runs north-west/south-east to the northern edge of the Site and Bole FP3, which runs east from Bole to the railway line.
- 10.4.15 One long distance path, the Trent Valley Way, traverses the study area. This enters the study area from the south below Sturton-le-Steeple to North Wheatley and South Wheatley to Gringley on the Hill to the north-west of the study area.

### Vegetation Cover

- 10.4.16 Agricultural land predominates within the study area with vegetation cover comprising arable crops, boundary hedgerows, hedgerow trees and small blocks of woodland.
- 10.4.17 **Chapter 3:** Description of the Site contains a full description of the West Burton Power Station Site, the Site and the proposed power plant site. The majority of the proposed power plant site comprises areas of hardstanding and grassland with small areas of broad leaved woodland, scrub and trees scattered throughout.

### Landscape Designations

- 10.4.18 The study area contains no landscape designations in relation to landscape quality or value. 35km to the east, Lincolnshire Wolds Area of Outstanding Natural Beauty is the nearest area designated for its landscape value.

### Landscape Value

- 10.4.19 The study area, which covers the Site and the West Burton Power Station Site immediately to the south-west, currently contains limited landscape features and thus has limited landscape value. BLCA identifies that the power station structures, pylons and associated overhead power lines have a strong visual influence within the study area (Ref 10-12).
- 10.4.20 Although the study area has no landscape designations relating to landscape value, there are a number of Scheduled Monuments, Conservation Areas and numerous listed buildings located within it. These are discussed in more detail within **Chapter 14: Cultural Heritage** and **Appendix 14A** (PEI Report Volume II). The study area used in **Chapter 14: Cultural Heritage** was determined by production of a ZTV. **Table 10-5** provides evidence on the landscape value and sensitivity of the study area and the Site.

### Landscape Sensitivity

- 10.4.21 An evaluation of sensitivity has been undertaken based on a subjective assessment of the capacity of the landscape to absorb development. Landscape sensitivity for each of the character areas has been assessed in accordance with current guidance and is recorded in **Table 10-5**.

**Table 10-5: Landscape Value**

Factor	Study Area	Site
Landscape quality (condition)	Quality of the landscape varies across the Study Area from very poor and disparate to very good and unified. Overall the landscape immediately surrounding the Site is classed as good due to the unified nature of the landscape, despite the detracting features of the West Burton Power Station Site and overhead power lines.	The landscape quality of the Site is poor and disparate.
Scenic quality	No areas designated for their scenic quality lie within the Study Area. Influenced by the West Burton Power Station Site and associated overhead power lines, the landscape remains unified.	Poor landscape quality within the Site and the detracting influence of the West Burton Power Station Site make the Site of little scenic value.
Rarity	The Study Area generally comprises agricultural landscape typical of the surrounding countryside.	The landscape of the Site is not typical of the wider surrounding countryside.
Representativeness	The landscape contains boundary hedgerows and historic field patterns.	No important landscape elements are evident on the Site.
Conservation interests	Historic field patterns are still evident throughout the Study Area. A Scheduled Monument lies immediately to the south of the West Burton Power Station Site and a number of conservation areas, listed buildings and other	No conservation interests have been identified within the Site.

Factor	Study Area	Site
	Scheduled Monuments have been identified within the study area.	
Recreation value	The landscape is of limited recreational value, this being related to the use of PRowS.	No recreational value has been identified within the Site.
Perceptual aspects	No specific, relevant perceptual aspects which define landscape character have been identified.	No specific, relevant perceptual aspects that define landscape character have been identified.
Overall landscape sensitivity	Medium, due to the overall good condition of the landscape, the absence of designated landscapes, its limited recreational value and its ability to accommodate the Proposed Development.	Low, due to the low landscape value derived from the factors noted above and the resulting capacity to accommodate the Proposed Development.

### The Site and Its Immediate Setting

- 10.4.22 The location of the Site is illustrated on **Figure 10.1** (PEI Report Volume III). The Site is located to the immediate north-west of the West Burton Power Station Site. To the north lies grassland with shrubs and Wheatley Beck, with Bole Ings drain and the Great Central Railway Line beyond. To the east lies scrub containing ponds with River Road and the River Trent beyond. River Road continues around the southern boundary of the Site with open farmland beyond. The remainder of the coal stockpile lies to the immediate west of the Site. The West Burton A Power Station Site (WBA) is immediately adjacent to the south-west of the Site, while the West Burton B Power Station Site (WBB) lies immediately adjacent to the south of the Site.
- 10.4.23 The West Burton Power Station Site is generally flat and low lying with slight changes in level ranging from approximately 2.6m Above Ordnance Datum (AOD) to approximately 16.2m AOD resulting from existing on-site sewage works and localised bunding.
- 10.4.24 The West Burton Power Station Site contains large buildings housing the power generation plant (turbines, boilers etc.), stacks, cooling towers, ancillary structures and existing coal stockpile within a railway loop. The heights of the larger existing structures on the power station site are provided in **Table 10-6**.
- 10.4.25 The immediate setting of the Site comprises generally flat, predominantly agricultural land of a rural character with open views across an extensive area. The West Burton Power Station Site, Cottam Power Station nearby, associated pylon lines and rail development have a visual presence detracting from the rural character of the area.

**Table 10-6: Existing Structures within West Burton Power Station Site**

Structure	Height (m) above ground level (AGL)
West Burton A stacks	198
West Burton A cooling towers	107

West Burton A boiler house	61
West Burton B CCGT stacks	80
West Burton B CCGT heat recovery steam generator building	40
West Burton B CCGT turbine hall	28

## Visual Baseline

10.4.26 Visibility within the study area is dictated by the screening effect of elements such as landform, hedgerows, woodland blocks and built development.

### Viewpoints

10.4.27 Locations within the ZTV where views of the Proposed Development would potentially be visible were identified through a desk based assessment and the use of 1:25,000 Ordnance Survey maps. The viewpoints identified within the LVIA within the WBB Environmental Statement (2005) (Ref: 10-14) were also cross referenced. These locations aimed to be representative of those views that would be available of the Proposed Development from key visual receptors.

10.4.28 The locations were visited to assess and record the potential views that receptors would have of the Proposed Development. Field surveys have been carried out by a Landscape Architect on 23<sup>rd</sup> March 2017 and 18<sup>th</sup> July 2017.

10.4.29 **Table 10-7** provides a list of the representative viewpoints assessed in this chapter, and a description of the view that is currently available from that location. **Figure 10.5** (PEI Report Volume III) illustrates the locations of the representative viewpoints, while **Figures 10.6 to 10.18** provide photographs for each viewpoint.

10.4.30 The viewpoints that have been taken forward for assessment purposes are the views considered as the most representative of those found within the Study Area (based on the degree of view of the Site, the receptors' sensitivity and the nature of the view). These representative viewpoints have been selected in agreement with the consultees in **Table 10-2**.

**Table 10-7: Representative Viewpoints**

Viewpoint reference	Receptor type	Description	Co-ordinates	Approximate distance to centre of Site (m)
1	Users of PRow	Footpath Saundby FP3 to east of Saundby Park Farm	476469,388372	4,380
<p><b>Description of view towards the Site</b></p> <p>Medium distance, open view south-eastwards across farmland with structures within WBA and WBB forming distinctive features on the horizon and viewed against the sky. WBB is partially screened by distant vegetation with associated pylons and overhead power lines extending to the left. Lower levels of WBA are partially obscured by gently rising landform and intervening vegetation.</p>				
2	Users of	Footpath Saundby FP2 to	479096,388521	2,610

Viewpoint reference	Receptor type	Description	Co-ordinates	Approximate distance to centre of Site (m)
	PRoW & adjacent residential	south of Beckingham, Marsh Lane		
<p><b>Description of view towards the Site</b></p> <p>Medium distance, open view south with WBA and WBB forming distinctive features on the horizon and viewed against the sky. Gently sloping landform partially screens low level elements of WBA and WBB. Large scale agricultural buildings within Hall Farm partially obscure the turbine hall, stacks and cooling towers within WBA. Pylons and overhead power lines extend left and right within the view, running northwards past the viewpoint.</p>				
3	Users of riverside footpath & residential receptors at Whittons Mill	Whittons Mill, Bridge St, Gainsborough	481450,389569	3,620
<p><b>Description of view towards the Site</b></p> <p>Long distance view south-west restricted by vegetation along the west bank of the River Trent. WBA and WBB are partially visible in the distance and screened by dominating large scale structures within the Kerry Ingredients site in the middle distance. Adjacent residential receptors at Whittons Mill are likely to obtain more open and less restricted views due to elevation above screening landscape elements.</p>				
4	Users of PRoW & residential receptors at Bole	Footpath Bole FP4, Bole	479147,386946	1,350
<p><b>Description of view towards the Site</b></p> <p>Short distance, open view south-eastwards across flat farmland, partially filtered and restricted by intervening boundary hedgerows and low hedgerow trees in the near distance. WBB is highly visible and dominant within the view due to close proximity and vertical extent within the view, compounded by associated pylons and overhead power lines to the left and right. Structures within WBA are partially visible with the existing coal pile screening lower elements and parts of WBB and WBA.</p>				
5	Users of PRoW	Footpath Lea 41/2	481619,387353	1,780
<p><b>Description of view towards the Site</b></p> <p>Short distance view south-west across Lea Marshes and vegetation along the River Trent to structures within the West Burton Power Station Site beyond. Riverside vegetation partially obscures lower parts of these structures which remain highly prominent and dominating within the view. Pylons and overhead power lines extend to the left and right of the view.</p>				
6	Residential receptors at	Green Lane, Lea	482459,386994	2,340

Viewpoint reference	Receptor type	Description	Co-ordinates	Approximate distance to centre of Site (m)
	Lea			
<p><b>Description of view towards the Site</b></p> <p>Elevated, medium distance view west across Lea Marshes to low hills in the far distance. The scene is well treed with intervening boundary hedgerows and hedgerow trees partially obscuring lower parts of structures within the West Burton Power Station Site. Due to their prominence above the horizon these remain visually dominant. Pylons and overhead power lines extend to the left and right. Views are oblique to the main elevations of the residential properties.</p>				
7	Users of PRow & residential receptors at West Burton	West Burton FP10	478619,385867	1,680
<p><b>Description of view towards the Site</b></p> <p>Narrow, short distance view east. Hedgerows, hedgerow trees and woodland enclose the view with rising landform and intervening vegetation partially obscuring WBB. Structures within WBA are generally obscured by hedgerows, with the stacks visually dominant due to close proximity. Pylons and overhead power lines are notably visible.</p>				
8	Users of B1241 at Knaith Park	B1241 at Knaith Park	483828,385875	3,575
<p><b>Description of view towards the Site</b></p> <p>Medium distance view west across nearly flat, well maintained pasture with post and rail fencing associated with Moorhouse Farm in the near distance, deciduous woodland extending across a large portion of the view in the middle distance framing structures within the West Burton Power Station Site beyond, prominent and extending above the horizon.</p>				
9	Users of PRow & residential receptors at Sturtonle-Steeple	Sturton-le-Steeple FP18, Common Lane	479127,384535	2,010
<p><b>Description of view towards the Site</b></p> <p>Short distance panoramic view north-eastwards across gently undulating open farmland. Intervening boundary hedgerows with low trees in the near distance partially obscuring WBB and WBA. Stacks within WBB are clear and distinct. Cooling towers within WBA and associated pylons dominate the view due to close proximity and scale with overhead power lines extending across a large proportion of the view, running northwards past the viewpoint.</p>				
10	Users of PRow	West Burton FP2	480148,384852	1,340
<p><b>Description of view towards the Site</b></p>				

Viewpoint reference	Receptor type	Description	Co-ordinates	Approximate distance to centre of Site (m)
Short distance view north across flat open farmland. Intervening boundary hedgerows with low trees in the middle and near distance partially obscure the base of WBB which otherwise remains visually prominent with its stack clearly visible. Cooling towers within WBA are visible to the left of view.				
11	Users of A156 & residential receptors at Knaith	Junction of A165/ Knaith Hill, Knaith	482934,384763	3,020
<p><b>Description of view towards the Site</b></p> <p>Wide, medium distance elevated view west across largely flat farmland to the horizon. Woodland blocks and boundary hedgerows partially enclose the landscape, filtering the view with low, maintained hedgerows to the roadside further obscuring the near view. Structures within the West Burton Power Station Site are prominent on the horizon with WBA having a great presence than WBB to the right of view.</p>				
12	Users of PRow/ Trent Valley Way	Sturton-le-Steeple BW7	481604,383007	3,450
<p><b>Description of view towards the Site</b></p> <p>Medium distance, panoramic view to the north-west across largely flat and featureless open farmland in the foreground. Pylons extend to the left, running past the viewpoint. Structures within WBA are highly prominent on the horizon with stacks, cooling towers and turbine hall distinct on the horizon. WBB is visually separate from WBA on the horizon with a lesser visual presence due to smaller scale. Stacks at WBB are clearly identifiable on the skyline. In conjunction with Kerry Industries mill and factory to the right of view and in the far distance, WBB and WBA exert a visual influence extending across the view. Some intervening vegetation comprising well-maintained hedgerows to field boundaries with hedgerow trees in the middle distance providing filtering to low level elements and parts.</p>				
13	Users of PRow/ Trent Valley Way	North Leverton with Hablesthorpe BOAT15	479657,381326	4,900
<p><b>Description of view towards the Site</b></p> <p>Long distance, partially enclosed view to the north across largely flat and featureless open farmland in the foreground to WBB on the horizon. Intervening vegetation in the foreground obscures WBA with only the upper parts visible above. Intermittent hedgerows to field boundaries and occasional trees in the middle distance provide low filtering. WBB is prominent and clearly identifiable on the horizon. Pylons in the middle distance extend to the right, running past the viewpoint.</p>				

### Visibility in the Wider Landscape

- 10.4.31 Structures within the West Burton Power Station Site are visible within the majority of views within the study area. Generally, flat, low-lying landform combined with field boundary vegetation and low level of tree cover does little to reduce the visibility of the power station structures due to their

scale. Views towards the Site from within settlements are generally restricted by built form or screening boundary vegetation. Plumes emanating from cooling towers and stacks within the West Burton Power Station Site increase the apparent massing and visibility of these structures, although this is operationally and weather dependant.

### Visual Sensitivity

- 10.4.32 An evaluation of sensitivity has been undertaken based on a subjective assessment of the susceptibility to change of the receptor and the value of the view at agreed representative viewpoints as shown on **Figure 10.5** (PEI Report Volume III).
- 10.4.33 The visual sensitivity for each of these representative viewpoints has been assessed in accordance with current guidance and is recorded in **Table 10-8**. Where there is a range of susceptibility or value of view then the highest criteria is used for the assessment of the sensitivity.

**Table 10-8: Visual Sensitivity**

Viewpoint reference	Receptor type	Description	Susceptibility of receptor to specific change	Value of view	Receptor sensitivity
1	Users of the PRow	Footpath Saundby FP3 to east of Saundby Park Farm	High	Medium	Medium
2	Users of the PRow, Residents	Footpath Saundby FP2 to south of Beckingham, Marsh Lane	High	Medium	Medium
3	Users of riverside footpath, Residents	Whittons Mill, Bridge St, Gainsborough	High	Medium	Medium
4	Users of the PRow, Residents	Footpath Bole FP4, Bole	High	Medium	Medium
5	Users of the PRow	Footpath Lea 41/2	High	Medium	Medium
6	Residents	Green Lane, Lea	High	Medium	Medium
7	Users of the PRow, Residents	Footpath West Burton FP10	High	Low	Medium
8	Road users	B1241 at Knaith Park	Medium	Medium	Medium
9	Users of the PRow, Residents	Footpath Sturton-le-Steeple FP18, Common Lane	Low	Low	Low
10	Users of the PRow	Footpath West Burton FP2	High	Low	Medium

Viewpoint reference	Receptor type	Description	Susceptibility of receptor to specific change	Value of view	Receptor sensitivity
11	Road users, Residents	Junction of A165/ Knaith Hill, Knaith	High	Low	Medium
12	Users of the PRow/Trent Valley Way	Footpath Sturton-le-Steeple BW7	High	Medium	High
13	Users of the PRow	Footpath North Leverton with Habbleshthorpe BOAT15	High	Low	Medium

### Future Baseline Conditions

- 10.4.34 For the purpose of this assessment, the future baseline has been set at 2020. The future baseline is a prediction of baseline conditions in the future but assuming the Proposed Development has not been or is being constructed. In 2020, the future baseline conditions are assumed to be similar as described for the existing baseline. It is assumed that small amounts of development within existing settlement boundaries would have been constructed, but the general landscape character and features would remain in a similar condition as they are now.
- 10.4.35 It is anticipated that WBA station would close by 2025 under current legislation; however, uncertainty regarding the future closure plans has precluded this scenario from consideration in this assessment.

## 10.5 Development Design and Impact Avoidance

- 10.5.1 Existing vegetation around the Site provides screening for low level operations and structures within the study area.
- 10.5.2 The mitigation of landscape effects is intrinsic within the development proposals which seek to substantially retain existing well established vegetation within the Site.
- 10.5.3 The following impact avoidance measures would either be incorporated into the design or are standard construction or operational measures. These measures have been taken into account as part of the impact assessment process:
- suitable materials would be used, where possible, in the construction of structures to reduce reflection and glare and to assist with breaking up the massing of the buildings and structures;
  - the selection of finishes for the buildings and other infrastructure would be informed by the finishes of the adjacent developments and agreed with relevant consultees at the detailed design stage in order to minimise the visual impact of the Proposed Development;
  - lighting required during the construction and operation stages of the Proposed Development would be designed to reduce unnecessary light spill outside of the Site boundary, in accordance with a lighting strategy that will accompany the Application for development consent; and
  - the existing vegetation along the Site boundary should be retained and managed to ensure its continued presence to aid the screening of low level views into the Site. This would be

incorporated into the landscaping strategy which will be submitted as part of the Application for development consent.

## 10.6 Likely Impacts and Effects

### Landscape

#### Construction

- 10.6.1 The Proposed Development may affect landscape character. The removal of characteristic landscape elements, and introduction of uncharacteristic elements which contrast with the existing landscape character are likely to result in adverse effects while the creation of elements that re-establish characteristic features in order to achieve biodiversity/landscape objectives are likely to result in beneficial effects.
- 10.6.2 Construction activities undertaken as part of the Proposed Development would introduce mobile plant including piling rigs, heavy plant machinery and cranes. These construction activities would result in the loss of an area of grassland within the Site, which would be utilised as the construction laydown area, alongside removal of vegetation present within. Works to facilitate construction of the southern outfall option or the northern outfall option, if they are required, are likely to require removal of a small amount of existing vegetation within areas of scrub near the approach to the River Trent. No other on-site or off-site landscape features would be impacted as a result of construction activities.

#### Operation

- 10.6.3 The Proposed Development would result in increased built form and structures within an existing West Burton Power Station Site, as detailed in **Chapter 4: Proposed Development**.
- 10.6.4 The extent, scale and impact of these landscape effects, taking the design into account, is described in the assessment of landscape effects provided in **Table 10-9** and **Table 10-10**.

**Table 10-9: Assessment of Landscape Effects - Construction**

Landscape type	Sensitivity of receptor	Description of impact	Predicted magnitude of impact	Classification of Effect
Natural England NCA 48 – Trent and Belvoir Vales (NE429)	Medium	The Proposed Development would introduce construction activity onto the existing West Burton Power Station Site and into the Trent and Belvoir Vales NCA. Due to the large scale of the NCA the construction activities are unlikely to give rise to any impacts on its overall character. Effects would be temporary, indirect and medium term.	Very low	Negligible adverse (not significant)
Bassetlaw Mid Nottinghamshire Farmlands	High	Construction activities would have an impact on the Mid Nottinghamshire RCA through the introduction of construction compounds and laydown	Low	Minor adverse (not significant)

Landscape type	Sensitivity of receptor	Description of impact	Predicted magnitude of impact	Classification of Effect
RCA		areas, machinery and other related activities. Impacts arising from the presence of construction machinery and activity would be temporary, of medium term and of low magnitude due to the localised influence of the existing power station on the condition and quality of the wider RCA. Construction of the Proposed Development would have a low magnitude of impact on the RCA.		
Bassetlaw Trent Washlands RCA	Medium	Construction activities would have a direct impact on the Trent Washlands RCA through the introduction of machinery and associated activities. Impacts arising from the presence of construction machinery and activity would be temporary, of medium term and of low magnitude given the localised influence the existing power station exerts on the condition and quality of the wider RCA. Development would have a low magnitude of impact on the RCA.	Low	Minor adverse (not significant)
West Lindsey Trent Valley LCA	Medium	The Site lies outside of but in close proximity to the Trent Valley LCA. The introduction of machinery and construction activity within the Site would have little direct impact on the wider LCA occurring within and adjacent to the existing West Burton Power Station Site. Temporary, medium term effects on perceived tranquillity of the LCA means that construction would have a low magnitude of impact on the RCA.	Very low	Negligible adverse (not significant)
The Site	Low	Construction activity would result in a direct effect on landscape features within the site. The removal of existing grassland and vegetation to allow introduction of	Low	Negligible adverse (not significant)

Landscape type	Sensitivity of receptor	Description of impact	Predicted magnitude of impact	Classification of Effect
		construction compounds and laydown areas would not necessitate changes to features characteristic of the wider landscape, resulting in a low magnitude of impact.		

**Table 10-10: Assessment of Landscape Effects - Operation**

Landscape type	Sensitivity of receptor	Description of impact	Predicted magnitude of impact	Classification of Effect
Natural England NCA 48 – Trent and Belvoir Vales (NE429)	Medium	The Proposed Development would introduce further built structures into the West Burton Power Station Site. Due to the large scale of the NCA and the similarity of use and scale between proposed and existing structures, the Proposed Development is considered unlikely to give rise to any impacts on its overall character.	Very low	Negligible adverse (not significant)
Bassetlaw Mid Nottinghamshire Farmlands RCA	High	The introduction of additional structures to the West Burton Power Station Site would have a direct but relatively localised impact on the Mid Nottinghamshire RCA that would not impact on its condition or quality overall. Impacts arising from their presence would be long-term, reversible and of low magnitude.	Low	Minor adverse (not significant)
Bassetlaw Trent Washlands RCA	Medium	During operation the Proposed Development would have a direct impact on the Trent Washlands RCA; however, the introduction of additional power generating structures within the West Burton Power Station Site would have a long-term low magnitude of effect on the RCA.	Low	Minor adverse (not significant)
West Lindsey Trent Valley LCA	Medium	The Site lies outside of but in close proximity to the Trent	Very low	Negligible adverse (not significant)

Landscape type	Sensitivity of receptor	Description of impact	Predicted magnitude of impact	Classification of Effect
		Valley LCA. The operation of the Proposed Development would have little direct impact on the wider LCA. Temporary, medium-term effects on perceived tranquillity of the LCA means that the operation of the Proposed Development would have a very low magnitude of impact on the RCA.		significant)
Landscape features	Low	Reinstatement of the grassland after use as a construction laydown area and the mitigation of ecological impacts through a scheme of ecological enhancements would provide a beneficial effect to the Site. This impact would be long term, low in magnitude and reversible.	Low	Negligible beneficial (not significant)

10.6.5 **Table 10-11** provides a summary of the landscape effects during construction and operation.

**Table 10-11: Summary of Landscape Effects**

Receptor	Sensitivity of receptor	Construction		Operation	
		Magnitude of impact	Classification of effect	Magnitude of impact	Classification of effect
Natural England NCA 48 – Trent and Belvoir Vales (NE429)	Medium	Very low	Negligible adverse (not significant)	Very low	Negligible adverse (not significant)
Bassetlaw Mid Nottinghamshire Farmlands RCA	High	Low	Minor adverse (not significant)	Low	Minor adverse (not significant)
Bassetlaw Trent Washlands RCA	Medium	Low	Minor adverse (not significant)	Low	Minor adverse (not significant)
West Lindsey Trent Valley LCA	Medium	Very low	Negligible adverse (not significant)	Very low	Negligible adverse (not significant)
Landscape features	Low	Low	Negligible adverse (not significant)	Low	Negligible beneficial (not significant)

### Operation

10.6.6 Potential effects on landscape arising from operation of the Proposed Development are likely to remain as those seen at opening.

### Visual Amenity

#### Construction

10.6.7 Changes in views may give rise to adverse or beneficial visual effects through obstruction in views, alteration of the components of the view and the opening up of new views by removal of screening. Potential visual effects arising from the construction activities may include:

- the introduction of stationary and moving piling rigs, cranes and other high level construction machinery;
- the introduction of low level construction operations including heavy plant movements, welfare facilities, laydown and storage areas;
- construction vehicles entering and leaving the Site; and
- the progressive construction of tall structures.

#### Operation

10.6.8 At this stage a worst-case scenario, including above ground cabling between the Proposed Development and the existing 400kV switchyard within WBB, has been assessed. Potential visual effects arising from opening of the Proposed Development may include the introduction of:

- one or more OCGT units each with a stack and transformer(s);
- associated ancillary equipment, facilities, buildings, pipelines, electrical connection, including above ground cabling between the Proposed Development and existing 400kV switchyard within WBB, diesel fuel tank, storage tanks and associated infrastructure, storm water attenuation system or similar; internal access roads and car parking, landscaping and fencing; and
- other minor infrastructure and auxiliaries/services.

10.6.9 The visual effects of the Proposed Development at each representative viewpoint during these stages are described in detail in **Table 10-12**.

**Table 10-12: Effects on Visual Amenity**

<b>Viewpoint 1: Footpath Saundby FP3 to east of Saundby Park Farm</b>				
<b>Grid Reference</b>	<b>Receptor Type</b>	<b>Elevation (m AOD)</b>	<b>Approximate Distance from centre of Site (m)</b>	<b>Direction of View</b>
476469, 388372	Users of PRow (Footpath)	40	4,380	South-east
<b>Visual susceptibility to change</b>		<b>Value of View</b>		<b>Sensitivity of receptor</b>
High		Medium		Medium

<b>Size/Scale, Duration &amp; Reversibility of Effect</b>		
<b>Construction</b>		
<p>Long distance views of construction operations would be visible to the left of existing structures within WBB. Views of ground level construction operations would be limited due to distance and intervening vegetation with construction of the tallest structures proposed visible in the context of existing large scale structures. The existing power station structures at WBA, distinct from WBB would still dominate views from this location due to their scale and massing in relation to the proposed construction operations.</p> <p>Impacts would occur over a limited geographical extent, be temporary and reversible.</p>		
<b>Magnitude of Impact</b>	Low	
<b>Significance of Effect</b>	Minor adverse (not significant)	
<b>Operation</b>		
<b>Visual susceptibility to change</b>	<b>Value of View</b>	<b>Sensitivity of receptor</b>
Medium	Medium	Medium
<p>The completed development would extend the visual extent of the existing WBB Power Station. An increased level of built form including tall structures would be observed. Proposed structures are likely to be visible with upper parts of associated structures including stacks within the view.</p> <p>A long distance view of structures similar in form, but of smaller mass and scale to existing structures, occurring over an extended, but still small geographical extent would be observed. The impact would be long-term and reversible.</p>		
<b>Magnitude of Impact</b>	Low	
<b>Significance of Effect</b>	Minor adverse (not significant)	

<b>Viewpoint 2: Footpath Saundby FP2 to south of Beckingham, Marsh Lane</b>				
<b>Grid Reference</b>	<b>Receptor Type</b>	<b>Elevation (m AOD)</b>	<b>Approximate Distance from Site (m)</b>	<b>Direction of View</b>
479096, 388521	Users of PRow & adjacent residential	6	2,610	South
<b>Visual susceptibility to change</b>		<b>Value of View</b>		<b>Sensitivity of receptor</b>
High		Medium		Medium
<b>Size/Scale, Duration &amp; Reversibility of Effect</b>				
<b>Construction</b>				

<p>Construction operations would be visible to the left of WBB. Views of ground level construction operations would be limited due to distance, intervening landform and vegetation with construction of the tallest structures proposed visible in the context of existing large scale structures. The existing power station structures at WBA, distinct from WBB would still dominate views from this location due to their scale and massing in relation to the proposed construction operations.</p> <p>A medium distance view of construction operations would be observed, occurring over a medium geographical extent and generally similar in form, but of smaller mass and scale to existing structures. The impact would be temporary and reversible.</p>		
<b>Magnitude of Impact</b>		Low
<b>Significance of Effect</b>		Minor adverse (not significant)
<b>Operation</b>		
<b>Visual susceptibility to change</b>	<b>Value of View</b>	<b>Sensitivity of receptor</b>
High	Medium	Medium
<p>The completed development would extend the visual extent of development within the West Burton Power Station Site. An increased level of built form including tall structures would be visible in the left of the existing scene. Proposed structures are likely to be partially visible but limited to the tallest structures(i.e., the stacks, which are likely to be clearly identifiable within the view). These would be seen in the context of the larger, taller existing development at WBA.</p> <p>A long distance view of structures similar in form, but of smaller mass and scale to existing structures, occurring over an extended, but still small geographical extent would be observed. The impact would be long-term and reversible.</p>		
<b>Magnitude of Impact</b>		Low
<b>Significance of Effect</b>		Minor adverse (not significant)

<b>Viewpoint 3: Whittons Mill, Bridge St, Gainsborough</b>				
<b>Grid Reference</b>	<b>Receptor Type</b>	<b>Elevation (m AOD)</b>	<b>Approximate Distance from Site (m)</b>	<b>Direction of View</b>
481450, 389569	Users of riverside footpath, residents of Whitton's Mill	8	3,620	South-west
<b>Visual susceptibility to change</b>		<b>Value of View</b>		<b>Sensitivity of receptor</b>
High		Medium		Medium
<b>Size/Scale, Duration &amp; Reversibility of Effect</b>				
<b>Construction</b>				

<p>Construction operations would be partially visible in front of the existing structures within WBB, but substantially screened by the large structures within the Kerry Ingredients site and intervening vegetation. Where visible, the construction of the tallest proposed structures would be visible in the context of existing large scale structures.</p> <p>A long distance view of construction operations would be observed, occurring over a small geographical area and generally similar in form, but of smaller mass and scale to existing structures. The impact would be temporary and reversible.</p>		
<b>Magnitude of Impact</b>		Low
<b>Significance of Effect</b>		Minor adverse (not significant)
<b>Operation</b>		
<b>Visual susceptibility to change</b>	<b>Value of View</b>	<b>Sensitivity of receptor</b>
High	Low	Medium
<p>Once constructed, it is predicted that the intervening screening provided by large structures within the Kerry Ingredients site and intervening vegetation would result in the Proposed Development being barely visible from the riverside walk and as such easily missed by the casual observer.</p> <p>A long distance view of structures similar in form, but of smaller mass and scale to existing structures, occurring over an extended, but still small geographical area would be observed. The impact would be long-term and reversible.</p>		
<b>Magnitude of Impact</b>		Very Low
<b>Significance of Effect</b>		Negligible adverse (not significant)

<b>Viewpoint 4: Footpath Bole FP4, Bole</b>				
<b>Grid Reference</b>	<b>Receptor Type</b>	<b>Elevation (m AOD)</b>	<b>Approximate Distance from Site (m)</b>	<b>Direction of View</b>
479147, 386946	Users of PRow & residential at Bole	14	1,350	South-east
<b>Visual susceptibility to change</b>		<b>Value of View</b>		<b>Sensitivity of receptor</b>
High		Low		Medium
<b>Size/Scale, Duration &amp; Reversibility of Effect</b>				
<b>Construction</b>				

<p>Construction operations would be partially visible to the left of existing structures within WBB. Views of ground level construction operations would be limited due to intervening landform and vegetation with construction of the tallest structures proposed visible in the context of existing large scale structures and against the sky. The existing power station structures at WBB would still dominate views from this location due to their scale and massing in relation to the proposed construction operations.</p> <p>A medium distance view of construction operations would be observed, occurring over a medium geographical area with structures generally similar in form, but of smaller mass and scale to existing structures. The impact would be temporary and reversible.</p>		
<b>Magnitude of Impact</b>		Medium
<b>Significance of Effect</b>		Moderate adverse (significant)
<b>Operation</b>		
<b>Visual susceptibility to change</b>	<b>Value of View</b>	<b>Sensitivity of receptor</b>
High	Low	Medium
<p>The completed Proposed Development would be prominent within the view, with taller structures including stacks visible against the sky, and extending the proportion of the view characterised by large scale built form.</p> <p>A medium distance view of the Proposed Development, occurring over a medium geographical extent with structures generally similar in form, but of smaller mass and scale to existing structures. The impact would be long-term and reversible.</p>		
<b>Magnitude of Impact</b>		Medium
<b>Significance of Effect</b>		Moderate adverse (significant)

<b>Viewpoint 5: Footpath Lea 41/2</b>				
<b>Grid Reference</b>	<b>Receptor Type</b>	<b>Elevation (m AOD)</b>	<b>Approximate Distance from Site (m)</b>	<b>Direction of View</b>
481619, 387353	Users of PRoW	5	1,780	South-west
<b>Visual susceptibility to change</b>		<b>Value of View</b>		<b>Sensitivity of receptor</b>
Medium		Low		Medium
<b>Size/Scale, Duration &amp; Reversibility of Effect</b>				
<b>Construction</b>				

<p>Construction operations would be partially visible in front of the existing WBB. Views of ground level construction operations would be limited due to intervening vegetation with construction of the tallest structures proposed visible in the context of existing large scale structures within the West Burton Power Station Site.</p> <p>A medium distance view of construction operations would be observed, occurring over a medium geographical extent with structures generally similar in form, but of smaller mass and scale to existing structures. The impact would be temporary and reversible.</p>		
<b>Magnitude of Impact</b>		Low
<b>Significance of Effect</b>		Minor adverse (not significant)
<b>Operation</b>		
<b>Visual susceptibility to change</b>	<b>Value of View</b>	<b>Sensitivity of receptor</b>
Medium	Low	Medium
<p>Completed structures would be visually assimilated into WBA and WBB. An observable increase in the level of tall structures is likely with taller structures including stacks seen against WBB and WBA behind.</p> <p>A medium distance view of structures similar in form, but of smaller mass and scale to existing structures, occurring over an extended, but still small geographical extent would be observed. The impact would be long-term and reversible.</p>		
<b>Magnitude of Impact</b>		Low
<b>Significance of Effect</b>		Minor adverse (not significant)

<b>Viewpoint 6: Green Lane, Lea</b>				
<b>Grid Reference</b>	<b>Receptor Type</b>	<b>Elevation (m AOD)</b>	<b>Approximate Distance from Site (m)</b>	<b>Direction of View</b>
478619, 385867	Residential receptors at Lea	17	2,340	West
<b>Visual susceptibility to change</b>		<b>Value of View</b>		<b>Sensitivity of receptor</b>
High		Medium		Medium
<b>Size/Scale, Duration &amp; Reversibility of Effect</b>				
<b>Construction</b>				

<p>Construction operations would be partially visible in front of the existing structures within the West Burton Power Station Site. Views of ground level construction operations would be limited due to intervening vegetation with construction of taller structures proposed visible against existing large scale structures within the West Burton Power Station Site behind.</p> <p>A medium distance view of construction operations would be observed, occurring over a small geographical area with structures generally similar in form, but of smaller mass and scale to existing structures. The impact would be temporary and reversible.</p>		
<b>Magnitude of Impact</b>		Low
<b>Significance of Effect</b>		Negligible adverse (not significant)
<b>Operation</b>		
<b>Visual susceptibility to change</b>	<b>Value of View</b>	<b>Sensitivity of receptor</b>
High	Medium	Medium
<p>Completed structures would be visually assimilated into the existing WBB and WBA. An observable increase geographical extent would occur with taller structures including stacks seen against WBA and WBB immediately behind.</p> <p>A medium distance view of structures similar in form, but of smaller mass and scale to existing structures, occurring over an extended, but still small geographical area would be observed. The impact would be long-term and reversible.</p>		
<b>Magnitude of Impact</b>		Low
<b>Significance of Effect</b>		Negligible adverse (not significant)

<b>Viewpoint 7: West Burton FP10</b>				
<b>Grid Reference</b>	<b>Receptor Type</b>	<b>Elevation (m AOD)</b>	<b>Approximate Distance from Site (m)</b>	<b>Direction of View</b>
478619, 385867	Users of PRow & residential at West Burton	13	1,680	East
<b>Visual susceptibility to change</b>		<b>Value of View</b>		<b>Sensitivity of receptor</b>
High		Low		Low
<b>Size/Scale, Duration &amp; Reversibility of Effect</b>				
<b>Construction</b>				

<p>Views of construction operations would be substantially obscured by intervening landform, vegetation and structures within WBB. Where visible, construction of the tallest structures within the Proposed Development would be viewed in the context of existing large scale structures at WBB to the forefront of the Site.</p> <p>A medium distance view of construction operations would occur over a negligible geographical area and generally similar in form, but of smaller mass and scale to existing structures. The impact would be temporary and reversible.</p>		
<b>Magnitude of Impact</b>		Low
<b>Significance of Effect</b>		Negligible adverse (not significant)
<b>Operation</b>		
<b>Visual susceptibility to change</b>	<b>Value of View</b>	<b>Sensitivity of receptor</b>
High	Low	Low
<p>Completed structures would extend the visibility of large power related structures but these would be viewed in the context of WBB. A visible increase in the level of tall structures is likely to be noticeable with low level structures likely to be screened by hedgerows in the middle distance.</p> <p>A medium distance view of structures similar in form, but of smaller mass and scale to existing structures, occurring over an extended, but still small geographical area would be observed. The impact would be long-term and reversible.</p>		
<b>Magnitude of Impact</b>		Low
<b>Significance of Effect</b>		Negligible adverse (not significant)

<b>Viewpoint 8: West Burton FP10</b>				
<b>Grid Reference</b>	<b>Receptor Type</b>	<b>Elevation (m AOD)</b>	<b>Approximate Distance from Site (m)</b>	<b>Direction of View</b>
483828, 385875	Users of B1241 at Knaith Park	25	3,575	West
<b>Visual susceptibility to change</b>		<b>Value of View</b>		<b>Sensitivity of receptor</b>
Medium		Medium		Medium
<b>Size/Scale, Duration &amp; Reversibility of Effect</b>				
<b>Construction</b>				

<p>Views of construction operations would be substantially limited by distance and intervening vegetation. Construction of the tallest structures proposed would be visible in the context of existing large scale structures within the West Burton Power Station Site.</p> <p>A long distance view of construction operations would be observed, occurring over a small geographical extent and generally similar in form, but of smaller mass and scale to existing structures. The impact would be temporary and reversible.</p>		
<b>Magnitude of Impact</b>		Low
<b>Significance of Effect</b>		Negligible adverse (not significant)
<b>Operation</b>		
<b>Visual susceptibility to change</b>	<b>Value of View</b>	<b>Sensitivity of receptor</b>
High	Low	Low
<p>Completed structures would marginally increase the visual extent of development within the West Burton Power Station Site, but they would predominantly be visually assimilated into it. Proposed structures are likely to be partially visible but seen in the context of the taller adjacent WBB.</p> <p>A long distance view of structures similar in form, but of smaller mass and scale to existing structures, occurring over a small geographical area would be observed. The impact would be long-term and reversible.</p>		
<b>Magnitude of Impact</b>		Low
<b>Significance of Effect</b>		Negligible adverse (not significant)

<b>Viewpoint 9: Sturton le Steeple FP18, Common Lane</b>				
<b>Grid Reference</b>	<b>Receptor Type</b>	<b>Elevation (m AOD)</b>	<b>Approximate Distance from Site (m)</b>	<b>Direction of View</b>
479127, 384535	Users of PRow & residents at Sturton le Steeple	10	2,010	North-east
<b>Visual susceptibility to change</b>		<b>Value of View</b>		<b>Sensitivity of receptor</b>
Medium		Low		Low
<b>Size/Scale, Duration &amp; Reversibility of Effect</b>				
<b>Construction</b>				

<p>Medium distance views of a large proportion of construction operations would be restricted by the existing structures of WBB. The movement of taller elements such as cranes and the construction of stacks may be partially visible.</p> <p>A medium distance view of construction operations would be partially observed, occurring over a negligible geographical area with structures generally similar in form, but of smaller mass and scale to existing structures. The impact would be temporary and reversible.</p>		
<b>Magnitude of Impact</b>		Low
<b>Significance of Effect</b>		Negligible adverse (not significant)
<b>Operation</b>		
<b>Visual susceptibility to change</b>	<b>Value of View</b>	<b>Sensitivity of receptor</b>
Medium	Low	Low
<p>Completed structures would be substantially screened by the existing development within the foreground of the scene (WBB) and vegetation along field boundaries and the periphery of the West Burton Power Station Site. The upper part of new stacks may be visible above the WBB structures, but it is anticipated that these could be easily missed by the casual observer.</p> <p>A short distance view of structures similar in form, but of smaller mass and scale to existing structures, occurring within a medium geographical area would be observed. The impact would be long-term and reversible.</p>		
<b>Magnitude of Impact</b>		Low
<b>Significance of Effect</b>		Negligible adverse (not significant)

<b>Viewpoint 10: West Burton FP2</b>				
<b>Grid Reference</b>	<b>Receptor Type</b>	<b>Elevation (m AOD)</b>	<b>Approximate Distance from Site (m)</b>	<b>Direction of View</b>
480148, 384852	Users of PRow	17	1,340	North
<b>Visual susceptibility to change</b>		<b>Value of View</b>		<b>Sensitivity of receptor</b>
High		Low		Medium
<b>Size/Scale, Duration &amp; Reversibility of Effect</b>				
<b>Construction</b>				
<p>Views of construction operations would be limited by intervening vegetation and built form at WBB. Construction of the tallest structures proposed would be visible behind and in conjunction with WBB.</p> <p>A short distance view of construction operations would be partially observed, occurring over a small geographical area with structures generally similar in form, but of smaller mass and scale compared to existing structures. The impact would be temporary and reversible.</p>				

<b>Magnitude of Impact</b>		Low
<b>Significance of Effect</b>		Minor adverse (not significant)
<b>Operation</b>		
<b>Visual susceptibility to change</b>	<b>Value of View</b>	<b>Sensitivity of receptor</b>
Medium	Low	Low
<p>Completed structures would increase observable built form and would be visually assimilated into WBB. Lower structures are likely to be partially screened by WBB and intervening vegetation with an increase in the level of tall structures including stacks clearly identifiable and seen in conjunction with those at WBB.</p> <p>A short distance view of structures similar in form, but of smaller mass and scale compared to existing structures, occurring over a medium geographical area would be observed. The impact would be long-term and reversible.</p>		
<b>Magnitude of Impact</b>		Low
<b>Significance of Effect</b>		Minor adverse (not significant)

<b>Viewpoint 11: Junction of A165/ Knaith Hill, Knaith</b>				
<b>Grid Reference</b>	<b>Receptor Type</b>	<b>Elevation (m AOD)</b>	<b>Approximate Distance from Site (m)</b>	<b>Direction of View</b>
480148, 384852	Users of A156 & residents	17	3,020	North-west
<b>Visual susceptibility to change</b>		<b>Value of View</b>		<b>Sensitivity of receptor</b>
High		Low		Medium
<b>Size/Scale, Duration &amp; Reversibility of Effect</b>				
<b>Construction</b>				
<p>Views of construction operations would be limited by intervening vegetation and distance. Construction of taller structures proposed would be visible in the context of existing large scale structures at WBB and WBA.</p> <p>A medium distance view of construction operations would be observed, occurring within a small geographical extent and generally similar in form, but smaller in mass and scale compared to existing structures. The impact would be temporary and reversible.</p>				
<b>Magnitude of Impact</b>			Low	
<b>Significance of Effect</b>			Minor adverse (not significant)	
<b>Operation</b>				
<b>Visual susceptibility to change</b>		<b>Value of View</b>		<b>Sensitivity of receptor</b>

High	Low	Medium
<p>Completed development would extend the visual presence of the West Burton Power Station Site through an observable increase in the level of tall structures, however low level structures are likely to be partially screened by intervening vegetation.</p> <p>A long distance view of structures similar in form, but of smaller mass and scale compared to existing structures, occurring within a small geographical extent would be observed. The impact would be long-term and reversible.</p>		
<b>Magnitude of Impact</b>		Low
<b>Significance of Effect</b>		Minor adverse (not significant)

<b>Viewpoint 12: Sturton-le-Steeple BW7</b>				
<b>Grid Reference</b>	<b>Receptor Type</b>	<b>Elevation (m AOD)</b>	<b>Approximate Distance from Site (m)</b>	<b>Direction of View</b>
481604, 383007	Users of PRow/ Trent Valley Way	6	3,450	North-west
<b>Visual susceptibility to change</b>		<b>Value of View</b>		<b>Sensitivity of receptor</b>
High		Medium		Medium
<b>Size/Scale, Duration &amp; Reversibility of Effect</b>				
<b>Construction</b>				
<p>Views of high level construction operations would be possible; with low level activities screened by intervening vegetation along field boundaries and the periphery of the West Burton Power Station Site and built form at WBB. The construction of taller structures would be visible in conjunction with large scale structures at WBB and WBA.</p> <p>A long distance view of construction operations would be observed, occurring over a small geographical extent and generally similar in form, but of smaller mass and scale to existing structures. The impact would be temporary and reversible.</p>				
<b>Magnitude of Impact</b>			Low	
<b>Significance of Effect</b>			Minor adverse (not significant)	
<b>Operation</b>				
<b>Visual susceptibility to change</b>		<b>Value of View</b>		<b>Sensitivity of receptor</b>
High		Medium		Medium

<p>The operational Proposed Development would be partially visible in the far distance and in the context of much larger developments such as WBA and WBB. Views would continue to be dominated by WBA and visually assimilated into WBB, extending its visual presence. Lower structures would be partially screened by intervening vegetation with an observable increase in the level of tall structures. Proposed structures are likely to be partially visible with taller structures including stacks clearly identifiable.</p> <p>A short distance view of structures similar in form, but of smaller mass and scale compared to existing structures, occurring over an extended, but still small geographical extent would be observed. The impact would be long-term and reversible.</p>	
<b>Magnitude of Impact</b>	Low
<b>Significance of Effect</b>	Minor adverse (significant)

<b>Viewpoint 13: North Leverton with Habbleshthorpe BOAT15</b>				
<b>Grid Reference</b>	<b>Receptor Type</b>	<b>Elevation (m AOD)</b>	<b>Approximate Distance from Site (m)</b>	<b>Direction of View</b>
479657, 381326	Users of PRow/ Trent Valley Way	9	4,900	North
<b>Visual susceptibility to change</b>		<b>Value of View</b>		<b>Sensitivity of receptor</b>
High		Low		Medium
<b>Size/Scale, Duration &amp; Reversibility of Effect</b>				
<b>Construction</b>				
<p>Views of construction operations would be limited by intervening vegetation and built form at WBB. The construction of taller structures proposed would be visible in conjunction with large scale structures of WBB and pylons in the foreground of the view.</p> <p>A long distance view of construction operations would be observed, occurring over a small geographical extent and generally similar in form, but of smaller mass and scale to existing structures. The impact would be temporary and reversible.</p>				
<b>Magnitude of Impact</b>			Low	
<b>Significance of Effect</b>			Negligible adverse (not significant)	
<b>Operation</b>				
<b>Visual susceptibility to change</b>		<b>Value of View</b>		<b>Sensitivity of receptor</b>
Low		Low		Medium

<p>The completed development would be visually assimilated into the existing WBB increasing its apparent visual extent. Lower structures are likely to be screened by intervening vegetation but taller structures (such as the stack(s)) are likely to be partially visible behind and in conjunction with WBB.</p> <p>A long distance view of structures similar in form, but of smaller mass and scale compared to existing structures, occurring over a small geographical extent would be observed. The impact would be long-term and reversible.</p>	
<b>Magnitude of Impact</b>	Low
<b>Significance of Effect</b>	Negligible adverse (not significant)

**Table 10-13** provides a summary of the effects on visual amenity during construction and operation.

**Table 10-13: Summary of Visual Amenity Effects**

Viewpoint reference	Sensitivity of Receptor	Construction		Operation	
		Magnitude of impact	Classification of effect	Magnitude of impact	Classification of effect
1	Medium	Low	Minor adverse (not significant)	Low	Minor adverse (not significant)
2	Medium	Low	Minor adverse (not significant)	Low	Minor adverse (not significant)
3	Medium	Low	Minor adverse (not significant)	Low	Minor adverse (not significant)
4	Medium	Medium	<b>Moderate adverse (significant)</b>	Medium	<b>Moderate adverse (significant)</b>
5	Medium	Low	Minor adverse (not significant)	Low	Minor adverse (not significant)
6	Medium	Low	Negligible adverse (not significant)	Low	Negligible adverse (not significant)
7	Medium	Low	Negligible adverse (not significant)	Low	Negligible adverse (not significant)
8	Medium	Low	Negligible adverse (not significant)	Low	Negligible adverse (not significant)
9	Low	Low	Negligible adverse (not significant)	Low	Negligible adverse (not significant)
10	Medium	Medium	Minor adverse (not significant)	Medium	Minor adverse (not significant)

Viewpoint reference	Sensitivity of Receptor	Construction		Operation	
		Magnitude of impact	Classification of effect	Magnitude of impact	Classification of effect
11	Medium	Low	Minor adverse (not significant)	Low	Minor adverse (not significant)
12	Medium	Low	Minor adverse (not significant)	Low	Minor adverse (not significant)
13	Medium	Low	Minor adverse (not significant)	Low	Minor adverse (not significant)

### Rochdale Envelope Parameters

- 10.6.10 Assessment has been undertaken with the design of the Proposed Development subject to ongoing feasibility. A worst-case scenario allowing for later choice of technology and dimensions and configuration of any buildings was assumed to incorporate a degree of flexibility. For the purposes of this assessment, it has been assumed that no more than five stacks, not exceeding a height of 45m would be located within the Proposed Power Plant Site.
- 10.6.11 It is considered that five 45m tall stacks evenly placed across the site/view would be more visually intrusive than a single 25m tall structure which would be partially obscured by vegetation within the study area. For this reason, it is considered that a worst-case scenario has been assessed in line with the Rochdale Envelope approach.

### Decommissioning

- 10.6.12 Changes in views may give rise to adverse or beneficial visual effects through obstruction in views, alteration of the components of the view and the opening up of new views by removal of screening. Potential visual effects arising during the decommissioning process may include:
- the introduction of stationary and moving cranes and other high level machinery;
  - the introduction of low level operations including heavy plant movements, welfare facilities, and storage areas;
  - vehicles entering and leaving the site; and
  - the progressive deconstruction of tall structures.
- 10.6.13 The landscape and visual effects during decommissioning would be similar to those described for construction.
- 10.6.14 Once the decommissioning process has been complete, it is anticipated that the resulting conditions would be similar to those currently existing in the baseline descriptions.

## 10.7 Mitigation and Enhancement Measures

- 10.7.1 Significant adverse visual impacts were identified at a single viewpoint only, (Viewpoint 4 PRoW Bole FP4 Footpath) during construction, operation and decommissioning. The opportunity for mitigation of the visual effects of the Proposed Development is limited due to the size and scale of the Proposed Development. As shown in the assessment, the effects on visual amenity largely relate to the height of the tallest structures, as such it is considered that the addition of landscape features such as trees and woodland would not be effective in reducing the effects on visual amenity.

10.7.2 Section 2.65 of NPS EN-2 (DECC, 2011b) states that:

*“It is not possible to eliminate the visual impacts associated with a fossil fuel generating station. Mitigation is therefore to reduce the visual intrusion of the buildings in the landscape and minimise impact on visual amenity as far as reasonably practicable.”* (paragraph 2.6.5).

10.7.3 The final finishes of the buildings and exact sizes of component parts would not be finalised until the final detailed design is complete. However, given the nature of the Proposed Development, it is anticipated that it would have a close visual relationship with existing structures on the West Burton Power Station Site.

## 10.8 Limitation or Difficulties

10.8.1 As discussed in **Chapter 4: The Proposed Development**, a number of technical parameters have yet to be finalised for the Proposed Development, in order to maintain flexibility as the design progresses. Therefore, the Rochdale Envelope approach has been applied to the assessment.

10.8.2 Views of the Proposed Development other than those assessed are acknowledged to exist. The viewpoints are not intended to provide an exhaustive or fully comprehensive catalogue of views of the Site; rather they provide a representative sample for the purpose of the landscape and visual impact assessment, using viewpoints agreed with key consultees.

10.8.3 Winter photographs at viewpoints agreed in July 2017 will be undertaken and included in the ES that will support the Application for development consent.

## 10.9 Residual Effects and Conclusions

10.9.1 The LVIA has been undertaken within technical parameters defined by **Chapter 4: The Proposed Development**. Refinement of this assessment consequent to the finalisation of these technical parameters is anticipated to be necessary for the ES.

10.9.2 A single adverse significant effect has been identified as resulting from the Proposed Development (Viewpoint 4 PRow Bole FP4 Footpath) during construction, operation and decommissioning. Due to the scale of the Proposed Development and open and elevated nature of the view, the Proposed Development would increase the proportion of large scale power related development within the scene. Since, it is considered that mitigation measures would not be effective in reducing this visibility, none are proposed. Visual effects resulting from the Proposed Development are seen in the context of WBB and WBA to the right of the Site. As such, these adverse significant effects would remain.

### Summary

10.9.3 The study area is located within two regional LCAs. Within both, the West Burton Power Station Site and associated overhead power lines which radiate into the surrounding countryside are considered by the relevant landscape character assessment to be visually prominent and as having influence on the regional landscape character.

10.9.4 The Proposed Development is assessed as likely to result in a low or very low impact on landscape character, due to the introduction of additional built form which is similar in form and smaller in scale to that already within the West Burton Power Station Site. This effect is assessed to be minor or negligible adverse and not significant.

10.9.5 The visual impact of the Proposed Development is considered in the context of existing large scale structures within the West Burton Power Station Site. These are visually prominent within the study area. Views towards the West Burton Power Station Site from within settlements within the study area are generally restricted to locations along settlement edges due to the screening effect

of built form and/ or boundary vegetation. Views from PRoW within the countryside tend to be open and expansive with low level views of the West Burton Power Station Site screened by vegetation within the intervening countryside and along the periphery of this Site.

- 10.9.6 It has been assessed that the majority of visual receptors would experience a low or medium magnitude of impact during construction and operation of the Proposed Development, resulting in a minor adverse effect that is not significant. However, it is assessed that receptors at Viewpoint 4 would experience a medium magnitude of impact as a result of the introduction of built structures against the skyline, making them more prominent and extending the proportion of the view including large scale development. This would result in a moderate adverse effect on receptors at this location that is significant. The opportunity for mitigation of the visual effects of the Proposed Development is limited due to the size and scale of constituent structures. However, the effects on visual amenity largely relate to the height of the tallest structures.
- 10.9.7 From the majority of viewpoints, and in the context of the landscape character of the area, it would be viewed within an existing industrialised landscape and would be seen as an associated part of this, rather than a separate development.
- 10.9.8 Residual effects are as summarised in **Table 10-14**.

**Table 10-14: Residual impacts summary table**

Predicted Impact	Duration	Mitigation	Residual Effect
Moderate adverse visual impact (significant) at Viewpoint 4	Long-term	None	Moderate adverse visual impact (significant)

## 10.10 References

- Ref 10-1 Council of Europe, Cultural Heritage, Landscape and Spatial Planning Division and Directorate of Culture and Cultural and Natural (2008) *European Landscape Convention and Reference Documents*.
- Ref 10-2 Department for Energy and Climate Change (2011b) *Overarching National Policy Statement for Energy EN-1*.
- Ref 10-3 Department for Energy and Climate Change (2011b) *National Policy Statement for Fossil Fuel Electricity Generating Infrastructure (EN-2)*.
- Ref 10-4 Department for Communities and Local Government (2012) *The National Planning Policy Framework*.
- Ref 10-5 Bassetlaw District Council (2011a) *Bassetlaw District Council Proposals Map Designation*.
- Ref 10-6 The Bassetlaw District Council (2011b) *Core Strategy and Development Management Policies Development Plan Document for Bassetlaw*.
- Ref 10-7 Landscape Institute and Institute of Environmental Management and Assessment (2013) *Guidelines for Landscape and Visual Impact Assessment Third Edition*.
- Ref 10-8 Natural England (2014) *An Approach to Landscape Character Assessment*.
- Ref 10-9 Landscape Institute (2011) *Advice Note 01/11 Photography and photomontage in landscape and visual impact assessment*.

- Ref 10-10 Natural England (2013) *NCA Profile 48: Trent and Belvoir Vales (NE429)*.
- Ref 10-11 Natural England (2013) *NCA Profile 45: Northern Lincolnshire Edge with Coversands (NE554)*.
- Ref 10-12 FPCR (2009) *Bassetlaw Landscape Character Assessment*.
- Ref 10-13 Environmental Resources Management (1999) *West Lindsey Landscape Character Assessment*.
- Ref 10-14 PB Power (2005) *West Burton CCGT Power Station Environmental Statement*.

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## 11. Ground Conditions and Hydrogeology

### 11.1 Introduction

- 11.1.1 This chapter of the Preliminary Environmental Information (PEI) Report addresses the potential effects of the Proposed Development on geology, geo-environmental ground conditions and groundwater.
- 11.1.2 This chapter describes the existing geological and hydrogeological conditions at the Proposed Development Site (the Site), and assesses the likely nature and existing sources of contamination which may be present at the Site. In addition, an assessment of the likely ground conditions to be encountered is made, based on a review of existing site investigations conducted at the Site. Having established baseline conditions, an assessment is made of the potential impacts to the existing geological and hydrogeological conditions from the Proposed Development and likely mitigation measures.
- 11.1.3 This chapter is supported by **Appendix 11A: Phase 1 Geotechnical and Geo-Environmental Site Assessment** (PEI Report Volume II). It should be noted that some of the potential impacts and effects relating to the hydrogeology underlying the Proposed Development Site are also addressed within **Chapter 12: Flood Risk, Hydrology and Water Resources** of this PEI Report. This includes a Water Framework Directive (WFD) screening matrix in **Appendix 12A: WFD Screening Assessment** (PEI Report Volume II), due to the considerable overlap between the two topic areas.

### 11.2 Legislation and Planning Policy Context

#### Legislative Background

- 11.2.1 Redevelopment of brownfield land which forms part of the Site must take into account the regulatory context of the work, provide information that is appropriate for development, and be in accordance with UK good practice. An environmental assessment of the condition of the Site must not only consider the potential receptors of human health and controlled waters, but also include a review of the relevant legislation and planning policy that applies to the Site and its immediate environs.

#### European Legislation

##### *Water Framework Directive (WFD)*

- 11.2.2 The European Union (EU) Water Framework Directive (WFD) (2000/60/EC) (Ref 11-1) is one of the key European Directives setting the context for the hydrogeological assessment included within this chapter. The purpose of the WFD is to establish a framework for the protection and improvement of groundwater, and inland surface waters (rivers and lakes), transitional waters (estuaries), coastal waters. The assessment on surface waters is described in **Chapter 12: Flood Risk, Hydrology and Water Resources**.
- 11.2.3 The WFD requires the UK to classify the current condition of key waterbodies (giving a '*status*' or '*potential*') and to set objectives to either maintain the condition, or improve it where a waterbody is failing minimum targets. Any activities or developments that could cause deterioration within a nearby waterbody, or prevent the future ability of a waterbody to reach its target status, must be mitigated so as to reduce the potential for harm and allow the aims of the WFD to be realised.

### **Industrial Emissions Directive (IED)**

- 11.2.4 The Industrial Emissions Directive (IED) (2010/75/EU) (Ref 11-2) was adopted on November 24 2010, and came into force in January 2011. The IED resulted in revisions to the existing Environmental Permitting Regulations (EPR) including the requirement to establish a baseline report for all regulated sites storing and handling hazardous materials as required in Article 22 of the IED. This process is outlined in the European Commission Guidance concerning baseline reports under Article 22(2) of Directive 2010/75/EU on industrial emissions (2014/C136/03) (Ref 11-3).
- 11.2.5 This guidance presented a seven-stage approach to generating a ‘baseline report’ which presents the condition of the land under the site for ‘*relevant hazardous substances*’ present at the Site. Following completion of a desktop assessment, collation of a targeted set of baseline site condition data for the Site may be needed to meet this requirement, including collection of samples of soil and groundwater and their analysis.
- 11.2.6 Article 16 of the IED requires monitoring of groundwater and soil condition to be carried out every 5 and 10 years respectively, with the scale and scope of this monitoring determined based on the findings of the baseline report.

### **Groundwater Daughter Directive (GDD)**

- 11.2.7 The Groundwater Daughter Directive (GDD) (2006/118/EC) (Ref 11-4) was adopted in November 2006, and sets out the approach to protect groundwater against pollution and deterioration in response to Article 17 of the WFD. The transposition of the GDD into law in England and Wales is achieved through the Groundwater Regulations (2009) (Ref 11-5), implemented in England and Wales through the Environmental Permitting Regulations (2010) (Ref 11-6) and two Directions to the Environment Agency from the Secretary of State (SoS) and National Assembly for Wales. The first Direction sets out the principles for classifying groundwater and surface water bodies and the second Direction sets out water quality standards and groundwater threshold values.

### **7<sup>th</sup> Environment Action Programme (EAP)**

- 11.2.8 The 7<sup>th</sup> EAP (Decision No. 1386/2013/EU) (Ref 11-7) entered into force in January 2014, and is guided by the following long term vision:

*“In 2050, we live well, within the planet’s ecological limits. Our prosperity and healthy environment stem from an innovative, circular economy where nothing is wasted and where natural resources are managed sustainably, and biodiversity is protected, valued and restored in ways that enhance our society’s resilience. Our low-carbon growth has long been decoupled from resource use, setting the pace for a safe and sustainable global society.”* (Annex, Paragraph 1)

- 11.2.9 The 7<sup>th</sup> EAP is based around three priority areas requiring more action, including:
- protect nature and strengthen ecological resilience;
  - boost resource-efficient, low-carbon growth; and
  - reduce threats to human health and wellbeing linked to pollution, chemical substances, and the impacts of climate change.
- 11.2.10 In relation to geology, hydrogeology and ground conditions, the first priority area identifies further action on soil protection and sustainable use of land, while the third area covers challenges to human health including air and water pollution, excessive noise and toxic chemicals.

### **National Legislation**

- 11.2.11 There are three key statutes dealing with the risks posed to human health and the environment associated with historic land contamination, namely:

- Part IIA of the Environmental Protection Act, 1990 (the 'Contaminated Land' regime) (Ref 11-8);
- the Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009 (Ref 11-9); and
- the Town and Country Planning Act 1990 (Ref 11-10).

11.2.12 In the UK, Part IIA of the Environmental Protection Act, as introduced by Section 57 of the Environment Act 1995 (Ref 11-11), makes provision for identifying '*contaminated land*', the circumstances in which remediation is required and who is responsible for that remediation. Under Part IIA, '*contaminated land*' in respect of which remediation may be required is:

*"Any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substance in, on or under the land, that -*

- *Significant harm is being caused or there is a significant possibility of such harm being caused; or*
- *Pollution of controlled waters is being or is likely to be caused."*

11.2.13 Under the Water Resources Act, '*controlled waters*' are defined as including both surface waters and groundwater. Once a site is classified as '*contaminated land*' then remediation is required to render significant pollutant linkages (i.e. the source-pathway-receptor relationships that are associated with significant harm and/or pollution of Controlled Waters) insignificant, subject to a test of reasonableness.

11.2.14 A number of specific regulations have been enacted to implement the statutory European and national legislation into UK law. These regulations include:

- the Anti-Pollution Works Regulations 1999 (Ref 11-5);
- the Control of Pollution (Oil Storage) (England) Regulations 2001 (Ref 11-12);
- the Environmental Damage Regulations 2015 (Ref 11-13); and
- the Environmental Permitting (England and Wales) Regulations (Ref 11-6), which control discharge of water to surface water and groundwater.

11.2.15 A review of the national, regional and local planning policy pertaining to local ground conditions and contaminated land follows.

## Planning Policy Context

### National Planning Policy

11.2.16 The Overarching National Policy Statement (NPS) for Energy (EN-1) Section 4.10 (Pollution control and other environmental regulatory regimes) (Ref 11-14) details that issues relating to discharges or emissions from a proposed project which may affect air quality, land quality and the marine environment, or which include noise and vibration may be subject to separate regulation under the pollution control framework or other consenting and licensing regimes. Before consenting any potentially polluting developments:

*"The relevant pollution control authority is satisfied that potential releases can be adequately regulated under the pollution control framework"; and*

*"The effects of existing sources of pollution in and around the site are not such that the cumulative effects of pollution when the proposed development is added would make that development unacceptable, particularly in relation to statutory environmental quality limits" (Paragraph 4.10.7)*

11.2.17 Section 5.3 of EN-1 (Biodiversity and geological conservation) states:

*“Where the development is subject to EIA the applicant should ensure that the ES clearly sets out any effects on internationally, nationally and locally designated sites of ecological or geological conservation importance, on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity.” (Paragraph 5.3.3)*

11.2.18 Section 5.10 of EN-1 (Land use including open space, green infrastructure & Green Belt) states:

*“Applicants should also identify any effects and seek to minimise impacts on soil quality taking into account any mitigation measures proposed. For developments on previously developed land, applicants should ensure that they have considered the risk posed by land contamination.” (Paragraph 5.10.8)*

11.2.19 Section 5.15 of EN-1 (Water Quality and resources) states:

*“Where the project is likely to have effects on the water environment, the applicant should undertake an assessment of the existing status of, and impacts of the proposed project on, water quality, water resources and physical characteristics of the water environment as part of the ES or equivalent. The ES should in particular describe:*

- The existing quality of waters affected by the proposed project and the impacts of the proposed project on water quality, noting any relevant existing discharges, proposed new discharges and proposed changes to discharges;*
- Existing water resources affected by the proposed project and the impacts of the proposed project on water resources, noting any relevant existing abstraction rates, proposed new abstraction rates and proposed changes to abstraction rates (including any impact on or use of mains supplies and reference to Catchment Abstraction Management Strategies);*
- Existing physical characteristics of the water environment (including quantity and dynamics of flow) affected by the proposed project and any impact of physical modifications to these characteristics; and*
- Any impacts of the proposed project on water bodies or protected areas under the Water Framework Directive and source protection zones (SPZs) around potable groundwater abstractions.” (paragraph 5.15.3)*

11.2.20 NPS EN-2 (Ref 11-15) on Fossil Fuel Electricity Generating Infrastructure (EN-2) states that where a project is likely to have ‘effects on water quality or resources, the applicant for development consent should undertake an assessment which should particularly demonstrate that appropriate measures will be put in place to avoid or minimise adverse impacts of abstraction and discharge of cooling water. The applicant for development consent should demonstrate measures to minimise adverse impacts on water quality and resources’. (paragraph 2.10.2)

11.2.21 The National Planning Policy Framework (NPPF) (Ref 11-17) identifies land contamination as a material consideration in the planning process, stating:

*“To prevent unacceptable risks from pollution and land instability, planning policies and decisions should ensure that new development is appropriate for its location. The effects (including cumulative effects) of pollution on health, the natural environment or general amenity, and the potential sensitivity of the area or proposed development to adverse effects from pollution, should be taken into account. Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner.” (paragraph 120)*

11.2.22 Further, the NPPF states that planning policies and decisions should ensure that:

*“The site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous*

*uses and any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation”;*

*“After remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990”;* and

*“Adequate site investigation information, prepared by a competent person, is presented.”*  
(paragraph 121)

11.2.23 **Table 11-1** provides a summary of relevant NPS advice regarding ground conditions and hydrogeology and presents details where matters are assessed within this chapter.

**Table 11-1: Summary of relevant NPS advice regarding Ground Conditions and Hydrogeology**

Summary of NPS	Consideration within the Chapter
<b>NPS EN-1</b>	
<p>Paragraph 4.10.7 states:</p> <p><i>“The relevant pollution control authority is satisfied that potential releases can be adequately regulated under the pollution control framework”;</i> and</p> <p><i>“The effects of existing sources of pollution in and around the site are not such that the cumulative effects of pollution when the proposed development is added would make that development unacceptable, particularly in relation to statutory environmental quality limits”</i></p>	<b>Section 11.5 and Table 11-12</b>
<p>Paragraph 5.3.3 states:</p> <p><i>“Where the development is subject to EIA the applicant should ensure that the ES clearly sets out any effects on internationally and locally designated sites of ecological and geological conservation importance, on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity”</i></p>	<b>Section 11.4</b>
<p>Paragraph 5.10.8 states:</p> <p><i>“Applicants should also identify any effects and seek to minimise impacts on soil quality taking into account any mitigation measures proposed. For developments on previously developed land applicants should ensure that they have considered the risk posed by land contamination”</i></p>	<b>Section 11.4</b>
<p>Paragraph 5.15.3 states:</p> <p><i>“Where the project is likely to have effects on the water environment, the applicant should undertake an assessment of the existing status of, and impacts of the proposed project on, water quality, water resources and physical characteristics of the water environment as part of the ES or equivalent. The ES should in particular describe:</i></p> <p><i>The existing quality of waters affected by the proposed project and the impacts of the proposed project on water quality, noting any relevant existing discharges, proposed new discharges and proposed changes to discharges;</i></p> <p><i>Existing water resources affected by the proposed project and the impacts of the proposed project on water resources, noting any</i></p>	<b>Section 11.4 and Table 11-10</b>

Summary of NPS	Consideration within the Chapter
<p><i>relevant existing abstraction rates, proposed new abstraction rates and proposed changes to abstraction rates (including any impact on or use of mains supplies and reference to Catchment Abstraction Management Strategies);</i></p> <p><i>Existing physical characteristics of the water environment (including quantity and dynamics of flow) affected by the proposed project and any impact of physical modifications to these characteristics; and</i></p> <p><i>Any impacts of the proposed project on water bodies or protected areas under the Water Framework Directive and source protection zones (SPZs) around potable groundwater abstractions.”</i></p>	
<b>NPS EN-2</b>	
<p>Paragraph 2.10.2 states, where a project is likely to have ‘effects on water quality or resources, the applicant for development consent should undertake an assessment which should particularly demonstrate that appropriate measures will be put in place to avoid or minimise adverse impacts of abstraction and discharge of cooling water. The applicant for development consent should demonstrate measures to minimise adverse impacts on water quality and resources’.</p>	Not relevant

**Local Planning Policy**

11.2.24 The Bassetlaw District Core Strategy and Development Management Policies Development Plan Document (Ref 11-18), adopted in December 2011, supersedes the old Local Plan that was approved in 2001. The Core DPD states:

*“The District supports a range of locally designated sites that reflect its variety of rich habitat and geology. Even so, Nottinghamshire as a whole performs very poorly in terms of the amount of its land covered by statutory biological or geological designations and Bassetlaw has considerable opportunity to contribute to the improvement of this figure.”*

11.2.25 The Core DPD Strategic Objective SO8 concerns protection of ‘Bassetlaw’s natural environment by maintaining, conserving and enhancing its characteristic landscapes, biodiversity, habitats and species and seeking quantitative and qualitative growth in the green infrastructure network across and beyond the District. (paragraph 3.3)

11.2.26 A Sustainability Assessment of the Publication Core Strategy and Development Management Policies (Ref 11-19) was published in November 2010, which included the following sustainability objective; ‘to protect and manage prudently the natural resources of the district including water, air quality, soils and minerals’.

11.2.27 None of the policies adopted in the Sturton Ward Neighbourhood Plan are relevant with respect to ground conditions and hydrogeology.

**Other Relevant Legislation, Policy, Standards and Guidance**

11.2.28 The Building Act 1984 (Ref 11-20) is supported by the Building Regulations 2000 (Ref 11-21), which contain detailed information regarding the preparation of a site for redevelopment and resistance to contaminants.

11.2.29 The Environment Agency provides general guidance on the management of land contamination in document ‘GPLC1 - Guiding Principles for Land Contamination’ (Ref 11-22). The Environment

Agency also acts as a statutory consultee for developments requiring an EIA. The Environment Agency's primary concern in the management of contaminated land through the planning regime is in respect of the protection of the water environment.

- 11.2.30 Model Procedures for the Management of Contaminated Land, Contaminated Land Report 11 (referred to in this PEI Report as 'CLR11') (Ref 11-23) outlines the approach for the evaluation of contamination in line with UK Government legislation, Environment Agency and National House-Building Council (NHBC) requirements. The procedures recommend the application of a risk based approach with the first tier assessment being a Phase 1 Desk Top Report to identify previous and current site uses, geological setting and historical contamination records. The approach to further investigation is then based on the risk established by virtue of the Phase 1 Report. If a site has no historical or current evidence of contaminative uses, the scope of further investigation can be less than sites with a long standing history of potentially contaminative uses.

## 11.3 Assessment Methodology and Significance Criteria

### Methodology for Assessing Baseline Conditions

- 11.3.1 Baseline information has been obtained in order to assess the likelihood of finding contamination and its potential nature and extent. Baseline conditions have been identified from documentary research of the site history, geology, hydrogeology and hydrology, and review of a commercially available regulatory database. The assessment has involved a review of the Groundsure Reports for the Proposed Development, as well as publically available BGS mapping (Ref 11-24) and the Environment Agency website (Ref 11-25). This information has then been used to formulate a Conceptual Site Model (CSM) to allow an assessment of potential environmental risks. The above information has been synthesised, in order to characterise the baseline conditions of the Site. Potential receptors were then identified and their relative sensitivity evaluated as described within **Table 11-2**.
- 11.3.2 The criteria used to determine the sensitivity of receptors and the magnitude of impacts has been developed by technical specialists and has been applied to similar land development proposals. Where appropriate, for the purpose of this assessment, risk likelihood has been interpreted as being equal to the impact rating (e.g. low likelihood/ low impact).

### Sensitivity/Importance of Receptors

- 11.3.3 Using information gathered during the desk-based study, the presence and relative sensitivity of receptors at risk from potential land contamination and risks to geological/ geomorphologic features have been evaluated by consideration of the following factors:
- surrounding land uses, based on mapping, site visits and consideration of the occupants of adjacent sites;
  - proposed end-use, based on the nature of the Proposed Development;
  - type of construction operations that would be necessary as part of the Proposed Development;
  - surrounding sites of nature conservation importance;
  - underlying groundwater;
  - surrounding sites and/or areas of geological/geomorphologic importance; and
  - geology, hydrogeology and hydrology of the Proposed Development and its surrounding area.
- 11.3.4 The sensitivity of receptors or geological features that could be affected by the Proposed Development is described qualitatively in **Table 11-2**.

**Table 11-2: Descriptive scale for sensitivity of receptors**

Qualitative description	Receptor sensitivity		
	Low	Medium	High
End users (operational workers/visitors)	'Hard' end use (e.g. industrial, car parking)	Landscaping or open space	Residential, allotments and play areas
Surrounding land uses	Industrial area	Open space or commercial area	Residential area
Construction workers	Minimal disturbance of ground	Limited earthworks	Extensive earthworks and demolition of buildings
Ecological sites	No sites of significant ecological value close by	Locally designated ecological sites	Nationally or internationally designated ecological sites, including Sites of Special Scientific Interest (SSSIs), Local and National Nature Reserves, Special Protection Areas.
Built environment	Not applicable	Buildings, including services and foundations	Nationally or internationally designated sites of historic value or other sensitivity
Geology / geomorphology	Areas of superficial geology or geomorphologic features with no special significance	Other areas of potential mineral resources Exposed geological features of local importance or educational value	Nationally or internationally designated geological sites Local Geological Sites SSSIs Mineral reserve allocated on Local Minerals Plan
Groundwater	Non aquifer Low quality resource No abstractions within 1km	Secondary Aquifer Abstraction point within 1km SPZ within 1km of the Site	Principal Aquifer High quality resource Abstraction point within 250m SPZ on-site

11.3.5 The Site was then considered in detail with respect to the proposed construction, operational and decommissioning periods, and any ground contamination or soil quality related impacts considered likely to result are described herein and, where possible, quantified.

### Prediction of Potential Impacts

11.3.6 The potential impacts (or risks) associated with contaminated land have generally been assessed by means of a hazard-pathway-receptor model (the Pollutant Linkage), where the following definitions apply:

- hazard: source of contamination;

- receptor: the entity that is vulnerable to harm from the hazard; and
- pathway: the means by which the hazard can come into contact with the receptor.

11.3.7 This assessment considers the impacts of existing contaminants in the ground under the Site, as well as those arising from West Burton A (WBA) and West Burton B (WBB) power stations and the potential for the Proposed Development to impact on land quality and receptors on and adjacent to the Site. The assessment also considers the potential for the Proposed Development to impact upon any geological/geomorphologic features.

### Contamination Sources (Hazards)

11.3.8 Land contamination sources can be described qualitatively according to the categories shown in **Table 11-3**. This is a qualitative judgement, but has been developed in line with an accepted methodology for Phase 1 desk studies and Part IIA contamination studies (Ref 11-8).

**Table 11-3: Descriptive scale for different sources of land contamination**

Qualitative description of source (hazard)	Previous land use
Low	Greenfield site, or previous or on-going activities with low potential to cause contamination (e.g. residential, retail or offices), or site investigation data indicating no significant contamination.
Medium	Previous or on-going activities with some potential to cause moderate contamination (e.g. railways, collieries, scrap yards), or site investigation data indicating limited contamination.
High	Previous or on-going activity on or near to site with high potential to cause land contamination (e.g. gasworks, chemical works, landfills), or site investigation data including widespread or severe contamination.

11.3.9 If a hazard has been identified and potentially sensitive receptors are present, then the potential impacts associated with the Proposed Development can be predicted by considering the pathways by which the hazard may affect the receptors. **Table 11-4** indicates the most likely potential impacts that may occur in relation to the Proposed Development for different categories of receptor.

**Table 11-4: Summary of the most likely sources of potential land contamination impacts that may affect sensitive receptors**

End users (operational workers / residents / visitors)	Surrounding land uses (including offsite residential areas)	Construction workers	Sensitive water resources	Ecological sites	Built environment
Direct or indirect ingestion of contaminated soil (operation)	Inhalation or deposition of wind-borne dust (construction)	Direct or indirect ingestion of contaminated soil (construction)	Existing and/ or new pollutant pathways (construction and/or operation)	Phytotoxic impacts on plants (operation)	Chemical attack of buried concrete structures (operation)
Concentration of flammable or asphyxiating in-ground gases in enclosed spaces (operation)	Migration of contamination in sub-surface strata (including gases) (construction and/or operation)	Concentration of flammable or asphyxiating gases in confined spaces (construction)	Generation of liquid and/ or mobile contaminants (operation)	Toxic impacts on fauna (operation and/or construction)	Concentration of flammable/ explosive gases in confined spaces (operation)
Inhalation of harmful in-ground vapours/ dusts indoors and outdoors (operation)	N/A	Inhalation of asbestos during building demolition (construction)	N/A	Indirect impacts via contamination of water resources (operation and/or construction)	Permeation of water supply pipelines (operation)

11.3.10 The potential impacts are assessed based on the existing land use at the Site and predicted construction, operation and decommissioning of the Proposed Development.

11.3.11 The magnitude of a potential impact is described, wherever possible, by using the terms defined in **Table 11-5**.

**Table 11-5: Descriptive scale for the impacts of land contamination**

Magnitude of impact	Examples of typical impacts
High	Loss of exposed designated geological feature Very high risk of exposure of a sensitive receptor to potentially harmful levels of contamination via a confirmed pathway
Medium	Quarrying of rock for imported fill, or substantial changes due to cuttings Proven source – pathway – receptor pollutant linkage identified with elevated level of contamination recorded/ or potential to be present

Magnitude of impact	Examples of typical impacts
Low	Superficial disturbance to geology; changes in geomorphology Identified source – pathway – receptor pollutant linkage identified but contamination likely to be low risk
Very low	Changes to made ground deposits No source – pathway – receptor pollutant linkage identified

### Significance of Effects

- 11.3.12 For each of the potential impacts identified, an assessment has been made of the likely significance of effects.
- 11.3.13 Where geological receptors are present, then their importance (sensitivity) has been determined (see **Table 11-2**) and the potential impact of the Proposed Development qualitatively predicted (see **Table 11-5**).
- 11.3.14 Effects are classified based on the identified sensitivity/importance of the receptor and the predicted magnitude of the impact, using the standard assessment matrix set out in **Table 11-6**, in conjunction with professional judgement of site-specific factors that may be of relevance.

**Table 11-6: Matrix to determine the significance of an effect (prior to mitigation)**

Magnitude of impact	Sensitivity/importance of receptor			
	High	Medium	Low	Very Low
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Very low	Minor	Negligible	Negligible	Negligible

- 11.3.15 This chapter considers that major or moderate effects are significant, in accordance with standard EIA practice.
- 11.3.16 If potentially significant effects are identified, measures are proposed to mitigate the risks from the hazards. However, industry best practices would be applied whether there is the potential for significant effects, or not. The assessment is undertaken on the assumption that best practice would be implemented during construction, operation and decommissioning. The generic categories of mitigation are outlined in **Table 11-7**.

**Table 11-7: Generic categories of mitigation**

Category of mitigation	Description of mitigation measures
Remedial works	Remedial work may be required to allow the development to proceed. The scope and nature of any remedial work is likely to be highly dependent on the results of investigations and subsequent risk assessments.

Category of mitigation	Description of mitigation measures
Design changes	Significant effects can be reduced by changes in design (e.g. protective measures to prevent build-up of flammable gases), or modification of layouts to ensure that sensitive end uses are sited away from likely areas of contamination. Relocation of built features away from geologically important features. Consideration of the construction method proposed for underground structures to minimise potential impacts on groundwater.
Protective measures during construction	Many of the potentially significant effects on the construction workforce can be mitigated by the use of appropriate protective equipment, such as gloves and respiratory protection, and effective dust suppression techniques.
Environmental management	Environmental management may be required to prevent construction work and future operations from giving rise to land contamination.

### Extent of Study Area

- 11.3.17 The Site encompasses the land required for the construction, operation and decommissioning of the Proposed Development (refer to **Chapter 3: Description of the Site**). The proposed power plant site is located adjacent to the River Trent, comprises in part an area of grassland to the north of WBB Power Station which was formerly a PFA disposal site (see **Figure 3.1** in PEI Report Volume III).

### Information Sources

#### *Desk Study*

- 11.3.18 A Phase 1 Geo-Environmental Site Assessment (**Appendix 11A** in PEI Report Volume II) was conducted to determine the baseline ground conditions and potentially contaminative land uses. As part of this assessment, Groundsure Reports for the Proposed Development were commissioned from Groundsure Limited.
- 11.3.19 The reports summarise environmental information available in the public domain from a variety of sources. Information is included on authorisations, permits, discharge consents, water abstractions, groundwater, surface water, ecological sensitivities, licensed waste management and disposal facilities, consented trade effluent discharges, records of unlicensed landfills in the search area, trade directory entries of potentially contaminating activities, Control of Major Accident Hazards (COMAH) registered sites, radon risk, coal (and other) mining and natural subsidence risk, and sensitive land uses (nature reserves, protected areas, sensitive habitats). It is noted that the Groundsure database is updated periodically and therefore it may not document recent developments/ registrations in the Site area or activities which have not been declared.

### Consultation

- 11.3.20 An initial consultation, part of the scoping opinion, has been undertaken and those responses pertinent to the assessment of geology, ground conditions and hydrogeology are summarised in **Table 11-8**.

**Table 11-8: Initial consultation summary table**

Consultee	Date (method of consultation)	Summary of consultee comments	Summary of response/ how comments have been addressed
Environment Agency	See Scoping Opinion (7.6.17)	The Environment Agency are satisfied with the proposed assessment of risk to contaminated waters from land contamination as presented in chapters 5.7.5 to 5.7.9 in the Scoping Report.	N/A
Marine Management Organisation	See Scoping Opinion (7.6.17)	The MMO have noted that the proposed development site is indicated to lie within the footprint of the EA recorded historic landfill. If the release of contaminated sediments into the River Trent is a possibility, MMO would expect to see this fully addressed within the Environmental Statement, with mitigation measures proposed where necessary.	The potential for contamination of the River Trent and a summary of the mitigation measures is included within this chapter and in <b>Appendix 11A</b> (PEI Report Volume II).
National Grid	See Scoping Opinion (7.6.17)	Drilling or excavation works should not be undertaken if they have the potential to disturb/adversely affect the foundations or 'pillars of support' of any existing tower. These foundations always extend beyond the base area of the existing tower. Foundation drawings can be obtained by contacting national grid.	Appropriate standoff distances will be adopted in future ground investigation works, having regard to the extent of the foundations and method for drilling which would be prescribed by contractor.

## 11.4 Baseline Conditions

### Existing Baseline

- 11.4.1 This section describes the Site at present (without the Proposed Development) and the sensitivity of the receiving environment to change.

### Designated Sites

- 11.4.2 The Site is located within a Nitrate Vulnerable Zone.
- 11.4.3 A Site of Special Scientific Interest (SSSI) is recorded at Lea Marsh, approximately 1km north-east of the Site.
- 11.4.4 No other environmentally sensitive sites (including Special Protection Areas, Special Areas of Conservation, Ramsar sites, or National and Local Nature Reserves) have been identified within 2km of the Site.

**Existing and Previous Land Uses**

11.4.5 **Table 11-9** details the history of the West Burton Power Station Site, based on available OS historical mapping (**Appendix 11A**: Phase I Geo-Environmental Site Assessment in PEI Report Volume II).

**Table 11-9: Review of historical maps relating to the Proposed Development Site**

Date	On-Site Land Use	Off-Site Land Use
1885-1886	<p>Agricultural land (fields); Two former river channel features (oxbow lakes, approx. 50-80m channel width) are denoted. One passes through the north of the Site beneath the centre of the Proposed Development and the Northern Outfall Option. The second passes beneath the eastern extent of the Southern Outfall Option;</p> <p>Building of unknown purpose and a small watercourse are shown to pass through the Site and the Southern Outfall Option.</p> <p>The River Trent follows its present course, adjoining the Site to the east.</p>	<p>Agricultural land (fields), field drains and minor watercourses.</p>
1899-1900	<p>Building of unknown use marked as 'Cheese House'.</p>	<p>Pumping House shown 150m to the north-west.</p>
1904	<p>No significant change.</p>	<p>No significant change.</p>
1916 -1921	<p>Two footpaths cross the north of the Site.</p>	<p>No significant change.</p>
1947-1948	<p>No significant change.</p>	<p>No significant change.</p>
1951	<p>Pumping House no longer inferred.</p>	<p>No significant change.</p>
1969-1974	<p>Rail infrastructure is present in the north-west of the Site, adjacent to the coal stockyard of WBA. Site drainage is denoted around the stockyard.</p> <p>Field drains shown across the Site.</p> <p>Pumping Station shown in the Southern Outfall Option.</p> <p>Inferred landfill in the north of the Site, assumed to be a PFA lagoon.</p>	<p>WBA and supporting infrastructure shown immediately west and south-west of the Site.</p> <p>Area approximately 150m to the north-west of the Site inferred as 'Emergency dust disposal area' (assumed to be purposed for PFA disposal).</p> <p>Wheatley Beck and the Catchwater Drain are named on mapping.</p> <p>Sewage works shown immediately north-east of the Site.</p> <p>Ground workings shown immediately north-west of the Site.</p>

Date	On-Site Land Use	Off-Site Land Use
1977-1980	The former river channels are no longer denoted.	Surface water ponds shown immediately east of the Site, between the northern and southern outfall options.  Former site of medieval village and church shown 100m south of the Site.  <i>'Emergency dust disposal area'</i> still inferred north-east of the Site.
1989-1994	No significant change.	No significant change.
2002	Works compound shown in the north of the Site.  Track shown through the south of the Site.	No significant change.
2010	North of the Site inferred as <i>'Emergency Dust Disposal Area'</i> .	Expansion of WBA supporting operations west of the Site (possible flu-gas desulphurisation plant).  Excavations of unknown purpose north-east of the Site are shown to be flooded.
2014	Construction of WBB. Supporting infrastructure is shown to extend around the Site and along the Northern Outfall Option.	No significant change.

11.4.6 Prior to its development as a power station in the late 1950s and early 1960s, the West Burton Power Station Site was primarily agricultural land. The West Burton Power Station Site is located immediately north of the remains of the medieval village of West Burton. Continued operation of the WBA facility has produced large volumes of PFA, which has been removed to disposal sites throughout the north-east of the West Burton Power Station Site or removed offsite.

11.4.7 Work began on the site of the WBB CCGT plant in 2008, with generation commencing in 2013.

#### Surrounding Area

11.4.8 The surrounding land use has been predominantly agricultural prior to 1969, after which WBA was constructed, which signalled a shift towards a mixed industrial/agricultural land use.

11.4.9 There are numerous surface water features present adjacent to the West Burton Power Station Site, including ponds and drainage water channels.

11.4.10 The West Burton Power Station is located on the western bank of the River Trent, with both WBA and WBB using river water for cooling, via an abstraction point, with water returned to river via an outfall.

11.4.11 Based on this risk outline, there is the potential for contamination to present a high-medium hazard to environmental receptors.

### Superficial Geology

- 11.4.12 A review of the Groundsure Reports (available on request), BGS 1:50,000 solid and drift geology sheet 101 for East Retford, existing site investigation records and publically available BGS borehole records has been conducted to identify the likely geological sequence at the Site.
- 11.4.13 From a review of BGS information and the geology sections of the Groundsure Reports, the following superficial deposits have been identified as potentially being present beneath the Site: Made Ground (associated with PFA deposition); Alluvium; and Glacial Till.
- 11.4.14 The relative extent of the uppermost superficial deposits in relation to the Site is discussed in more detail below.

### Superficial Geology – Proposed Power Plant Site

- 11.4.15 Based on a review of the BGS sheets and Groundsure Report, superficial deposits are shown to underlie the full extent of the Proposed Power Plant Site, consisting of: Alluvium – comprised of clay, silt, sand and gravel.
- 11.4.16 Thick deposits of made ground are also present within the Site; due to the former land use as the PFA disposal site.

### Bedrock Geology – Proposed Power Plant Site

- 11.4.17 The geological map and Groundsure Report indicate that the Proposed Power Plant Site is underlain by Mercia Mudstone. The following boreholes located within the Site encountered Mercia Mudstone:
  - SK88NW42, located within the WBB Site, encountered mudstones and siltstones of the Mercia Mudstone group at 4.11m below ground level (bgl) and terminated at 17.34m bgl; and
  - SK88NW41, located within the footprint of the proposed development encountered very stiff to hard weathered ‘Keuper Marl’ (Mercia Mudstone Group) at 5.03m bgl and terminated at 12.34m bgl.

### Coal Mining

The Groundsure Report and the online Coal Authority mapping tools do not show the Site to be within an identified coal mining reporting area. The Groundsure Report revealed no recorded instances of coal mining, mineral extraction, clay extraction or natural cavities beneath the Site. The sensitivity of the geology is low/moderate, based on the absence of coal mining activity beneath the Site.

### Hydrogeology

- 11.4.18 The EA aquifer classifications for the identified superficial deposits and bedrock underlying the Site are summarised in **Table 11-10**.

**Table 11-10: Summary of EA aquifer classifications**

Formation	EA aquifer classification	Aquifer definition
<b>Superficial deposits</b>		
Alluvium (clay, silt, sand)	Secondary A Aquifer	Defined by the EA as ‘permeable layers capable of supporting water supplies at a

Formation	EA aquifer classification	Aquifer definition
and gravel)		<i>local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers’.</i>
Glacial Till (clay)	Secondary A (Undifferentiated) Aquifer	Defined by the EA as ‘an aquifer where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type’.
<b>Bedrock</b>		
Mercia Mudstone Group	Secondary B	Defined by the EA as ‘predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers’.

- 11.4.19 Soils at the Site are classified as being of a high leaching potential, meaning that they readily transmit liquid discharges and pollutants, with the exception of soils in an area to the north of the Proposed Development and those derived from glacial till in the south-east, which are not classified.
- 11.4.20 The Site is not located within a groundwater source protection zone (SPZ), according to the EA.
- 11.4.21 The Groundsure Report has not recorded any groundwater abstraction licenses within 2km of the Site.
- 11.4.22 Based on the presence of Secondary A Aquifers in superficial drift deposits and proximity to the River Trent, risk to groundwater is likely to be high.

**Radon**

- 11.4.23 The GroundSure Report indicates that the Site is not located in a Radon Affected Area, because less than 1% of properties are above the Action Level and no radon protective measures are necessary in construction of new properties or extensions.

**Summary of Anticipated Ground Conditions – Proposed Power Plant Site**

- 11.4.24 Previous investigations into the ground conditions beneath the Site (see **Appendix 11A: Phase I Geotechnical and Geo-Environmental Site Assessment in PEI Report Volume II**) identified that made ground is underlain by an unknown thickness of PFA (circa 7–8m) which was previously anticipated due to the Site also being the previous location of the WBB PFA disposal site. The termination depth of the PFA was identified in 3 of the 4 boreholes, this unit was underlain by Mercia Mudstone, as shown in **Table 11-11**.

**Table 11-11: Generalised Ground Conditions beneath the Proposed Development Site**

<b>Geological unit</b>	<b>Top of strata (metres below ground level)</b>	<b>Anticipated Strata Thickness (m)</b>	<b>Description</b>
Made ground (other)	Ground surface	0.1 – 2.0	Top soil, crushed stone, concrete and rubble
Made ground (PFA)	0.1-2.0	7.8 – 9.9	Pulverised Fuel Ash
Superficial deposits (alluvium)	9.8 – 10.0	3.4 – 4.0	Alluvial Sand
Mercia Mudstone Group	13.4 – 13.8	Not proven	Initially weathered Mudstone (marl)

**Previous Reports and Geophysical Investigation**

11.4.25 Groundwater monitoring data taken from the Annual Groundwater Monitoring Report produced by EDF in 2013 (Ref 11-26) suggests that estimated groundwater levels may vary from 2.5m bgl close to the banks of the River Trent, to 4.1-4.3m bgl in the north of the Site; to 4.8-5.1m bgl in the south of the Site (stated figures are approximate).

**Potential Pollutant Linkages**

11.4.26 In order for an area of potential contamination within the confines of the Site to pose a significant level of risk to or as a result of the Proposed Development or the wider environment, a potential source and sensitive target or receptor has to be identified, together with a plausible and effective pathway by which the receptor may be exposed to any given hazard.

11.4.27 Based upon the available information, potential sources of contamination within the Site include:

- contamination associated with the historical disposal of PFA (which may include asbestos containing materials and other waste materials);
- permitted activities relating to the West Burton Power Station Site’s existing operation of power stations,, including storage and handling of fuels and oils etc.;
- contamination resulting from the Site’s previous use as a construction laydown area, during the construction of WBB;
- railway sidings adjacent to the coal stockyard;
- the Site’s surface water and process water effluent systems, including oil-water interceptors, drains, sumps and gulleys; and
- historical agricultural land use (e.g. use of pesticides, heavy equipment).

11.4.28 Based upon the available information, potential sources of contamination outside the Site (typically within 500m, unless otherwise specified) include:

- contamination associated with the historical deposit of PFA;
- permitted activities relating to the existing operations associated with WBA and WBB, including contaminants associated with the main power plant from the boiler house, turbine house, substation etc.;

- the nearby wastewater treatment works;
- the West Burton Power Station Site's effluent systems, including oil-water interceptors, drains, sumps and gulleys; and
- the coal stockyard and associated activities (including the railway line serving WBA).

#### *Potential Contaminants of Concern*

11.4.29 Potential compounds of concern associated with the identified potential sources of contamination may include, but are not limited to:

- heavy metals;
- asbestos;
- inorganic ions, including alkalinity and sulphate;
- volatile Organic Compounds (VOCs), including benzene, toluene, ethylbenzene and xylene (BTEX);
- semi Volatile Organic Compounds (SVOCs) including polycyclic aromatic hydrocarbons (PAHs);
- total petroleum hydrocarbons (TPH); and
- ground gases (carbon dioxide, methane, hydrogen sulphide etc.).

#### *Potential Receptors*

11.4.30 Based upon the available information, the following are considered to be potential receptors:

- human health:
  - employees on neighbouring sites (WBA and WBB); and
  - future construction or demolition workers.
- controlled waters:
  - shallow groundwater within the superficial deposits (Secondary A Aquifer);
  - deeper groundwater within the bedrock (Secondary B Aquifer); and
  - surface water (including the Catchwater drain, Wheatley Beck, fishing ponds to the east of the Site and the River Trent) assumed to be in hydraulic continuity with the shallow groundwater.
- infrastructure:
  - below-ground structures (e.g. concrete foundations, plastic water pipes); and
  - confined spaces within buildings (e.g. basements, store cupboards, service ducts).
- ecology:
  - including flora and fauna in woodlands, fishing ponds surrounding the Site.

#### *Potential Pathways*

11.4.31 Based upon the available information, the following are considered potential pathways:

- human health:
  - dermal contact with substances in shallow soil and/or shallow groundwater;
  - inhalation of substances in dust;

- inhalation of substances from the partitioning of vapours from soil;
- inhalation of ground gas; and
- accidental ingestion of soil/dust and/or shallow groundwater during potential groundworks.
- controlled waters:
  - vertical migration through vegetated areas into areas of permeable made ground/ shallow soil;
  - lateral and vertical migration within the made ground and superficial deposits (e.g. leaching from PFA in the unsaturated zone into shallow groundwater);
  - preferential lateral and vertical migration along former river channels, and former field drains (including granular backfilling materials);
  - lateral and vertical migration within shallow groundwater in the made ground/superficial deposits, including to deeper groundwater;
  - lateral and vertical migration within deeper groundwater in the bedrock; and
  - lateral migration within groundwater to surface water courses including the fishing ponds and River Trent.
- infrastructure –
  - direct contact of substances within shallow groundwater with offsite concrete foundations, plastic water pipes etc.; and
  - migration of ground gases and accumulation in confined spaces (e.g. basements, service ducts).
- ecology:
  - plant uptake and subsequent ingestion by fauna.

11.4.32 Environmental receptors identified for the current operation of WBA and WBB (i.e. baseline conditions) are summarised in **Table 11-12**.

**Table 11-12: Summary of baseline receptors and sensitivity**

Receptor	Sensitivity	Assumptions
On-site workers	Low	Assumes correct use of suitable PPE and compliance with site operating procedures.
Construction/excavation workers	Medium	Assumes correct use of suitable PPE, compliance with procedures minimising exposure.
Off-site residents	Low	Initial high sensitivity reduced to low based on distance from site to neighbouring residents and assuming site operations are conducted according to agreed protocols, guidance and legislation, and no spillages or releases occur.
Groundwater (Secondary A and B aquifer deposits) and surface water	Medium/High	May be reduced to medium assuming normal site operations, no spills or releases and correct operation of site drainage.
On-site and off-site flora and fauna	Medium	Assuming normal site operations with no spills or releases and adherence to site guidance and protocols during operations.

Receptor	Sensitivity	Assumptions
Onsite infrastructure	Low	Assuming appropriate mitigation measures are in place during excavation.

### Future Baseline

- 11.4.33 In the event that the Proposed Development does not proceed, no significant changes to the existing baseline assumed for the Proposed Development are anticipated.

## 11.5 Development Design and Impact Avoidance

- 11.5.1 The following impact avoidance measures would either be incorporated into the design or are standard demolition/construction and operational practices. These measures have therefore been taken into account during the impact assessment in **Section 11.6**. Any need for additional mitigation measures are described, where necessary, in **Section 11.7**.

### Construction

- 11.5.2 The appointed contractor(s) would (in due course) be required to produce a Construction Environmental Management Plan (CEMP) that would provide details of proposed environmental control measures, including measures related to the protection of land quality. The CEMP would include the impact avoidance measures as outlined in this section, it would align with the framework CEMP that will be included as part of the Application for development consent for development consent.
- 11.5.3 During construction of the Proposed Development, the contractor(s) would be required to minimise adverse land contamination effects on sensitive receptors by implementing good operational practices (e.g. employing suitable surface water drainage control).
- 11.5.4 Construction workers would be protected from contact with hazardous materials by adopting appropriate health and safety measures including an assessment of appropriate measures under the Control of Substances Hazardous to Health (COSHH) Regulations 2002 (Ref 11-27). Such measures would include suitable personal protective equipment, hygiene facilities and the implementation of dust control where considered necessary.
- 11.5.5 With regards to earthworks, the contractor(s) would ensure that all material is suitable for its proposed use and would not result in an increase in contamination-related risks on identified receptors including any landscaped areas and underlying groundwater. The CEMP would include measures to ensure that all materials are suitable for the proposed end use. This may include a Materials Management Plan as an appendix, to deal with any removal of materials off-site.
- 11.5.6 The final levels of the proposed development platform may require removal of some of the existing PFA deposits present on the Site. Should the removal of PFA be required, a separate consent would be sought (from NCC), which would include a characterisation of the PFA to determine suitability for re-use.
- 11.5.7 The main potential source of oils and fuels on site is from plant and machinery. All plant and machinery would be checked regularly and, where possible, the use of drip trays would be employed, should vehicles be parked on unsurfaced areas of the Site. An emergency spillage action plan would be produced and provisions made to contain any leak/spill.
- 11.5.8 Given the historical land use within the West Burton Power Station Site, there is a potential for contamination to be encountered locally within excavations. The contractor(s) would be required to

implement pollution control measures to deal with any contaminated land encountered during the construction works. These measures would include, as a minimum, the following:

- All workers would be required to wear PPE as applicable.
- Should any potentially contaminated ground, including isolated 'hotspots' of contamination and/ or potential deposits of asbestos containing materials (ACM), be encountered during construction, the contractor(s) would be required to investigate the area and then assess whether there is a need for containment or disposal of the material. The contractor(s) would also be required to assess whether any additional health and safety measures are required. Any such investigations would be required to be undertaken in consultation with the Environment Agency and other appropriate consultees. To further minimise the risks of contaminants being mobilised and contaminating other soils or water, construction workers would be briefed as to the possibility of the presence of such materials.
- In the event that contamination is identified during construction works, appropriate remediation measures would be taken to protect construction workers, future site users, water resources, structures and services.
- The contractor(s) would be required to place arisings and temporary stockpiles away from watercourses and drainage systems, whilst surface water would be directed away from stockpiles to prevent erosion.
- The risk to surface water and groundwater from run-off from any contaminated stockpiles during construction works would be further reduced by implementing suitable measures to minimise rainwater infiltration and/or capture runoff and leachates, through use of bunding and/ or temporary drainage systems. These mitigation measures would be designed in line with current good practice, follow appropriate guidelines and all relevant licences including discharge consents.
- Any waters removed from excavations by dewatering would be discharged appropriately, subject to the relevant licences being obtained.
- The contractor(s) would implement a dust suppression/management system in order to control the potential risk from airborne contamination migrating off-site to adjacent sites, specifically the adjacent agricultural land, surrounding villages and the River Trent.

11.5.9 Foundations and services would be designed and constructed to prevent the creation of pathways for the migration of contaminants and be constructed of materials that are suitable for the ground conditions and designed use, for example water supply pipes would be designed in accordance with current good practice and applicable guidance to ensure pipes are protected from potential impacts associated with any contamination.

11.5.10 Piling design and construction works would be completed following preparation of a piling risk assessment, completed in accordance with the Environment Agency's '*Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention*' (Ref 11-28). A piling and penetrative foundation design method statement would be submitted to and approved by the local planning authority prior to relevant works commencing; secured by a Requirement in the DCO.

11.5.11 A site-specific (Phase 2) intrusive ground investigation will be undertaken to inform the ground conditions assessment to be included in the ES, which will be submitted with the application for development consent. The scope of the intrusive ground investigation will be developed and detailed in the ES that accompanies the Application for development consent.

11.5.12 Following completion of the investigation, the need for any mitigation measures additional to the impact avoidance measures as presented above would be defined.

## Operation

- 11.5.13 Liquid fuel storage areas and transformer building areas would be appropriately bunded to ensure that, in the event of any spillage, the materials are safely contained. Most significant impacts to soil and groundwater can be avoided with good housekeeping and management practices adopted and adhered to. However, cumulative emissions of oil based materials from road vehicles are more difficult to manage. Oil/water separators would be installed as appropriate within the drainage system to reduce the likelihood of oil-based materials impacting on the environment.

## Decommissioning

- 11.5.14 During decommissioning, the contractor(s) would be required to minimise adverse land contamination effects on sensitive receptors by implementing good operational practices (e.g. the use of Personal Protective Equipment (PPE) such as dust masks if necessary, and suitable surface water drainage control).
- 11.5.15 During any earthworks operations (for example to reprofile the Site following demolition of buildings and structures, to create a platform for future development), the contractor(s) would ensure that all material is suitable for its proposed use and would not result in an increase in contamination-related risks on identified receptors including any landscaped areas. This would be controlled under a Material Management Plan as defined in the CIRIA Definition of Waste.
- 11.5.16 The contractor(s) would be required to implement pollution control measures to deal with any contaminated land encountered during the site activities. These measures would include the following:
- should any potentially contaminated ground, including isolated 'hotspots' of contamination, be encountered during demolition works, the contractor(s) would be required to investigate the area and then assess whether there is a need for containment or disposal of the material. The contractor(s) would also be required to assess whether any additional health and safety measures are required. Any such investigations would be required to be undertaken in consultation with the Environment Agency and other appropriate consultees. To further minimise the risks of contaminants being mobilised and contaminating other soils/ water during the development of the site, demolition workers would be briefed as to the possibility of the presence of such materials;
  - in the event that contamination is identified during site works, appropriate remediation measures would be undertaken to protect workers, future site users, water resources, structures and services;
  - the contractor(s) would be required to place arisings and temporary stockpiles away from watercourses and drainage systems, whilst surface water would be directed away from stockpiles to prevent erosion;
  - the risk to surface water and groundwater from run-off from any contaminated stockpiles during demolition works would be further reduced by implementing suitable measures including sealing stockpiles to prevent rainwater infiltration. Alternatively bunding and/ or temporary drainage systems would be put in place, designed in line with current good practice, following appropriate guidelines and obtaining all relevant licences including discharge consents;
  - any fuels or chemicals used during demolition phase would be stored in bunded areas with an impermeable base in accordance with Environment Agency guidelines, thereby limiting the potential for migration of contaminants into groundwater following leaks/ spillages;

- any waters resulting from dewatering would be discharged appropriately, subject to the relevant licences being obtained; and
- the contractor(s) would implement a dust suppression/management system in order to control the potential risk from airborne contamination migrating off site to adjacent sites.

## 11.6 Likely Impacts and Effects

### Construction

11.6.1 Potential impacts during the construction phase (including demolition of structures within the Site) are anticipated to include the following:

- the discovery of soils exhibiting visual and olfactory evidence of contamination during groundworks and the potential disturbance of residual soil contamination through construction activities such as the removal of existing site drainage;
- the discovery of impacted groundwater/surface water recovered during dewatering which may not be suitable for discharge (including via an outfall) without treatment;
- foundation methods and construction activities that may open and/or modify potential pollutant linkages, including the disturbance of sediments from existing drainage channels and the fishing ponds;
- re-profiling of the Site including the possible introduction of new fill materials and the removal of unsuitable or excessive materials;
- runoff from contaminated material exposed and/or stockpiled during site construction works;
- contamination arising from spillages associated with vehicles and construction materials;
- airborne contamination arising from potentially contaminated dust;
- removal of any waste materials and/or contaminated soil; and
- introduction of contaminated materials during infilling activities.

### Operation

11.6.2 Potential impacts during the operational phase are anticipated to include the following:

- leaks, spills and contamination from storage of chemicals, fuels and wastes on site affecting site users and groundwater; and
- presence of gases, vapours and groundwater in the ground affecting site users and buildings.

### Decommissioning

11.6.3 Potential impacts during the decommissioning phase are anticipated to include the following:

- generation of wastes during decommissioning of existing chemical tanks, pipework, and associated infrastructure;
- generation of crushed concrete and other demolition materials;
- the discovery of soils exhibiting visual and olfactory evidence of contamination during demolition and the potential disturbance of residual soil contamination through demolition activities such as the removal of existing site drainage;
- demolition activities that may open and/or modify potential pollutant linkages, including the disturbance of sediments;

- re-profiling of the Site including the removal of unsuitable materials;
- runoff from contaminated material exposed and/ or stockpiled during site demolition works;
- contamination arising from spillages associated with vehicles and demolition materials;
- airborne contamination arising from potentially contaminated dust;
- removal of any waste materials and/or contaminated soil; and
- introduction of contaminated materials during infilling activities.

## Effects

11.6.4 It is concluded that, with the implementation of the impact avoidance measures and best practice guidance defined within **Section 11.5**, there is a low likelihood of the identified sensitive receptors being impacted upon by the Proposed Development throughout the construction, operation and decommissioning periods, as described in **Table 11-13**.

**Table 11-13: Summary of impacts and effects**

Description of impact	Mitigating factors	Sensitivity of resource/ receptor	Magnitude of impact	Classification of effect
Construction				
Impact to construction workers from contaminated soils, sediments and groundwater/ surface water encountered during construction	PPE requirements and engineering controls to be determined following groundwater monitoring as part of the future site investigation. Depth to groundwater to be considered as part of the ES.	Medium	Low	Minor adverse (not significant)
Impact to groundwater from runoff and/ or leachates from stockpiled materials during construction	Thickness of made ground/ PFA anticipated to be high. Mitigation measures to be adopted including collection of runoff and/ or covering of stockpiles.	Medium	Low	Minor adverse (not significant)
Impact to groundwater through creation of new or exacerbation of existing pathways during construction	Potential for residual sources of contamination likely to be moderate. Additional mitigation (e.g. piling risk assessment) would further reduce hazard.	Medium	Low	Minor adverse (not significant)
Impacts to flora, fauna and agricultural land from contaminated soils encountered during construction	Contaminated soils anticipated to be restricted to the Proposed Power Plant Site, away from agricultural land.	Medium	Low	Minor adverse (not significant)

Description of impact	Mitigating factors	Sensitivity of resource/receptor	Magnitude of impact	Classification of effect
Impact to workers, offsite residents and land from potentially contaminated dusts generated during construction	Adoption of suitable mitigation measures to minimise dust generation (e.g. damping down of materials).	Medium	Low	Minor adverse (not significant)
Risks to underlying groundwater potential contamination in imported fill placed at the site.	Imported fill to be suitable for use, and subject to testing and visual inspection prior to acceptance at the Site.	Medium	Low	Minor adverse (not significant)
Operation				
Impact to groundwater from spills, leachates and runoff during site operation	All fuel and chemical storage areas to be bunded. Design of surface water drainage to include oil-water separator and sediment traps	Medium	Low	Minor adverse (not significant)
Impacts to buildings and site workers from gases, vapours and groundwater during operation	Risks to be minimised through completion of site investigation and adoption of design measures and engineering controls to minimise risks.	Low	Low	Negligible adverse (not significant)

## Rochdale Envelope

11.6.5 As set out in **Chapter 4**: The Proposed Development, there are areas for which there is currently variability in the design that could affect the assessment. The Rochdale Envelope defined for building sizes and limits of deviation for building locations do not affect this assessment and is therefore not considered further.

## 11.7 Mitigation and Enhancement Measures

11.7.1 As no significant effects have been identified, no additional mitigation measures are required in order to further reduce the potential impacts and effects from the ground conditions on the Proposed Development. Notwithstanding, following completion of a ground investigation in due course, it will be possible to refine the need for any additional design and impact avoidance measures beyond detailed in **Section 11.5**. It is envisaged that the ground investigation will be designed to provide additional information on the following:

- the depth, nature and properties of PFA and made ground deposits underlying the Site;
- the presence and extent of possible perched water within the PFA;
- the composition and nature of material in the mounds present on the Site; and

- the presence and composition of deeper groundwater within the underlying superficial deposits.

11.7.2 The scope of the ground investigation will be agreed with the Environment Agency and Bassetlaw District Council.

## 11.8 Limitations or Difficulties

### Assumptions

11.8.1 The identification of possible future receptors is based on the Proposed Development indicative concept design. Detailed method statements and/or work plans for the construction activities at the Site are not available as a contractor has not yet been appointed. However, it is considered reasonable to assume that proposed demolition/construction activities would follow industry best practice and relevant guidance and comply with current applicable legislation, and that standard construction techniques would be used.

### Limitations

11.8.2 There is little information currently available on ground conditions within the Proposed Power Plant Site, and in particular relating to the nature and extent of the PFA deposits which may be present. The absence of data for these parts of the Site is considered to represent a data gap, and there may be ground conditions or contamination present within these areas which could not be considered in the current assessment. Further site investigation will be undertaken to inform the ground conditions assessment included in the ES and also to enable the specification of appropriate mitigation and design measures to avoid significant adverse effects.

## 11.9 Residual Effects and Conclusions

Based on the information as detailed herein, the construction, operation and decommissioning activities associated with the Proposed Development would have the potential to generate a number of land contamination related adverse effects on identified receptors if appropriate impacts avoidance measures (as detailed in **Section 11.5**) are not implemented. However, as it can be assumed that the impacts avoidance measures detailed in **Section 11.5** are employed and any further mitigation measures identified following an appropriately designed ground investigation are implemented, the significance of effects related to potential geological, hydrogeological and contamination related impacts associated with the Proposed Development during the construction, operation and decommissioning periods are likely to be negligible or minor adverse(not significant).

## 11.10 References

- Ref 11-1 European Commission (2000) Water Framework Directive (2000/60/EC).
- Ref 11-2 European Parliament and Council of the European Union (2010) *Directive 2010/75/EU on industrial emissions (integrated pollution and control)*.
- Ref 11-3 European Commission (2014) *European Commission Guidance concerning baseline reports under Article 22(2) of Directive 2010/75/EU on industrial emissions*.
- Ref 11-4 European Parliament and Council of the European Union (2006) *Directive 2006/118/EC on the protection of groundwater against pollution and deterioration (Daughter to 2000/60/EC)*.
- Ref 11-5 Her Majesty's Stationary Office (1999) *Water Resources, England and Wales The Anti-Pollution Works Regulations 1999*.

- Ref 11-6 Her Majesty's Stationary Office (2010) *Environmental Protection, England and Wales The Environmental Permitting (England and Wales) Regulations 2010*.
- Ref 11-7 European Parliament and Council of the European Union (2013) *Decision 1386/2013/EU on a General Union Environment Action Programme to 2020 'Living well, within the limits of our planet'*.
- Ref 11-8 Her Majesty's Stationary Office (1990) *The Environmental Protection Act 1990*.
- Ref 11-9 Her Majesty's Stationary Office (2009) *The Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009*.
- Ref 11-10 Her Majesty's Stationary Office (1990) *The Town and Country Planning Act 1990*.
- Ref 11-11 Her Majesty's Stationary Office (1995) *The Environment Act 1995*.
- Ref 11-12 Her Majesty's Stationary Office (2001) *The Control of Pollution (Oil Storage) (England) Regulations 2001*.
- Ref 11-13 Her Majesty's Stationary Office (2015) *The Environmental Damage (Prevention and Remediation) (England) Regulations 2015*.
- Ref 11-14 Department of Energy and Climate Change (2011) Overarching National Policy Statement for Energy (EN-1). Available from: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/47854/1938-overarching-nps-for-energy-en1.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf)
- Ref 11-15 Department of Energy and Climate Change (2011) National Policy Statement for Fossil Fuel Electricity Generating Infrastructure (EN-2). Available from: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/47855/1939-nps-for-fossil-fuel-en2.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/47855/1939-nps-for-fossil-fuel-en2.pdf)
- Ref 11-16 Department of Energy and Climate Change (2011) National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/47857/1941-nps-gas-supply-oil-en4.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/47857/1941-nps-gas-supply-oil-en4.pdf)
- Ref 11-17 Department of Communities and Local Government (2012) *The National Planning Policy Framework (NPPF)*.
- Ref 11-18 Bassetlaw District Council (2011), Bassetlaw District Core Strategy & Development Policies DPD. Available at: <http://www.bassetlaw.gov.uk/media/105902/CS1AdoptedCoreStrategy.pdf>
- Ref 11-19 Bassetlaw District Council (2010) *A Sustainability Assessment of the Publication Core Strategy and Development Management Policies*.
- Ref 11-20 Her Majesty's Stationary Office (1984) *The Building Act 1984*.
- Ref 11-21 Her Majesty's Stationary Office (2000) *The Building Regulations 2000*.
- Ref 11-22 Environment Agency (2010) *GPLC1 - Guiding Principles for Land Contamination*.
- Ref 11-23 Department of the Environment, Food and Rural Affairs (2004) *Model Procedures for the Management of Contaminated Land, Contaminated Land Report 11*.
- Ref 11-24 British Geological Survey (2017) ([www.bgs.co.uk](http://www.bgs.co.uk)) accessed July 2017.

- Ref 11-25 Environmental Agency (2017)  
(<https://www.gov.uk/government/organisations/environment-agency>) accessed July 2017.
- Ref 11-26 EDF, 2013, Annual Groundwater Monitoring Report.
- Ref 11-27 Control of Substances Hazardous to Health (COSHH) Regulations, 2002.
- Ref 11-28 Environment Agency, 2001, Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention.

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## 12. Flood Risk, Hydrology and Water Resources

### 12.1 Introduction

- 12.1.1 This chapter of the Preliminary Environmental Information (PEI) Report addresses the potential effects of the Proposed Development on water resources, flood risk and drainage.
- 12.1.2 This chapter is supported by **Appendix 12A: Flood Risk Assessment (FRA)**, including a Conceptual Drainage Strategy as Annex 3 and **Appendix 12B: Water Framework Directive (WFD) Screening Assessment** provided in PEI Report Volume II. The FRA details the existing levels of flood risk associated with the Site and the surrounding area, quantifies the volume of surface water on the Site and requiring management, identifies the impacts that the Proposed Development would have upon these aspects, and suggests potential mitigation measures to reduce the impact and manage the flood risk.
- 12.1.3 An Outline Drainage Strategy for the Proposed Development (see **Appendix 12A** in PEI Report Volume II) provides guidance and information with regards to the effective and safe drainage of surface water for the Site. The final drainage design would be completed during the detailed design stage.
- 12.1.4 It should be noted that some of the potential impacts and effects relating to the hydrogeology underlying the Proposed Development are also addressed within **Chapter 11: Ground Conditions and Hydrogeology** of this PEI Report, due to the considerable overlap between the two subject areas.

### 12.2 Legislation, Planning Policy and Guidance

#### Legislative Background

##### *European Legislation*

- 12.2.1 The European Union (EU) Water Framework Directive (WFD) (2000/60/EC) (Ref.12-1) is the primary European Directive setting the context for the requirements of this chapter. The purpose of the Directive is to establish a framework for the protection and improvement of inland surface waters (rivers and lakes), transitional waters (estuaries), coastal waters and groundwater.
- 12.2.2 The Directive requires the UK to classify the current condition of key waterbodies (giving a '*status*' or '*potential*') and to set objectives to either maintain the condition, or improve it where a waterbody is failing minimum targets. Any activities or developments that could cause deterioration within a nearby waterbody, or prevent the future ability of a waterbody to reach its target status, must be mitigated so as to reduce the potential for harm and allow the aims of the WFD to be realised.

##### *National Legislation*

- 12.2.3 The Water Resources Act 1991 (as amended) (Ref.12-2) sets out the relevant regulatory controls that provide protection to waterbodies and water resources (from abstraction pressures and pollution).
- 12.2.4 Other relevant national legislation which set out requirements related to control and protection of water resources and flood risk management includes:
- The Flood and Water Management Act 2010 (FWMA) (Ref.12-3) – see paragraph 12.2.6 and paragraph 12.2.7;

- The Water Act 2003 (Ref.12-4) and 2014 (Ref.12-5) governing the control of water abstraction, discharge to water bodies, water impoundment, conservation and drought provision;
- The Environment Act 1995 (Ref.12-6) which established the Environment Agency and its statutory role in water resource protection;
- The Environmental Protection Act 1990 (Ref.12-7) which provides for integrated pollution control; and
- The Land Drainage Act 1991 (Ref.12-8) which provides for drainage management related to non-main rivers.

12.2.5 A number of specific regulations have been enacted to implement the statutory European and national legislation into UK law - these regulations include:

- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 (Ref.12-9). These Regulations are important to the assessment within this chapter as they set the WFD environment quality standards that need to be met and maintained in UK waterbodies;
- The Water Environment (WFD) Regulations 2015 (Ref.12-10);
- The Water Framework Directive (Standards and Classification) Directions 2015 (Ref.12-11);
- The Anti-Pollution Works Regulations 1999 (Ref.12-12);
- The Control of Pollution (Oil Storage) (England) Regulations 2001 (Ref.12-13);
- The Groundwater Regulations (England and Wales) 2009 (Ref.12-14);
- The Environmental Damage Regulations 2009 (Ref.12-15);
- The Flood Risk Regulations 2009 (Ref.12-16);
- The Water Resources Act (Amendment) (England and Wales) Regulations 2009 (Ref.12-17);
- The Environmental Permitting (England and Wales) Regulations 2010 (Ref.12-18), which control discharge of water to surface water and groundwater; and
- The Water Supply (Water Quality) Regulations 2010 (Ref.12-19).

12.2.6 The FWMA, enacted by Government in 2010 in response to The Pitt Review (Ref.12-20) designated unitary authorities, such as Nottinghamshire County Council (NCC), as Lead Local Flood Authorities (LLFAs). As a LLFA, NCC has responsibilities to lead and co-ordinate local flood risk management. Local flood risk is defined as the risk of flooding from surface water runoff, groundwater and ditches and watercourses (collectively known as ordinary watercourses).

12.2.7 The FWMA also formalises the flood risk management roles and responsibilities for other organisations including the Environment Agency, water companies and highways authorities establishing them as Risk Management Authorities (RMAs). The responsibility to lead and co-ordinate the management of tidal and fluvial flood risk remains that of the Environment Agency.

## Planning Policy Context

### *National Planning Policy*

12.2.8 The Overarching National Policy Statement (NPS) for Energy (EN-1) Section 5.7 (Flood Risk) (Ref.12-21) details that projects of 1 hectare (ha) or greater in Flood Zone 1 in England and all proposals for energy projects located in Flood Zones 2 and 3 in England should be accompanied by an FRA. The requirements for FRAs are that they should:

- be proportionate to the risk and appropriate to the scale, nature and location of the project;

- consider the risk of flooding arising from the project in addition to the risk of flooding to the project;
- take the impacts of climate change into account, clearly stating the development lifetime over which the assessment has been made;
- be undertaken by competent people, as early as possible in the process of preparing the proposal;
- consider both the potential adverse and beneficial effects of flood risk management infrastructure, including raised defences, flow channels, flood storage areas and other artificial features, together with the consequences of their failure;
- consider the vulnerability of those using the Site, including arrangements for safe access;
- consider and quantify the different types of flooding (whether from natural and human sources and including joint and cumulative effects) and identify flood risk reduction measures, so that assessments are fit for the purpose of the decisions being made;
- consider the effects of a range of flooding events including extreme events on people, property, the natural and historic environment and river and coastal processes;
- include the assessment of the remaining (known as 'residual') risk after risk reduction measures have been taken into account and demonstrate that this is acceptable for the particular project;
- consider how the ability of water to soak into the ground may change with development, along with how the proposed layout of the project may affect drainage systems;
- consider if there is a need to be safe and remain operational during a worst-case flood event over the development's lifetime; and
- be supported by appropriate data and information, including historical information on previous events.

12.2.9 In determining an application for development consent, the Secretary of State should be satisfied that where relevant:

- the application is supported by an appropriate FRA;
- the Sequential Test has been applied as part of site selection;
- a sequential approach has been applied at the site level to minimise risk by directing the most vulnerable uses to areas of lowest flood risk;
- the proposal is in line with any relevant national and local flood risk management strategy;
- priority has been given to the use of sustainable drainage systems (SuDs); and
- in flood risk areas the project is appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed over the lifetime of the development.

12.2.10 Section 5.15 of NPS EN-1 details that where the project is likely to have effects on the water environment, the applicant for development consent should undertake an assessment of the existing status of, and impacts of the proposed project on, water quality, water resources and physical characteristics of the water environment as part of the Environmental Statement or equivalent.

12.2.11 The Environmental Statement should in particular describe:

- The existing quality of waters affected by the proposed project and the impacts of the proposed project on water quality, noting any relevant existing discharges, proposed new discharges and proposed changes to discharges:

- Existing water resources affected by the proposed project and the impacts of the proposed project on water resources, noting any relevant existing abstraction rates, proposed new abstraction rates and proposed changes to abstraction rates (including any impact on or use of mains supplies and reference to Catchment Abstraction Management Strategies).
- Existing physical characteristics of the water environment (including quantity and dynamics of flow) affected by the proposed project and any impact of physical modifications to these characteristics.
- Any impacts of the proposed project on waterbodies or protected areas under the Water Framework Directive and source protection zones (SPZs) around potable groundwater abstractions.

12.2.12 NPA EN-2 (Ref.12-22) on Fossil Fuel Electricity Generating Infrastructure (NPS EN-2) states that where a project is likely to have effects on water quality or resources the applicant for development consent should undertake an assessment which should particularly demonstrate that appropriate measures will be put in place to avoid or minimise adverse impacts of abstraction and discharge of cooling water. The applicant for development consent should demonstrate measures to minimise adverse impacts on water quality and resources.

12.2.13 **Table 12-1** provides a summary of relevant NPS advice regarding water quality and resources, including signposting to where matters are addressed in this chapter.

**Table 12-1: Summary of NPS advice on Water Resources**

Summary of NPS	Consideration within the Chapter
<b>NPS EN-1</b>	
<p>Paragraph 5.15.2 states: <i>“Where the project is likely to have effects on the water environment, the applicant should undertake an assessment of the existing status of, and impacts of the proposed project on, water quality, water resources and physical characteristics of the water environment as part of the ES or equivalent.”</i></p>	<p>This chapter (Chapter 12) of the PEI Report considers the existing status of, and impacts of the Proposed Development on water quality, water resources and physical characteristics of the water environment.</p>
<p>Paragraph 5.15.3 states: <i>“The ES should in particular describe:</i></p> <ul style="list-style-type: none"> <li>- <i>the existing quality of waters affected by the proposed project and the impacts of the proposed project on water quality, noting any relevant existing discharges, proposed new discharges and proposed changes to discharges;</i></li> <li>- <i>existing water resources affected by the proposed project and the impacts of the proposed project on water resources, noting any relevant existing abstraction rates, proposed new abstraction rates and proposed changes to abstraction rates (including any impact on or use of mains supplies and reference to Catchment Abstraction Management Strategies);</i></li> <li>- <i>Existing physical characteristics of the water environment (including quantity and dynamics of flow) affected by the proposed</i></li> </ul>	<p>Baseline conditions describing the existing quality of waters (including discharges), water resources (including abstractions), and existing physical characteristics of the water environment have been presented in <b>Section 12.4</b>.</p> <p>The likely impacts and effects of the Proposed Development are assessed in <b>Section 12.6</b></p>

Summary of NPS	Consideration within the Chapter
<p><i>project and any impact of physical modifications to these characteristics; and</i></p> <ul style="list-style-type: none"> <li>- <i>Any impacts of the proposed project on water bodies or protected areas under the Water Framework Directive and source protection zones (SPZs) around potable groundwater abstractions.</i></li> </ul>	
<b>NPS EN-2</b>	
<p>Paragraph 2.10.2 states: “<i>Where the project is likely to have effects on water quality or resources the applicant should undertake an assessment as required in EN-1 Section 5.15. The assessment should particularly demonstrate that appropriate measures will be put in place to avoid or minimise adverse impacts of abstraction and discharge of cooling.</i>”</p>	<p>An assessment of the effects on water quality and water resources is included within the chapter (Chapter 12) of the PEI Report and will be refined within the final ES as necessary.</p> <p>Mitigation of construction and operational impacts is discussed in <b>Section 12.5</b>.</p>

- 12.2.14 The National Planning Policy Framework (NPPF) (Ref.12-23) outlines the Government’s economic, environmental and social planning policies for England.
- 12.2.15 On 6th March 2014 the National Planning Practice Guidance (NPPG) web-based resource was launched (Ref.12-26) which includes greater emphasis on issuing more robust guidance with regards to flood risk. The purpose of the new online national planning guidance is to give simplicity and clarity to the planning system.
- 12.2.16 The NPPG contains guidance in relation to water supply, wastewater and water quality, and flood risk management. It also provides advice and information on how planning can and should protect water quality; ensure the delivery of adequate water and wastewater infrastructure for new development and ensure development is protected from flood risk, and does not increase flood risk elsewhere.
- 12.2.17 The Non-statutory Technical Standards for Sustainable Drainage Systems (Ref.12-27) was published in March 2015 and is the current guidance for the design, maintenance and operation of Sustainable Drainage Systems (SuDS). The standards set out that the peak runoff rates should be as close as is reasonably practicable to the greenfield rate, but should never exceed the pre-development runoff rate.
- 12.2.18 The standards also set out that the drainage system should be designed so that flooding does not occur on any part of a development site for a 1 in 30 year rainfall event, and that no flooding of a building (including basement) would occur during a 1 in 100 year rainfall event.
- 12.2.19 It is also noted within the standards that pumping should only be used when it is not reasonably practicable to discharge by gravity.
- 12.2.20 The East Inshore and East Offshore Marine Plans (Ref.12-28) are guidance documents for developers to ensure the sustainable development of the marine area and protection of the marine ecosystem. These plans have been published in line with the Marine Policy Statement (Ref.12-29) and NPPF.
- 12.2.21 The East Inshore Marine Plan area includes the coastline stretching from Flamborough Head to Felixstowe, extending out to the seaward limit of the territorial sea (approximately 12 nautical miles), and the waters of any estuary, river or channel, so far as the mean high water spring tidal

limit. This includes the tidal limits for the Humber Estuary, which incorporates areas of Bassetlaw District. The locations of both options for the proposed surface water outfall point are located within the tidal reach of the River Trent.

### Local Planning Policy

12.2.22 The Core Strategy and Development Management Policies DPD (Ref.12-30) was adopted by Bassetlaw District Council (BDC) in December 2011 and forms part of its Local Plan. The Core Strategy is the key Local Development Framework document that sets out a vision for change in Bassetlaw along with the place-specific policy approaches to be taken in order to achieve this vision over a period of 18 years. A small number of more detailed development management policies, are also included. Relevant district wide policies include:

- Policy DM10: Renewable and Low Carbon Energy:
  - *“The Council will be supportive of proposals that seek to utilise renewable and low carbon energy to minimise CO2 emissions. Proposal for renewable and low carbon energy infrastructure will also need to demonstrate that they... iv. Will not result in unacceptable impacts in terms of visual appearance, noise, shadow flicker, watercourse engineering and hydrological impacts, pollution, or traffic generation”;*
- Policy DM12: Flood Risk, Sewerage and Drainage:
  - *“Part A – Flood Risk: Proposals for development of new units in Flood Zones 2, 3a and 3b that are not defined by national planning guidance as being suitable for these zones will not be supported while development sites remain available in sequentially superior locations across the District. Reference should be made to the Council’s Strategic Flood Risk Assessment when making assessments about likely suitability. Site specific Flood Risk Assessments will be required for all developments in flood risk areas, even where flood defences exist, as defined on the Proposals Map.*
  - *Part B – Sewerage and Drainage: Proposals for new development in... vi. North Wheatley,... ix. South Wheatley and x. Sturton-le-Steeple will only be supported where it is demonstrated to the Council’s satisfaction that the proposed development will not exacerbate existing land drainage and sewerage problems in these areas. All new development will be required to incorporate Sustainable Drainage Systems (SuDS) and provide details of adoption, ongoing maintenance and management. Proposals will be required to provide reasoned justification for not using SuDS techniques, where ground conditions and other key factors show them to be technically feasible.”*

### Internal Drainage Board (IDB) Byelaws

12.2.23 Internal Drainage Boards (IDBs) are responsible for managing water levels in the watercourses designated to each IDB and work in partnership with other authorities to actively manage and reduce the risk of flooding within the Board’s district. They have permissive powers under the Land Drainage Act 1991 (as amended by the 1994 Act) to undertake maintenance on any watercourse within their district other than ‘Main Rivers’ and to supervise all matters relating to the drainage of land within their districts. Permissive powers means that IDBs are permitted to undertake works on ordinary watercourses but the responsibility remains with the riparian owner<sup>1</sup> as the IDBs are not obligated. IDBs can undertake works on watercourses outside their drainage district in order to benefit the district. IDBs may make byelaws, approved by the relevant Minister, for securing the efficient working of the drainage systems.

12.2.24 The Trent Valley IDB operates in the flood risk study area for the Proposed Development. Any developer working in an IDB area should review the following byelaws (Ref.12-31):

<sup>1</sup> The responsibility for managing and maintaining ordinary watercourses falls to riparian owners who typically own land on either bank and therefore are deemed to own the land to the centre of the watercourse. NYCC, as the LLFA, has permissive powers to manage the risk of flooding arising from the watercourses through engagement with riparian owners and enforcing maintenance responsibilities in accordance with the Land Drainage Act 1991, <http://www.legislation.gov.uk/ukpga/1991/59/contents>

- Byelaw 3: Control of introduction of water and increase in flow or volume of water;
- Byelaw 4: Control of sluices etc.;
- Byelaw 6: Diversion or stopping up of watercourses;
- Byelaw 10: No obstructions within 9m (7m for the Selby Area IDB) of the edge of the watercourse;
- Byelaw 17: Fences, excavations, pipes etc.; and
- Byelaw 18: Interference with Sluices.

## Other Guidance

### *Environment Agency Pollution Prevention Guidance Notes*

12.2.25 The Environment Agency Pollution Prevention Guidance (PPG) Notes provide advice on statutory responsibilities and good environmental practice. Although the PPGNs have been revoked they still provide relevant guidance. The Guidance Notes of particular relevance to the Proposed Development include:

- PPG 1 – General Guide to the Prevention of Pollution (Ref.12-32) provides an introduction to the prevention of pollution from a variety of sources.
- PPG2 – Above Ground Oil Storage Tanks (Ref.12-33) offers advice on storage options, equipment and its maintenance and how to deal with spills.
- PPG3 – Use and Design of Oil Separators in Surface Water Drainage Systems (Ref.12-34) provides guidance on when oil separators are appropriate and what size and type of separator are required.
- PPG4 – Disposal of Sewage Where No Mains Drainage is Available (Ref.12-35) offers advice if connection to the local sewage network is not possible and offers guidance on alternative means of wastewater disposal.
- PPG5 – Works In, Near To, or Liable To Affect Watercourses (Ref.12-36) provides guidance on general precautions to take when working in the vicinity of, or immediately upstream of the site, to as far downstream as a potential impact may influence the quality or quantity of the watercourse.
- PPG6 – Working at Construction or Demolition Sites (Ref.12-37) repeats much of what PPG5 presents but concentrates specifically on the situations likely to occur at demolition and construction sites.
- PPG7 – Refuelling Activities (Ref.12-38), provides information on the correct delivery, storage and dispensing of fuel to help reduce the risk.
- PPG 13 – Vehicle Washing and Cleaning (Ref.12-39).
- PPG 18 – Managing Fire Water and Major Spillages (Ref.12-40).
- PPG 21 – Pollution Incident Response Planning (Ref.12-41) contains advice for those developing site specific pollution incident response plans to help prevent and mitigate damage to the environment caused by accidents such as spillage and fire.

### *Construction Industry Research and Information Association (CIRIA) Guidance*

12.2.26 The CIRIA guidance of relevance to the Proposed Development includes:

- Guidance C532 - Control of Water Pollution from Construction Sites (Ref.12-42) brings together the Environment Agency guidance but goes into greater detail with regard to sources

of water on construction sites, pollutants and pathways. In addition, it provides guidance on planning for the type and location of suitable control measures.

- Guidance C753 - The SuDS Manual (Ref.12-43) provides best practice guidance on the planning, design, construction, operation and maintenance of SuDS to facilitate their effective implementation within developments.

## 12.3 Assessment Methodology and Significance Criteria

### Consultation

12.3.1 **Table 12-2** summarises the consultation responses of relevance to water resources and flooding received as a result of scoping the assessment (see Scoping Opinion (PEI Report Volume II, **Appendix 26**) (7.6.17)).

**Table 12-2: Consultation summary table**

Consultee	Date (method of consultation)	Summary of Consultee comments	Summary of Response/ how comments have been addressed
Environment Agency	See Scoping Opinion (7.6.17)	Before the commencement of the site specific flood risk assessment it would be advisable to submit a product 4 data request to the Environment Agency.	A Product 4 has been received from the Environment Agency and has been assessed within the supporting FRA - <b>Appendix 12A</b> (PEI Report Volume II).
		Given the proximity of parts of the site to the tidal flood defences of the River Trent the FRA should contain site specific breach analysis details.	Flood risk from all potential sources has been assessed within the supporting FRA - <b>Appendix 12A</b> (PEI Report Volume II) which also details relevant mitigation.
		The FRA should include an assessment of flooding from all potential sources of flooding detailing relevant mitigation.	
		FRA should address the increase in impermeable areas within the site and the effect on surface water runoff including relevant mitigation measures.	A conceptual drainage strategy is provided within the supporting FRA <b>Appendix 12A</b> (PEI Report Volume II).
		Dependent on the construction of the outfalls then you may also need to apply for a flood risk permit.	Referenced in <b>Section 12.5</b> of this chapter.

Consultee	Date (method of consultation)	Summary of Consultee comments	Summary of Response/ how comments have been addressed
Marine Management Organisation	See Scoping Opinion (7.6.17)	The ES should fully assess the potential impacts of the Project on flood risk, hydrogeology and water resources, with proposed mitigation measures included where necessary. Additionally, should any flood defence work be required, the MMO should be notified and details of this fully presented within the ES, including works methodology, alongside a robust assessment of impacts and any associated mitigation measures. Details of this would also need to be captured within the DML	The potential impacts on the River Trent and a summary of the mitigation measures is included within this chapter.  Flood risk has been assessed within the supporting FRA - <b>Appendix 12A</b> (including a Conceptual Drainage Strategy) (PEI Report Volume II).
Trent Valley IDB	See Scoping Opinion (7.6.17)	Trent Valley IDB advise that the Board's watercourses are protected by byelaws if any of the Proposed Development proposals are within 9m of a Board maintained watercourse the Board's consent will be required	IDB byelaws are outlined in <b>Section 12.5</b> .
Canals and Rivers Trust	See Scoping Opinion (7.6.17)	The Canals and Rivers Trust advise any surface water outfalls to the River Trent as may be identified as being required so that flow rates of the discharges can be agreed and ensure that their location and means of construction do not impede navigation on the river or otherwise raise any navigational safety issues. Any need for such outfalls and any measures required to maintain safe navigation should be fully addressed within the EIA.	Relates to the surface water outfall options only. Mitigation measures at this stage, should the surface water outfall option be progressed, are outlined in <b>Section 12.5</b> and would evolve as the design progresses. Not applicable to the surface water drainage system should it discharge to the existing power station drainage network.

## Assessment Methods

- 12.3.2 There is no standard methodology for assessing the magnitude of impacts and significance of effects of developments on the water environment. Each project is evaluated according to its individual characteristics. A methodology for assessing the significance of any effect has therefore been developed for projects throughout the UK, based on relevant legislation.
- 12.3.3 The assessment criteria used in this chapter are based on the web-based DETR (Department of the Environment, Transport and the Regions) document 'Transport Analysis Guidance' (known as WebTAG) Unit 3.3.11 (Ref.12-44). This methodology provides an appraisal framework for taking the outputs of the environmental impact process and analysing the key information of relevance to the water environment. Although this guidance is intended for transport studies, it is commonly used for water resources impact assessment for other types of infrastructure, and is considered suitable for application to other development schemes (including the Proposed Development) in the absence of other suitable guidance.
- 12.3.4 For the purpose of this assessment, a number of modifications to the WebTAG criteria have been made to address relevant legislation (notably the WFD). These modifications are based on other more recent guidance, where appropriate (e.g. The Design Manual for Roads and Bridges (DMRB) (Ref.12-45)) and professional judgement.

## Significance Criteria

- 12.3.5 The WebTAG methodology takes into account the importance and magnitude of predicted impacts on the water environment. Importance is based on the value of the feature or resource (see **Table 12-3**), while the magnitude of a potential impact is estimated based on the degree of impact and is independent of the importance of the feature (see **Table 12-4**).
- 12.3.6 The basic approach to assessing the impacts of the Proposed Development on water receptors is to consider how sensitive the receptors may be to changes in surface water or groundwater conditions, including flows and water quality. The indicators used in making a professional judgement on the importance of a water feature under consideration include quality, scale, rarity and substitutability where:
- quality is a measure of the physical condition of the attribute;
  - scale requires consideration of the geographical scale at which the attribute matters to both policy makers and stakeholders, at all levels;
  - rarity requires consideration of whether the water feature is commonplace or scarce, at the scale at which it matters; and
  - substitutability requires consideration of whether water attributes are replaceable over a given time frame.

**Table 12-3: Importance of water feature or resource (modified from WebTAG Unit 3.3.11)**

Importance	Criteria	Examples
Very high	Attribute with a high quality and rarity, regional or national scale and limited potential for substitution.	<p><b>Water resources:</b> Watercourse having a WFD classification as shown in a River Basin Management Plan (RBMP) and <math>Q95 \geq 1.0\text{m}^3/\text{s}</math>  Source Protection Zone (SPZ) 1 within a Principal Aquifer</p> <p><b>Water abstraction:</b> <math>&gt;1,000\text{m}^3/\text{day}</math></p> <p><b>Receptors to flood risk:</b> essential infrastructure or highly vulnerable development*</p>

Importance	Criteria	Examples
High	Attribute with a high quality and rarity, local scale and limited potential for substitution or attribute with a medium quality and rarity, regional or national scale and limited potential for substitution.	<b>Water resources:</b> Watercourse having a WFD classification as shown in a RBMP, and Q95 < 1.0m <sup>3</sup> /s Principal Aquifer (not within SPZ 1) [Cyprinid or Salmonid fishery] <b>Water abstraction:</b> 500-1,000m <sup>3</sup> /day <b>Receptors to flood risk:</b> more vulnerable development*
Medium	Attribute with a medium quality and rarity, local scale and limited potential for substitution or attribute with a low quality and rarity, regional or national scale and limited potential for substitution.	<b>Water resources:</b> Watercourse detailed in the Digital River Network** but not having a WFD classification as shown in a RBMP; Secondary Aquifer <b>Water abstraction:</b> 50-499m <sup>3</sup> /day <b>Receptors to flood risk:</b> less vulnerable development*
Low	Attribute with a low quality and rarity, local scale and limited potential for substitution.	<b>Water resources:</b> Surface water sewer, agricultural drainage ditch; non-aquifer <b>Water abstraction:</b> <50m <sup>3</sup> /day <b>Receptors to flood risk:</b> water compatible development*

\* As defined in Table 2 of the Flood Risk section of the PPG (Department for Communities and Local Government, 2014)

\*\* Digital River Network is a dataset that comprises river centrelines which has been digitised from OS 1:50,000 mapping. It consists of rivers; canals; surface pipes (man-made channels for transporting water such as aqueducts and leats); and miscellaneous channels (including estuary and lake centrelines and some underground channels).

### Magnitude of Impacts

- 12.3.7 Impacts may be adverse or beneficial, depending on the circumstances. Impacts are quantified where practicable and the degree or magnitude of impact is assessed on a qualitative scale, to facilitate comparison with impacts on other environmental receptors, which is further described in **Table 12-4**.
- 12.3.8 For an impact on water quality to exist, it is necessary for a pollution linkage to be identified whereby a source of pollution, a sensitive receptor to that pollution and a pathway by which the two are linked is demonstrated to exist (Source-Pathway-Receptor model). This model identifies the potential sources or 'causes' of impact as well as the receptors (water resources) that could potentially be affected. However, the presence of a potential impact source and a potential receptor does not always infer an impact, as there needs to be a clear mechanism or 'pathway' via which the source can have an effect on the receptor. For example, sewer flooding does not necessarily increase the risk of flooding unless the sewer is local to the Site and ground levels encourage surcharged water to accumulate.
- 12.3.9 The first stage in applying the Source-Pathway-Receptor model is to identify the causes or 'sources' of potential impact from a development. The impact sources have been identified through a review of the details of the Proposed Development, including the size and nature of the development, potential construction methodologies and timescales. This has been undertaken in the context of local conditions relative to water resources near the application site, such as topography, geology, climatic conditions and potential sources of contamination.
- 12.3.10 The next step in the model is to undertake a review of the potential receptors, that is, the water resources themselves that have the potential to be affected. The identification of potential water resource receptors has been undertaken through:

- a review of baseline data in consultation with the Environment Agency; and
- a walkover survey of the Site.

12.3.11 The last stage of the model is, therefore, to determine if there is a viable exposure pathway or a 'mechanism' linking the source to the receptor. The identification of sources and receptors is set out in the baseline section below and pathways are identified in the impact and effect section which highlights potential pathways that may lead to an impact on water quality.

**Table 12-4: Magnitude of potential impacts**

Magnitude	Impact	Description
High	Adverse: loss of an attribute and/or quality and integrity of an attribute	Decrease in surface water ecological or chemical WFD status or groundwater qualitative or quantitative WFD status. Change in flood risk to receptor from low or medium to high risk.
	Beneficial: creation of new attribute or major improvement in quality of an attribute	Increase in productivity or size of fishery; increase in surface water ecological or chemical WFD status; increase in groundwater quantitative or qualitative WFD status. Change in flood risk to receptor from high to low.
Medium	Adverse: loss of part of an attribute or decrease in integrity of an attribute	Measurable decrease in surface water ecological or chemical quality, or flow; reversible change in the yield or quality of an aquifer; such that existing users are affected, but not changing any WFD status. Change in flood risk to receptor from low to medium.
	Beneficial: moderate improvement in quality of an attribute	Measurable increase in surface water quality or in the yield or quality of aquifer benefiting existing users but not changing any WFD status. Change in flood risk to receptor from medium to low.
Low	Adverse: some measurable change to the integrity of an attribute	Measurable decrease in surface water ecological or chemical quality, or flow; decrease in yield or quality of aquifer; not affecting existing users or changing any WFD status. Change in flood risk to receptor from no risk to low risk.
	Beneficial: measurable increase, or reduced risk of negative effect to an attribute	Measurable increase in surface water ecological or chemical quality; increase in yield or quality of aquifer not affecting existing users or changing any WFD status. Change in flood risk to receptor from low risk to no risk.
Very low	No change to integrity of attribute	Negligible change discharges to watercourse or changes to an aquifer which lead to no change in the attribute's integrity.

12.3.12 In the context of the Proposed Development, short-term effects are considered to be those associated with the construction and decommissioning phases and which cease when construction or decommissioning works are completed; long-term effects are those associated with the completed, operational Proposed Development and which last for the duration of the operational phase. Effects may also be permanent (irreversible) or temporary (reversible) and direct or indirect.

12.3.13 Effects on areas on the scale of the Nottinghamshire or Lincolnshire County or Bassetlaw or West Lindsey District (or similar scale, across local authority boundaries) are considered to be at a regional level, whilst effects that cover different parts of the country, or England as a whole, are considered being at a national level. Smaller scale effects (to the Site or neighbouring sites) are considered to be at a local level.

**Significance of Effects**

12.3.14 The following significance categories have been used for both potential and residual effects:

- Neutral: effects to a water resource receptor that are neither advantageous or detrimental;
- Beneficial: a beneficial/ positive effect on the quality of a water resource receptor; or
- Adverse: a detrimental/ negative effect on the quality of a water resources receptor.

12.3.15 When an effect is considered to be beneficial or adverse, the following levels of significance are stated, as shown in **Table 12-5**:

- Negligible: imperceptible effects to a water resources receptor;
- Minor: a limited, very short or highly localised effect on a water resource of high or medium importance, or a wide extent or long duration effect on a water resource of low quality/importance. A minor effect would not prevent compliance with legislation, water quality standards or policy;
- Moderate: a local scale medium magnitude of change on a water resource of high quality; or a large (reversible) effect on a water resource of medium quality/importance. A moderate effect would not affect the long term status of a waterbody under the WFD; and
- Major: a magnitude of change on a water resource of high quality/importance resulting in a deterioration of waterbody status; preventing WFD objectives or compliance with other legislation being met.

12.3.16 The significance of a potential effect is derived by considering both the importance of the feature and the magnitude of the impact, using a matrix as illustrated in **Table 12-5**.

**Table 12-5: Classification of Effects**

Magnitude of impact	Sensitivity/ importance of receptor			
	Very High	High	Medium	Low
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Very low	Minor	Negligible	Negligible	Negligible

12.3.17 In line with other EIA disciplines, this chapter considers that major or moderate effects are deemed to be significant.

## 12.4 Baseline Conditions

### Extent of Study Area

- 12.4.1 The Site encompasses the land required for the construction and operation of the Proposed Development and associated connections including: cooling water connections, surface water abstraction connections, electrical connection, and the gas pipeline route. The Site is located on the banks of the River Trent, and comprises an area of grassland to the north of West Burton B (WBB) Power Station which was formerly a Pulverised Fuel Ash (PFA) disposal site (see **Figure 3.1** in PEI Report Volume III).
- 12.4.2 This assessment considers water bodies that are hydrologically connected with the Site, based on available data. The main watercourses in the vicinity of the Site include the River Trent, Wheatley Beck and Catchwater Drain. The assessment considers watercourses within an area spanning from immediately upstream of the Site, to as far downstream as a potential impact may influence the quality or quantity of the watercourse.
- 12.4.3 The study area for consideration of potential impacts on groundwater is larger than the surface water study area, in order to consider potential impacts on the aquifer.

### Sources of Information/Data

- 12.4.4 In order to identify and characterise the surface water and groundwater receptors considered as part of this assessment, available data on surface water and groundwater quality and quantity within the vicinity of the Site have been obtained. A number of sources of information and websites have been consulted, including:
- Ordnance Survey maps;
  - Multi-Agency Geographical Information for the Countryside (MAGIC) website (Ref. 12-46);
  - Environment Agency website (Ref. 12-47);
  - Humber River Basin Management Plan (RBMP) (Ref. 12-48);
  - Groundsure Report (available on request);
  - The Environment Agency was consulted and provided data on water, uses of groundwater, surface water features (potable water sources, fisheries, consented discharges etc.), groundwater quality and RBMP status and objectives;
  - BDC Strategic Flood Risk Assessment (Ref. 12-49);
  - Nottinghamshire County Council (NCC) Preliminary Flood Risk Assessment (Ref. 12-50);
  - A walkover of the study area by ecologists and land contamination specialists (undertaken in Spring/Summer 2017) to identify, locate and describe water resource receptors. Further information is outlined in **Chapter 9: Ecology and Nature Conservation** and **Chapter 11: Ground Conditions and Hydrogeology**.

### Existing Baseline

#### Topography

- 12.4.5 According to a recent topographical survey of Site (Ref. 12-51), the ground level varies from a low point of 2.6m Above Ordnance Datum (AOD) within the southern outfall option area, to a high point of 16.2m AOD on a raised mound at the northern end of the proposed power plant site area. The majority of the Site lies between 10m AOD - 14m AOD, including the proposed power plant site area, the electricity connection route, and the western two-thirds of the construction laydown area. The lowest areas of the Site include the northern and southern outfall corridors, which lie between

3.5–7.0m AOD, the eastern extent of the construction laydown area, which lies between 7.0–8.0m AOD and the rail offloading area, which lies between 8.0-9.0m AOD.

- 12.4.6 A notable steep ridge is present immediately to the east of the proposed power plant site and the electricity connection route, where ground descends from a plateau at approximately 12m AOD to approximately 3 m AOD, over a short distance.

### *Drainage*

- 12.4.7 The Site comprises predominantly undeveloped land that drains via natural processes of overland flow and infiltration to ground.
- 12.4.8 Areas of the Site where hardstanding is located (such as the existing gas reception facility used by and located within the WBB power station and the 400kV substation within the WBB power station site) would continue to drain to the existing surface water drainage system associated with the WBB power station.
- 12.4.9 West Burton Sewage Treatment Works (STW) is located to the edge of the Site to the east and is owned and operated by Severn Trent Water which holds the appropriate consent to discharge to the River Trent. The STW takes foul water from the West Burton A (WBA) and WBB power stations.

### *Surface Waterbodies*

- 12.4.10 The tidal stretch of the River Trent (Environment Agency Main River) lies directly adjacent to the northern and southern outfall option locations and approximately 225m to the east of the Site.
- 12.4.11 Wheatley Beck, an Ordinary Watercourse under the jurisdiction of the Trent Valley IDB, is located to the north and north-east of the Site and flows west to east and then north to south-east adjacent to the areas under consideration for ecological mitigation to the north of the Site. The watercourse forms a confluence with the River Trent approximately 165m from the north-east boundary of the Site.
- 12.4.12 Catchwater Drain, an Ordinary Watercourse under the jurisdiction of the Trent Valley IDB, flows from south-west to north-east passing to the east of Burton Round. Catchwater Drain outfalls via a pumped discharge to the River Trent approximately 415m from the eastern boundary of the WBB 400kv substation.
- 12.4.13 An un-named drain, under the jurisdiction of the Trent Valley IDB, is located to the south of the West Burton Power Station Site and flows from west to east parallel with River Road. The drain discharges to the Catchwater Drain approximately 120m upstream of the pumping station.
- 12.4.14 Railway Dyke Drain, an Ordinary Watercourse under the jurisdiction of the Trent Valley IDB, flows from south-west to north-east, parallel with railway loop. The drain is pumped, via the Wheatley Beck pumping station, into the Wheatley Beck at NGR 479434,386438.
- 12.4.15 There is a small land drain to the north of the railway loop within the coal stockpile area which flows intermittently. The drain serves the low lying area beneath a small viaduct carrying the railway tracks at the northern end of the stockpile area. The drainage system consists of a drainage sump which is emptied by the Viaduct Pump House and discharges to Wheatley Beck. The system only discharges in periods of rainfall and only drains a small area of land which has not been used for coal storage.
- 12.4.16 There is a drainage channel located around the periphery of the railway loop which drains water from the railway loop and coal stockpile area. This drainage channel discharges to the Wheatley Beck, to the north-west of the railway loop via oil interceptors.

12.4.17 The following additional surface water features have been identified within, or in close proximity to, the Site:

- reedbeds present to the south-east of the Site within West Burton Reedbed LWS. These are currently managed in late summer by cutting parts of the reedbed to maintain areas of open water;
- a small area of reedbed (approximately 500m<sup>2</sup>) adjacent to an access track in the north of the Site;
- ash lagoons located to the north-west of the Site;
- several large, longitudinal flooded former gravel pits are present to the east of the Site within West Burton Power Station Local Wildlife Site (LWS). These have steep to vertical banks and deep, clear water (over 1m deep at the margins). The waterbodies have been stocked with a range of coarse fish;
- a wet ditch is present at the base of the bank leading down to the flooded gravel pits to the east of the Site. The wetted channel is approximately 1-2m wide and 0.5m deep, with generally shallow earth banks; and
- several areas of standing open water are present within the reedbeds and wet woodland within West Burton Reedbed LWS to the south-east of the Site.

#### Surface Water Quality

12.4.18 The classification of waterbodies is reported in the 2015 cycle of the River Basin Management Plans (RBMP). The Humber RBMP (Ref. 12-48) assesses the pressures facing the water environment in the Humber river basin district and lists actions to address them. The Humber RBMP is in the second iteration of a series of six-year planning cycles and will be updated in 2021.

12.4.19 Some surface water bodies are designated as 'artificial' or 'heavily modified'. This is because they may have been created or modified for a particular use such as water supply, flood protection, navigation or urban infrastructure.

12.4.20 According to the Humber RBMP, by definition, artificial and heavily modified waterbodies are not able to achieve natural conditions. Instead the classification and objectives for these waterbodies, and the biology they represent, are measured against 'ecological potential' rather than status. For an artificial or heavily modified waterbody to achieve good ecological potential, the chemistry must be good. Chemical status is assessed by compliance with the environmental standards for chemicals that are listed in the Priority Substances Directive 2008/105/EC, which is a 'daughter' directive of the WFD. Chemical status is recorded as either 'good' or 'fail', in terms of whether the chemical status is compliant with environmental standards.

12.4.21 In addition, any modifications to the structural or physical nature of the waterbody that harm biology must only be those essential for its valid use. All other such modifications must have been altered or managed to reduce or remove their adverse impact, so that there is the potential for biology to be as close as possible to that of a similar natural waterbody. Often though, the biology will still be impacted and biological status of the waterbody may be less than good (Environment Agency, 2009b). The ecological status takes into account physio-chemical elements, biological elements, specific pollutants and hydromorphology.

#### River Trent

12.4.22 The stretch of the River Trent nearest to the Site (defined in the WFD as 'GB104028058480 - River Trent from Carlton on Trent to Laughton Drain') is classified as an artificial waterbody due to land drainage and navigation modifications.

- 12.4.23 Water quality within the stretch of the River Trent adjacent to the West Burton Power Station Site has been generally improving, reaching 'moderate' overall and ecological potential and 'good' chemical status in the 2015 cycle of the Humber RBMP process (there are five classes of ecological status; high, good, moderate, poor and bad). 'Good' ecological potential is expected to be met in 2027 and is based on the following quality elements: biological quality, general chemical and physio-chemical quality, water quality with respect to specific pollutants (synthetic and non-synthetic), and hydromorphological quality.
- 12.4.24 Based on **Table 12-3**, the River Trent is considered to be a water resource receptor of very high importance with respect to water quality.

#### Wheatley Beck

- 12.4.25 Wheatley Beck (defined in the WFD as 'GB104028058360 - Wheatley Beck Catchment (trib of Trent)') is classified as a heavily modified waterbody although no reason is provided for this designation within the WFD (Ref. 12-48). Wheatley Beck is currently classified as having 'Moderate' ecological potential and 'good' chemical status. 'Good' ecological potential is expected to be met in 2027.
- 12.4.26 Based on **Table 12-3**, Wheatley Beck is considered to be a water resource receptor of high importance with respect to water quality, as it has water quality objectives under the WFD.

#### Catchwater Drain and Associated Tributaries

- 12.4.27 Catchwater Drain (defined in the WFD as 'GB104028058350 - Catchwater Drain catchment (trib of Trent)') is classified as a heavily modified waterbody although no reason is provided for this designation within the WFD (Ref. 12-48). Catchwater Drain is classified as being of 'Moderate' ecological potential and 'good' chemical status. 'Good' ecological potential is expected to be met in 2027 (Ref. 12-48). Although the associated tributaries of Catchwater Drain have no designation under WFD, it is likely that water quality and hydrological conditions are similar to that of Catchwater Drain.
- 12.4.28 Based on **Table 12-3**, Catchwater Drain and its associated tributaries are considered to be water resource receptors of high importance with respect to water quality.

#### Railway Dyke Drain and Land Drain to North of the Site

- 12.4.29 Railway Dyke Drain, the drain to the south and the land drain to the north of the Site are not classified under the WFD and no water quality information is provided within the Humber RBMP.
- 12.4.30 Given that the watercourses are detailed in the Digital River Network but do not have a WFD classification as shown in a RBMP (**Table 12-3**), the Railway Dyke Drain, the drain to the south and the land drain are considered to be water resource receptors of medium importance.

#### Additional Identified Surface Water Features

- 12.4.31 The additional surface water features identified at paragraph 12.4.13 are not classified under the WFD and no water quality information is provided within the Humber RBMP.
- 12.4.32 Given that the surface water features are not detailed in the Digital River Network and do not have a WFD classification as shown in a RBMP (**Table 12-3**), these features are considered to be water resource receptors of low importance.
- 12.4.33 Information from the GroundSure Report indicates there are no surface water abstractions for potable water within a 2km radius of the West Burton Power Station.

- 12.4.34 There are four surface water abstractions listed within 2km of the Site operated by a number of different companies for hydraulic testing and spray irrigation. The maximum daily volume of the abstraction is in excess of 1,000m<sup>3</sup> from the River Trent, therefore the River Trent is considered to be a receptor of very high importance in relation to water supply abstractions.
- 12.4.35 Information from the GroundSure Report indicates there are eleven Licensed Discharge Consent records within a 0.5km radius of the West Burton Power Station. Of these, all but three licences are listed as 'revoked'.
- 12.4.36 The West Burton Power Station has three discharge consents, one for process effluent, one for site drainage and one relating to cooling water, which discharge directly to the River Trent or indirectly to the River Trent via Wheatley Beck.
- 12.4.37 Other discharge licences include:
- One licence for West Burton Sewage Treatment Works for sewage discharges (final/treated effluent) direct to the River Trent approximately 120m to the north of the Site;
  - One licence for West Burton Pumping Station for a sewer storm overflow indirectly to Catchwater Drain, approximately 65m to the south-west of the Site; and
  - One licence for Sturton-le-Steeple Quarry for process effluent direct to the River Trent, approximately 0.4km east of the Site.

### *Recreation*

- 12.4.38 No recreational clubs using the watercourses for recreational purposes in the area surrounding the West Burton Power Station Site have been identified.
- 12.4.39 The nearest local boating club to the Site appears to be Torksey Yacht Club, located at the junction of the Fosdyke Navigation and the River Trent, south-east of Cottam Power Station, approximately 8km south of the Site.
- 12.4.40 According to the Canal & Rivers Trust website (Ref. 12-52), the nearest fishery appears to be located to the north-east of Cottam Power Station, upstream of the Site on the River Trent, on the right bank, at Marton (approximately 365m upstream of the pumping station).
- 12.4.41 OS mapping indicates that public access to the riverside via definitive footpaths and/or bridleways is available along the River Trent, Wheatley Beck and Catchwater Drain. Given the above information, it is considered that the River Trent is a water resource of high importance with regard to recreation. As access is possible along the Wheatley Beck and Catchwater Drain, these water resources are considered to be of medium importance with regard to recreation.
- 12.4.42 There is no public access to either the Railway Dyke Drain, or the land drain to the north of the Site. Therefore, these water resources are considered to be of low importance with regard to recreation as are the other identified water features.

### *Biodiversity*

- 12.4.43 There are no international nature conservation designations within the study area (refer to **Chapter 9: Ecology and Nature Conservation**).
- 12.4.44 There is one national nature conservation designation in the search area. Lea Marsh SSSI is located approximately 1.0km north-east of the Site, and lies approximately 1.5km downstream of the Site along the River Trent. The River Trent provides connectivity between the Site and the SSSI, as the SSSI is subject to seasonal inundation from the watercourse.

- 12.4.45 There are eleven Local Wildlife Sites (LWS) within 2km of the Site. West Burton Power Station LWS lies partly within the boundary of the Site, and a further four are located within a 500m radius. Further details of the LWS are summarised in **Chapter 9: Ecology and Nature Conservation**.
- 12.4.46 The River Trent is designated under the Freshwater Fish Directive, the Nitrates Directive and the Urban Wastewater Treatment Directive. The River Trent also has ecological classification under the WFD and, therefore, is considered to be a water resource of high importance with regard to biodiversity.
- 12.4.47 Both Wheatley Beck and Catchwater Drain are designated under the Nitrates Directive and have ecological classification under the WFD and, therefore, are considered to be water resources of high importance with regards to biodiversity.
- 12.4.48 Although the remaining identified watercourses/ surface water features within the study area have no ecological classification under the WFD, a site walkover undertaken as part of the ecological baseline study (as outlined in **Chapter 9: Ecology and Nature Conservation**) identifies the study area as having potential for great crested newts, refuge habitats for otter, interest for water beetles. Given this information, these watercourses/ water features are considered to be of medium importance with regard to biodiversity.

### Geology

- 12.4.49 **Chapter 11: Ground Conditions and Hydrogeology** contains a detailed review of the geology and hydrogeology of the area. In summary, the strata at the Site from ground level down comprise:
- Made ground deposits, including a layer of Pulverised Fuel Ash (PFA) (reported in previous site investigations);
  - Superficial deposits of alluvium comprising clay, silt, sand and gravel; and
  - Bedrock comprising the Mercia Mudstone group (mudstone or dolomitic siltstone).

### Hydrogeology

- 12.4.50 The alluvium superficial deposits are classified as a Secondary A aquifer. The Environment Agency defines Secondary A aquifers as being 'permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers'.
- 12.4.51 Groundwater monitoring data taken from the Annual Groundwater Monitoring Report (produced by EDF in 2013 suggests that estimated groundwater levels may vary from 2.5m bgl close to the banks of the River Trent, to 4.1-4.3m bgl in the north of the Site; to 4.8-5.1m in the south (Ref 12-55) stated figures are approximate).
- 12.4.52 The Mercia Mudstone bedrock is classed by the Environment Agency as a Secondary (Undifferentiated) aquifer. The Environment Agency defines Secondary (Undifferentiated) aquifers as '*an aquifer where it has not been possible to attribute either category A or B to a rock type*'. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.

### Groundwater Quality

- 12.4.53 The Site is not located within a groundwater Source Protection Zone (SPZ).
- 12.4.54 WFD status for groundwater consists of two components: quantitative and chemical status. These two components result in a single final classification of Good or Poor status.

### Shallow Groundwater

- 12.4.55 The Environment Agency groundwater vulnerability mapping shows that the soils in the vicinity of the coal stockyard have been assigned a 'Minor Aquifer High' vulnerability classification. This indicates that they have been assigned a high leaching potential. Soils of a high leaching potential are considered to have little ability to attenuate diffuse source pollutants and allow liquid discharges to move rapidly into underlying strata and shallow groundwater. It is therefore likely that groundwater quality in the superficial strata in the vicinity of the Site is poor.
- 12.4.56 Using the examples presented in **Table 12-2**, the shallow groundwater is considered to be a water resource of medium importance with respect to water quality (i.e. no WFD designation and designated Secondary Aquifer).

### Deep Groundwater

- 12.4.57 The WFD status of the local groundwater (GB40402G990300 – Lower Trent Erewash – Secondary Combined) currently has Poor chemical status, but is predicted to achieve Good chemical status by 2027, and the quantitative status is currently good and is expected to remain as Good in 2027. The current overall status of the aquifer unit is Poor with the objective to meet Good overall status by 2027.
- 12.4.58 The groundwater is designated as a Drinking Water Protected Area and under the Nitrates Directive.
- 12.4.59 The Lower Trent Erewash – Secondary Combined waterbody is considered to be a water resource receptor of high importance with respect to water quality having a WFD classification as shown in the RBMP.

### Groundwater Abstractions

- 12.4.60 The Groundsure report (available on request) has not recorded any groundwater abstraction licenses within 2km of the Site.
- 12.4.61 Although the Lower Trent Erewash – Secondary Combined waterbody is not a Principal aquifer and there are no groundwater abstractions in the vicinity of the Site, the wider aquifer is designated as a Drinking Water Protected Area and therefore considered to be a water resource receptor of high importance with regard to water supply.

### Flood Risk

- 12.4.62 The importance of receptors in the context of flood risk relates to the NPPF vulnerability classification for land uses potentially affected by any changes in flood risk as a result of the Proposed Development. Potential receptors could therefore be occupiers or users of the Proposed Development itself, as well as users or occupiers of land outside of the Site boundary that could be affected by changes to flood risk resulting from the Proposed Development. The receptor importance is therefore defined independently of the sources of flood risk.
- 12.4.63 The NPPF considers the vulnerability of different forms of development to flooding and classifies proposed uses accordingly. The Proposed Development is considered as 'Essential Infrastructure' in the NPPF vulnerability classification and as such it is assigned as a receptor of very high importance. The vulnerability and hence importance of receptors elsewhere has been defined where flood risk impacts have the potential to occur.
- 12.4.64 A FRA has been undertaken to ascertain if the Site is at risk of flooding or if the Proposed Development of the Site would cause an increase in the off-site flood risk (see **Appendix 12A** – Flood Risk Assessment in PEI Report Volume II). The FRA has been prepared in accordance with

the NPPF and supporting PPG. For further information on flood risk, the FRA should be consulted, although the section below provides a summary of flood risk for the Proposed Development:

- 12.4.65 The majority of the Site is shown to be at low risk from fluvial, tidal, and artificial sources, as well as flooding from drainage infrastructure. There is considered to be a medium risk of flooding from groundwater, which would be elevated to high should below ground infrastructure be required.
- 12.4.66 If the outfall corridors were to be developed, the flood risk to these areas would be at higher risk . Given the nature of development, this could be managed to an appropriate level, however further assessment would be required.
- 12.4.67 There remains a residual low to medium risk of flooding to the Site from a breach of the flood defences and from failure or exceedance of the surface water drainage system.
- 12.4.68 The FRA (**Appendix 12A**, PEI Report Volume II) serves to demonstrate that the Proposed Development would remain safe during its lifetime and would not increase flood risk elsewhere and is, therefore, considered to be acceptable in flood risk terms.

**Summary of Baseline Conditions and Importance of Existing Resource**

- 12.4.69 Only surface watercourses in close proximity (hydraulic connectivity) to the Site and with the significant potential to be affected by the Proposed Development have been considered further within this impact assessment.
- 12.4.70 **Table 12-6** provides a summary of the importance of the waterbodies in the vicinity of the Proposed Development.

**Table 12-6: Importance of identified surface water feature/ receptor**

Water Resource	Attributes	Importance
River Trent	Water quality	Very High
	Recreation/ other uses	High
	Water supply	Very high
	Biodiversity	High
Wheatley Beck	Water quality	High
	Recreation/ other uses	Medium
	Biodiversity	High
Catchwater Drain (and associated tributaries)	Water quality	High
	Recreation/ other uses	Medium
	Biodiversity	High
Railway Dyke Drain and Land drain to north of Site	Water quality	Medium
	Recreation/ other uses	Low
	Biodiversity	Medium

Water Resource	Attributes	Importance
Additional Identified Water Features	Water quality	Low
	Recreation/ other uses	Low
	Biodiversity	Medium
Secondary A aquifer (shallow groundwater)	Groundwater vulnerability	Medium
Secondary B aquifer (deep groundwater)	Groundwater vulnerability	High
	Water supply/ abstractions	High

### Future Baseline – Pre-Construction (2019/early 2020)

12.4.71 Baseline conditions pre-construction in 2019/early 2020 are not expected to be significantly different to current baseline conditions. In respect of water quality, the WFD is driving improvements in waterbodies, but the deadline for the River Trent, Wheatley Beck and Catchwater Drain to achieve 'good' ecological and chemical potential is 2027, and it is not anticipated that significant progress will have been made by 2019/ early 2020. The future baseline (2019/early 2020) is therefore assessed to be similar to current baseline conditions.

#### Surface Water

12.4.72 In terms of water quality, the River Trent, Wheatley Beck and Catchwater Drain currently have moderate ecological potential and good chemical potential. It is expected that the water quality will improve in the future, meeting the requirements of the WFD (good ecological and chemical potential) by 2027. No substantial change is, however, expected by 2019/early 2020.

12.4.73 No substantial changes are anticipated to all other identified waterbodies by 2019/early 2020.

#### Groundwater

12.4.74 Groundwater quality of the underlying Secondary Undifferentiated Aquifer is currently 'Poor', and the waterbody has 'Good' quantitative status. It is expected that groundwater status will improve in the future, meeting the requirements of the WFD (good quantitative status and good chemical quality by 2027). No substantial change is, however, expected by 2019/early 2020.

12.4.75 No substantial changes are anticipated to Secondary A Aquifer by 2019/early 2020.

#### Flood Risk

12.4.76 It is unlikely that that there will be any substantial change in the risk of flooding from all sources by 2019/early 2020.

### Future Baseline – Operation (2027 - 2066)

12.4.77 Baseline conditions in 2027 (the target year for WFD compliance) would be moderately different to current baseline conditions as set out below.

### Surface Water

- 12.4.78 In terms of water quality, it is expected that water quality in the River Trent, Wheatley Beck and Catchwater Drain will improve, meeting the requirements of the WFD (good ecological and chemical potential) by 2027. Although water quality within the River Trent, Wheatley Beck and Catchwater Drain will have improved under this scenario, the importance of the water quality attribute will remain unchanged as the waterbodies will continue to have water quality objectives under the WFD and, it is assumed, the size of the respective river channels will remain unchanged.
- 12.4.79 No substantial changes are anticipated to all other identified waterbodies by 2027.

### Groundwater

- 12.4.80 It is expected that groundwater status will improve by 2027, meeting the requirements of the WFD (good quantitative status and good chemical quality). It is unlikely that the importance of the groundwater attributes will change as the Mercia Mudstone will continue to have water quality objectives under the WFD and will remain designated as a Secondary B Aquifer.
- 12.4.81 Water quality within the Secondary A Aquifer may have improved under this scenario however, no substantial changes are anticipated to the attributes of the Secondary A Aquifer by 2027.

### Flood Risk

- 12.4.82 Based on the Environment Agency climate change guidance (Ref. 12-53), it is likely that the peak river flow in the River Trent, Wheatley Beck and Catchwater Drain and the minor watercourses will have increased by a maximum of 30% by the year 2066, based on predictions for the Humber River Basin District. Peak rainfall intensity is also predicted to increase by a maximum of 20% across the same timescale.
- 12.4.83 The impact of climate change, as outlined above, is likely to increase the risk of flooding to the Proposed Development and the surrounding area from all sources with the predominant flood risks being tidal and surface water flooding.
- 12.4.84 Given the potential changes outlined above, the future baseline (2066) is therefore assessed as a worst-case scenario as it represents the life time of the Proposed Development.

## 12.5 Development Design and Impact Avoidance

- 12.5.1 The Proposed Development has the potential to impact on both the surface and groundwater resources in the vicinity of the Site through both quality and quantity changes (though quantitative changes are only considered here in relation to the any general changes to the quantity of a waterbody as a resource).
- 12.5.2 The surface and ground waterbodies as described above have been assessed for the likelihood of actual effects occurring as a result of the Proposed Development.

### Impact Avoidance

- 12.5.3 The following impact avoidance measures would either be incorporated into the design or are standard demolition, construction and operational practices. These measures have therefore been taken into account during the impact assessment in **Section 12.6**. Any need for additional mitigation measures as identified as a result of the impact assessment are described (where necessary) in **Section 12.7**.

### Construction

- 12.5.4 For the purposes of this assessment, it is assumed that the measures set out below would be required of any contractors undertaking construction work in relation to the Proposed Development.
- 12.5.5 As a general measure to protect ground and surface water from a range of activities associated with construction of this type, best practice would be implemented through a Construction Environmental Management Plan (CEMP), whilst the contractors undertaking the works at the Proposed Development would comply with relevant guidance during construction, including the Environment Agency PPGs and IDB byelaws. A framework CEMP will be provided with the Environmental Statement and secured through a requirement of the DCO.

### Staff Awareness/Training

- 12.5.6 The contractor(s) would ensure that Proposed Development construction personnel are fully aware of the potential impact to water resources associated with the proposed construction works and procedures to be followed in the event of an accidental pollution event occurring. This would be included in the site induction and training, with an emphasis on procedures and guidance to reduce the risk of water pollution.

### Pollution Plans

- 12.5.7 Plans to deal with accidental pollution would be included within the CEMP and signed off prior to commencement of construction. The CEMP would include specific measures to manage pollution risks during construction of the new surface water outfall (if this drainage option is progressed), which would involve works in/ near to/ in the River Trent. Works at the proposed surface water outfall location may require the use of coffer dams. Any new outflow works proposed would be undertaken in accordance with a Deemed Marine Licence (secured through the DCO).
- 12.5.8 Any necessary equipment (e.g. spillage kits) would be held on Site and all site personnel would be trained in their use. The Environment Agency would be informed immediately in the unlikely event of a suspected pollution incident.

### Storage of Materials

- 12.5.9 The CEMP would incorporate measures set out in the Environment Agency PPG. Examples of such measures include:
- placing arisings and temporary stockpiles outside of the Flood Zone 3 flood extent and away from drainage systems, and directing surface water away from stockpiles to prevent erosion;
  - containment measures would be implemented, including drip trays, bunding or double-skinned tanks of fuels and oils; all chemicals would be stored in accordance with their Control of Substances Hazardous to Health (COSHH) guidelines (Ref. 12-54), whilst spill kits would be provided in areas of fuel/ oil storage;
  - an Emergency Spillage Plan would be produced, which site staff would have read and understood;
  - the mixing and handling of materials would be undertaken in designated areas and away from surface water drains;
  - plant and machinery would be kept away from surface water bodies wherever possible and would have drip trays installed beneath oil tanks/ engines/ gearboxes and hydraulics, which would be checked and emptied regularly. Refuelling and delivery areas would be located away from surface water drains; and

- exposed ground and stockpiles would be protected as appropriate and practicable to prevent windblown migration of potential contaminants. Water suppression would be used if there is a risk of fugitive dust emissions (see also **Chapter 6: Air Quality**).

#### Discharge/Disposal of Site Runoff/Material

- 12.5.10 Plans for the discharge and/or disposal of potentially contaminated water would be agreed in advance with the Environment Agency, LCC/NCC and the IDB where appropriate, and permits obtained as required.
- 12.5.11 All foul water from any site compound (including temporary toilets) would be either tankered away to an appropriate disposal facility by a licensed waste disposal contractor, or treated on site in a septic tank. Any potentially contaminated water would be tested, and if it is not of a suitable quality, agreed disposal procedures would be followed. Construction drainage details would be developed in consultation with the Environment Agency.
- 12.5.12 As would be detailed in the CEMP, if any suspected contaminated material is discovered during the works, it would be tested and dealt with appropriately. Pre-construction sediment contamination testing would be undertaken prior to works commencing. If material is considered to be contaminated, it would be disposed of to a licensed facility (also see **Chapter 11: Ground Conditions and Hydrogeology**).
- 12.5.13 Any waters removed from excavations by dewatering would be discharged appropriately, subject to the relevant licenses being obtained.
- 12.5.14 Foundations and services would be designed and constructed to prevent the creation of pathways for the migration of contaminants and would be constructed of materials that are suitable for the ground conditions and designed use. For example, water supply pipes would be designed in accordance with current good practice and applicable guidance to ensure pipes are protected from potential impacts associated with contamination.
- 12.5.15 No discharges from any self-contained wheel wash and localised wheel wash would be permitted to discharge into any surface water system.

#### Temporary Drainage and Settlement

- 12.5.16 Temporary drainage facilities would be provided during the construction phase, where necessary, to ensure controlled discharge of surface water runoff.
- 12.5.17 It would be a contractual requirement of the contractor to ensure that runoff from the Site does not cause pollution or flooding. Measures that would be considered for implementation for temporary drainage through the construction design and/or CEMP include:
- installation of measures such as swales, silt fences and appropriately sized settlement tanks/ ponds to reduce sediment load;
  - cut-off ditches or geotextile silt-fences, installed around excavations, exposed ground and stockpiles to prevent uncontrolled release of sediments from the Proposed Development;
  - site access points would be regularly cleaned to prevent build-up of dust and mud;
  - a valve would be installed to isolate the settlement tank/ ponds in the event of a polluted discharge;
  - oil interceptors to be installed (notably the outflow from the settlement pond/ tank) to reduce the potential risk for contamination of groundwater and surface water; and
  - all potentially polluted waters (including washdown areas, stockpiles and other areas of risk for water pollution) to have separate drainage and to be tankered away from the Site.

- 12.5.18 In addition, if monitoring (see below) demonstrates unsatisfactory levels of solids or other pollutants, measures would be implemented (e.g. changes to site drainage and settlement facilities and/ or use of flocculants) to control suspended solids or other polluted discharge to watercourses.

#### Wastewater Generation

- 12.5.19 A septic tank is likely to be used for treatment of sanitary or domestic wastewater from offices/administration/welfare facilities. This septic tank would be emptied as required and tankered off site to a waste water treatment plant.

#### Coffer Dams

- 12.5.20 Should the option of a new surface water drainage outfall be progressed, a coffer dam would be constructed in the River Trent to divert the flow away from the in-stream construction area at the proposed discharge point, to allow construction activities to take place safely. Maintaining a dry channel bed in the areas of in-channel working would help to reduce overall channel disturbance and sediment generation.
- 12.5.21 As described in **Chapter 4: The Proposed Development**, construction of the coffer dam would be timed to avoid sensitive times of the year (i.e. installation during lower flow periods). The coffer dam would be designed to minimise changes in riverbed and bank erosion and toe scour over the duration of use, and the duration of the coffer dam being in place would also be minimised to reduce the potential for erosion and scour impacts (as well as flood risk impacts).
- 12.5.22 Waters removed by dewatering within the coffer dam area would be discharged appropriately, subject to the relevant licences being obtained. Any potentially contaminated water/sediment would be tested, and if it is not of a suitable quality, agreed disposal procedures would be followed.
- 12.5.23 Whilst in-situ, the coffer dam would be regularly inspected and maintenance undertaken, where required, and any water entering the coffer dam area via seepage would be disposed of appropriately (i.e. by pumping back into the River Trent).
- 12.5.24 Silt curtains would be deployed to enclose the coffer dam installation and removal works.
- 12.5.25 Appropriate licences would be obtained from the Environment Agency with regards working within the watercourse and a Deemed Marine Licence would be sought, if required, for works at the discharge point.
- 12.5.26 There are potential risks of bank erosion on the eastern bank of the River Trent opposite the potential coffer dam locations, and to agricultural land and flood defence infrastructure (embankment) opposite and adjacent to the coffer dam locations. The coffer dams might have the effect of locally accelerating and diverting flows into channel banks, but temporary bank protection could mitigate this, as would the design and scale of the coffer dam structure. Local channel banks would need to be inspected at the same time as the coffer dam, and maintained as necessary.

#### Flood Risk

- 12.5.27 Construction works undertaken adjacent to, beneath and within watercourses (including the construction of the proposed surface water outfall) would comply with relevant guidance during construction, including the Environment Agency PPGs and the requirements of the Trent Valley IDB byelaws, particularly Byelaws 3, 6, 10 and 17.
- 12.5.28 Construction would take place during the lower flow periods to reduce the likelihood of flooding and reduce the impact of hydrodynamic erosion/scour during installation.
- 12.5.29 The CEMP would incorporate measures aimed at preventing an increase in flood risk during the construction works. The majority of the Proposed Development is located in Flood Zone 1 and in

these areas, specific management pertaining to construction practices and flood risk would not be required. Examples of measures that would be implemented in the Proposed Development areas in Flood Zones 2 and 3 include:

- topsoil and other construction materials would be stored outside of the 1 in 100 year floodplain extent;
- connectivity would be maintained between the floodplain and the River Trent, with no changes in ground levels within the floodplain as far as practicable;
- the construction laydown area site office and supervisor would be notified of any potential flood occurring by use of the Floodline Warnings Direct service; and
- the Contractor would be required to produce a Flood Risk Management Action Plan/ Method Statement which would provide details of the response to an impending flood and include –
  - a 24 hour availability and ability to mobilise staff in the event of a flood warning;
  - the removal of all plant, machinery and material capable of being mobilised in a flood for the duration of any holiday close down period;
  - details of the evacuation and site closedown procedures; and
  - arrangements for removing any potentially hazardous material and anything capable of becoming entrained in floodwaters, from the temporary works areas.

### Operation

12.5.30 The operational phase of the Proposed Development would require storage, transport, handling and use of minor volumes of potentially polluting substances (i.e. diesel). Throughout its lifetime, the facility would be regulated by the EA through an Environmental Permit, which would include conditions relating to handling, storage and use of diesel, including emergency procedures in line with the use of Best Available Techniques (BAT). These measures would be in place to prevent pollution during plant operation in accordance with the permit.

12.5.31 A number of the impact avoidance measures employed during the construction phase would remain for the operation phases of the Proposed Development (where relevant), and would be implemented through the Site operator's Environmental Management System (EMS), for example:

- plans to deal with accidental pollution and any necessary equipment (e.g. spillage kits) would be held on Site and all site personnel would be trained in their use, for example the plan would incorporate details on how to appropriately deal with accidental spillages to ensure they are not drained to any surface water system;
- containment measures would be implemented, including bunding or double-skinned tanks for fuels and oils; all chemicals would be stored in accordance with their COSHH guidelines; and
- interceptors would be incorporated into the drainage system to prevent material entering the surface water drainage system or local waterbodies.

### Contaminated Fire Water

12.5.32 In the event of a fire, the surface water drainage system would be closed to prevent contaminated water being released through surface water drains. Fire water would be contained on Site and either disposed off-site in accordance with waste management legislation (if contaminated) or discharged to surface water in accordance with the Environmental Permit, if the water quality is acceptable for surface water discharge (and subject to agreement with the Environment Agency and/or the Trent Valley IDB). This strategy would prevent pollution of surface and groundwater waterbodies.

## Site Drainage

12.5.33 An Outline Drainage Strategy has been produced see **Appendix 12A** (Flood Risk Assessment, Annex 3).

12.5.34 The descriptions below represent the two drainage strategy options currently being considered:

- **Preferred Option 1 – Connection to West Burton A or B:** the strategy comprises a 'tie-in' design to the combined WBA/ WBB system. The construction of a new 1,000m<sup>3</sup>/h WBA separator is currently underway which could potentially accommodate (without bypass) 100% of the surface water flow (assumed to be 18mm/h). Further discussion and agreement with the existing stakeholders and engineers responsible for the management of WBA/ WBB is required to determine whether Option 1 is likely to be feasible.
- **Option 2 – New Outlet into the River Trent:** This option would only be taken forward should preferred option 1 not be technically or economically feasible. Site drainage would be discharged at a new outfall point on the west side of the River Trent. New pipework and associated infrastructure would be provided for the new outfall as part of the Proposed Development. Permission to discharge would be sought from the Environment Agency and the criteria for both water quality and quantity would be determined. The Floods and Water Management Act 2010 (Ref 12-13) requires SuDS criteria to be incorporated into the design. The fundamental principles underpinning the procedures are:

- Storm water runoff rates and volumes should approximate to the site greenfield response over a range of storm frequencies.

The agreement on a permitted flow rate (litres per second per hectare (l/s/ha)) from the Proposed Development would determine the volume of on-site attenuation that needs to be designed at the detailed design stage. At scheme feasibility stage, a value of 5 l/s/ha is traditionally assumed to develop criteria for initial sizing and costing.

Detailed design should consider the following rainfall events:

- 1% annual probability (1 in 100 year event) for flows to be managed within the Site;
- 3.33% annual probability (1 in 30 year event) a Sewers for Adoption (SfA) (Ref. 12-55) requirement to carry water within the Site without causing any flooding;
- 100% annual probability (1 in 1 year event) is the highest probability event to be considered to ensure watercourses are tightly controlled for frequent events; and
- Considerations of climate change factors would be taken into account, using current guidance.

SuDs standards (Ref. 12-27) require that the first choice of surface water disposal should be to discharge to infiltration systems. SuDs systems/units shall also contribute to improving the water quality and sediment control. Attenuation would be achieved by limiting discharge through an appropriate flow attenuation device.

12.5.35 The details set out in the drainage strategy (**Appendix 12A** (Flood Risk Assessment, including an Outline Drainage Strategy as Annex 3) represent a conceptual outline drainage design and would be developed through detailed design and in response to requirements identified through the detailed design process.

## Flood Risk

12.5.36 The Applicant would subscribe to the Environment Agency's Flood Alert Service in the area.

12.5.37 As a precaution, flood resilience measures would be incorporated into the Proposed Development design to minimise the amount of damage and reduce the recovery time in the unlikely case of the Site becoming inundated. During construction the opportunity would be taken to adopt flood

resilient design techniques for the terrestrial elements of the Proposed Development. The following resilient measures have been identified as possible options for inclusion at the Site, subject to final design:

- minimum ground level must be above the River Trent 1 in 100 year flood level plus a 30% allowance for climate change (i.e. a minimum of 7.10 mAOD);
- finished floor levels would be raised 300mm above adjacent ground levels, to mitigate against the residual risk of a breach of flood defences, overland flows and flooding from drainage infrastructure;
- adequate containment of storage areas to ensure material does not wash away and cause pollution;
- flood proofing including the use of flood resistant building materials, use of water resistant coatings, use of galvanised and stainless steel fixings and raising electrical sockets and switches;
- inclusion in the existing Power Station's emergency response procedures including the recommendation of at least one Flood Warden for the proposed power plant site;
- as a precaution, the new surface water discharge point (if this option is progressed), located in Flood Zone 3, would not be visited for maintenance work when a flood warning is in effect on the River Trent;
- implementation of a Surface Water Management Strategy; and
- oil interceptors would be based on guidance within PPG3 (Ref 12-14) and are likely to be Class 1 Full Retention systems.

12.5.38 Further details are included within the FRA presented as **Appendix 12A** (PEI Report Volume II).

### *Decommissioning*

12.5.39 The Proposed Development would be subject to decommissioning under the conditions of the Environmental Permit including conditions relating to chemical/polluting material handling, storage and use and emergency procedures in line with BAT. A detailed Decommissioning Environmental Management Plan would be prepared to identify required measures to prevent pollution during this phase of the Proposed Development, based on the detailed decommissioning plan.

12.5.40 The impact avoidance measures for decommissioning would be similar to those identified above for the construction phase. As above, measures would be in place to prevent pollution in accordance with the permit.

## 12.6 Likely Impacts and Effects

### *Construction*

12.6.1 The groundwater resources and surface watercourses described above (River Trent, Wheatley Beck, Catchwater Drain, and Railway Dyke Drain, Land Drain to North of the Site and Other Water Features) have been assessed for the likelihood of actual effects occurring as a result of the construction phase of the Proposed Development (taking into account the mitigation measures as detailed in **Section 12.5**).

### *Surface Water Contaminated Runoff Entering Watercourses and Spillage of Pollutants*

12.6.2 During construction, there is an elevated risk of leakage or accidental spillage of construction materials and potential pollutants used on Site, migrating to nearby surface watercourses or infiltrating to groundwater. Washout facilities (washing of tools, plant and equipment), storage and

use of various liquids and soluble solids, unstable exposed soils, excavated materials, stored aggregates, contaminated road surfaces, and fuel storage and handling all have the potential to result in pollution of water resources. Inappropriate disposal of waste materials associated with the construction phase also has the potential to enter surface water.

- 12.6.3 In-channel works associated with the potential surface water discharge point options in the River Trent have the potential to disturb sediment on the bed of the watercourse, resulting in the re-suspension of contaminated sediment within the channel. The River Trent is turbid in this area, and flood embankments would trap sediment in the channel that would otherwise be deposited onto the floodplain. As such, baseline sediment concentrations are high, and localised impacts are likely to be trivial and of short duration.
- 12.6.4 Some construction activities could have the potential to create pathways through the subsurface strata and lead to contamination of the underlying Secondary B Aquifer. A significant accidental discharge of fuel, for example, or a toxic substance would be detrimental to surface water and groundwater receptors and attributes.
- 12.6.5 Contaminated material exposed or disturbed during the construction works has the potential to affect surface water or groundwater (as discussed in **Chapter 11: Ground Conditions and Hydrogeology**). As described, there is not a significant risk of impact from contaminated material on surface water and groundwater receptors after the implementation of impact avoidance measures - details are provided in **Chapter 11: Ground Conditions and Hydrogeology** which should be referred to for further information.
- 12.6.6 With the measures set out in **Section 12.5** (including the implementation of a CEMP and the use of a coffer dam to provide 'dry' in-channel working, should the surface water discharge outfall option be progressed), the likelihood of such an event occurring is low. Taking this into account, and based on the information available to date, the anticipated potential effects on different water attributes are described below.

#### River Trent

- 12.6.7 Potential contamination impacts and effects on the River Trent are assessed below:
- Water quality and WFD status (very high importance):
    - Possibility of a short-term, measurable but highly localised and temporary change in water quality, assuming a worst-case scenario (this conclusion is reached having consideration to the dilution potential of the river and its current quality). The potential impact is evaluated to be of very low magnitude, and whilst effects might be experienced in the localised area, no effect on the quality of the river and WFD status would be experienced with the implementation of the impact avoidance measures described in **Section 12.5** above.
    - The significance of this effect is therefore considered to be minor adverse (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented).
  - Recreation (high importance):
    - There is the possibility of a short-term, localised temporary impact on recreational activity such as walking and river navigation in the unlikely event of a pollution incident, but given the localised nature, such an impact is evaluated to be of low magnitude as a worst-case scenario.
    - The resulting effect would be minor adverse (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented).

- Biodiversity (high importance):
  - There is the possibility of a highly localised effect on water quality that could potentially have a short-term, temporary and localised ecological impact, however the impact and effect would be constrained to the area immediately adjacent to the Site (fish, invertebrates of Local Value etc. being affected from the changes to water quality) and as assessed in **Chapter 9: Ecology and Nature Conservation**, would not affect the structure or function of the River Trent at this location or more widely. The impact is evaluated to be of very low magnitude due to high level of dilution.
  - The significance of this effect is therefore considered to be negligible (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented).
- . The predicted effect on river habitats of Local value is therefore neutral and not significant.

#### Wheatley Beck

12.6.8 Potential contamination impacts and effects on Wheatley Beck are assessed below:

- Water quality and WFD status (high importance):
  - Possibility of a medium-term, measurable but highly localised and temporary change in water quality, assuming a very worst-case scenario. The potential impact is evaluated to be of low magnitude, and whilst effects might be experienced in the localised area, no effect on the quality of the watercourse and WFD status would be experienced with the implementation of the impact avoidance measures.
  - The significance of this effect is therefore considered to be minor adverse (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented).
- Recreation (medium importance):
  - There exists the potential for a short-term, localised temporary impact on recreational activity such as walking etc., but given the localised nature, such an impact is evaluated to be of low magnitude as a worst-case scenario.
  - The resulting effect would be negligible (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented).
- Biodiversity (high importance):
  - There is the possibility of a medium term, highly localised effect on water quality that could potentially have a temporary and localised ecological impact, however the impact and effect would be constrained to the area immediately adjacent to the site (fish, invertebrates etc. being affected from the changes to water quality) and the impact is evaluated to be of low magnitude due to high level of dilution.
  - The significance of this effect is therefore considered to be minor adverse (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented).

#### Catchwater Drain (and associated tributaries)

12.6.9 Potential contamination impacts and effects on Catchwater Drain and associated tributaries are assessed below:

- Water quality and WFD status (high importance):
  - Possible short-term, measurable but highly localised and temporary change in water quality, assuming a very worst-case scenario. The potential impact is evaluated to be of low magnitude, and whilst effects might be experienced in the localised area, no effect on the quality of the watercourse and WFD status would be experienced with the implementation of the impact avoidance measures;

- The significance of this effect is therefore considered to be minor adverse (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented).
- Recreation (medium importance):
  - There exists the potential for a short-term, localised temporary impact on recreational activity such as walking etc., but given the localised nature, such an impact is evaluated to be of low magnitude as a worst-case scenario;
  - The resulting effect would be negligible (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented).
- Biodiversity (high importance):
  - There is the possibility of a short-term, highly localised effect on water quality that could potentially have a temporary and localised ecological impact, however the impact and effect would be constrained to the area immediately adjacent to the Site (fish, invertebrates etc. being affected from the changes to water quality) and the impact is evaluated to be of low magnitude due to high level of dilution;
  - The significance of this effect is therefore considered to be minor adverse (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented).

#### Railway Dyke Drain/Drain to north of Site

12.6.10 Potential contamination impacts and effects on Railway Dyke Drain/Drain to North of Site are assessed below:

- Water quality and WFD status (medium importance):
  - Possible medium term, measurable but highly localised and temporary change in water quality, assuming a very worst-case scenario. The potential impact is evaluated to be of low magnitude, and whilst effects might be experienced in the localised area, no effect on the quality of the watercourse and WFD status would be experienced with the implementation of the impact avoidance measures.
  - The significance of this effect is therefore considered to be negligible (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented).
- Recreation (low importance):
  - There exists the potential for a short-term, localised temporary impact on recreational activity such as walking etc., but given the localised nature, such an impact is evaluated to be of low magnitude as a worst-case scenario.
  - The resulting effect would be negligible (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented).
- Biodiversity (medium importance):
  - There is the possibility of a medium term, highly localised effect on water quality that could potentially have a temporary and localised ecological impact, however the impact and effect would be constrained to the area immediately adjacent to the Site (newts, invertebrates etc. being affected from the changes to water quality) and the impact is evaluated to be of low magnitude due to high level of dilution.
  - The significance of this effect is therefore considered to be negligible (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented).

#### Additional Identified Surface Water Features

12.6.11 Potential impacts and effects on other surface watercourses from suspended sediments are assessed below:

- Water quality (low importance):
  - Possible highly localised and temporary change in water quality, assuming a very worst-case scenario, impact of low magnitude.
  - The significance of this effect is therefore considered to be negligible (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented).
- Recreation (low importance):
  - There exists the potential for a localised temporary impact on recreational activity, an impact of low magnitude as a worst-case scenario.
  - The resulting significance of this effect would be negligible (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented).
- Biodiversity (medium importance):
  - Possible localised and temporary ecological impact resulting from the effect on water quality, impact of low magnitude.
  - The significance of this effect is therefore considered to be negligible (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented).

#### **Surface Water – Suspended Sediments in Site Runoff/Re-suspension of Sediments in Watercourses**

- 12.6.12 The movement and storage of construction and waste materials to and from the Site, and from other construction activities, has the potential to give rise to suspended solids that could become entrained in surface water run-off from the Site following rainfall. This creates a potential risk of increased sediment loads being discharged into the nearby surface water. High sediment input has the potential to affect waterbodies by increasing turbidity, reducing dissolved oxygen (DO) levels and reducing light penetration. There could also be toxic effects caused by inorganic and organic compounds associated with suspended sediment. Indirect effects could include impacts on invertebrates and fish communities, and destruction of feeding areas, refuges and both breeding and spawning grounds.
- 12.6.13 In-channel works associated with the potential surface water discharge outfall options in the River Trent have the potential to disturb sediment on the bed and banks of the watercourse resulting in the re-suspension of sediment within the channel. Issues associated with high sediment input are detailed in the paragraph above. Such issues can be a particular risk upstream of weirs, where channel gradients and flows are reduced, and sediment can be stored. This has the potential to concentrate contaminants, and for the degradation of the DO of sediment and interstitial water by chemical and biological oxygen demand. Plumes of pollutants or depleted DO released by construction or other activities may be confined upstream of the weir and may not disperse quickly.
- 12.6.14 Water in the lowland reaches of the River Trent is turbid with suspended sediment, and the flow is generally slack within the reach at the Site due to the naturally low gradient. The River Trent waterbody adjacent to the proposed works currently has mitigation measures set under the WFD with regards to the strategic management of sediment, bank rehabilitation, a reduction in the impact of dredging and sediment suspension.
- 12.6.15 With the measures set out in **Section 12.5**, including the implementation of a CEMP (and the use of cofferdams to provide 'dry' in-channel working should the surface water outfall option be progressed), however, the likelihood of this occurring would be very low. Taking this into account, the following effects on different attributes are described below.

## River Trent

12.6.16 Potential impacts and effects on the River Trent from suspended sediments are assessed below:

- Water quality and WFD status (very high importance):
  - Possible localised and temporary changes in water quality, the potential impact is evaluated to be of low magnitude given the level of dilution in the watercourse, no effect on water quality and WFD status would be experienced.
  - The significance of this effect is therefore considered to be moderate adverse (significant), but unlikely to occur based on the impact avoidance measures to be implemented.
- Recreation (high importance):
  - There exists the potential for a localised temporary impact on recreational activity, but given the localised nature, such an impact is evaluated to be of low magnitude as a worst-case scenario.
  - The significance of this effect is therefore considered to be minor adverse (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented).
- Biodiversity (high importance):
  - It is possible that the River Trent could experience a localised and temporary impact with the potential to affect ecology (fish, invertebrates etc., resulting from a change in water quality). Considering a worst-case scenario, this impact is evaluated to result in an impact of low magnitude in the localised area immediately adjacent to the Site.
  - The significance of this effect is therefore considered to be minor adverse (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented).

## Wheatley Beck

12.6.17 Potential impacts and effects on Wheatley Beck from suspended sediments are assessed below:

- Water quality and WFD status (high importance):
  - Possible localised and temporary changes in water quality, the potential impact is evaluated to be of low magnitude given the level of dilution in the watercourse, no effect on water quality and WFD status would be experienced.
  - The significance of this effect is therefore considered to be minor adverse (not significant) (but unlikely to occur).
- Recreation (medium importance):
  - There exists the potential for a localised temporary impact on recreational activity, but given the localised nature, such an impact is evaluated to be of low magnitude as a worst-case scenario.
  - The resulting effect would be negligible (not significant).
- Biodiversity (high importance):
  - It is possible that Wheatley Beck could experience a localised and temporary impact with the potential to affect ecology (fish, invertebrates etc., resulting from a change in water quality). Considering a worst-case scenario, this impact is evaluated to result in an impact of low magnitude in the localised area immediately adjacent to the Site.
  - The significance of this effect is therefore considered to be minor adverse (not significant) (but unlikely to occur).

### Catchwater Drain (and associated tributaries)

12.6.18 Potential impacts and effects on Catchwater Drain (and associated tributaries) from suspended sediments are assessed below:

- Water quality and WFD status (high importance):
  - Possible localised and temporary changes in water quality, the potential impact is evaluated to be of low magnitude given the level of dilution in the watercourse, no effect on water quality and WFD status would be experienced.
  - The significance of this effect is therefore considered to be minor adverse (not significant) (but unlikely to occur).
- Recreation (medium importance):
  - There exists the potential for a localised temporary impact on recreational activity, but given the localised nature, such an impact is evaluated to be of low magnitude as a worst-case scenario.
  - The resulting effect would be negligible (not significant).
- Biodiversity (high importance):
  - It is possible that Catchwater Drain (and associated tributaries) could experience a localised and temporary impact with the potential to affect ecology (fish, invertebrates etc., resulting from a change in water quality). Considering a worst-case scenario, this impact is evaluated to result in an impact of low magnitude in the localised area immediately adjacent to the Site.
  - The significance of this effect is therefore considered to be minor adverse (not significant) (but unlikely to occur).

### Railway Dyke Drain/ Drain to north of Site

12.6.19 Potential impacts and effects on Railway Dyke Drain/ Drain to north of Site from suspended sediments are assessed below:

- Water quality and WFD status (medium importance):
  - Possible localised and temporary changes in water quality, the potential impact is evaluated to be of low magnitude given the level of dilution in the watercourse, no effect on water quality and WFD status would be experienced.
  - The resulting effect would be negligible (not significant).
- Recreation (low importance):
  - There exists the potential for a localised temporary impact on recreational activity, but given the localised nature, such an impact is evaluated to be of low magnitude as a worst-case scenario.
  - The resulting effect would be negligible (not significant).
- Biodiversity (medium importance):
  - It is possible that Railway Dyke Drain/ Drain to north of Site could experience a localised and temporary impact with the potential to affect ecology (newts, invertebrates etc., resulting from a change in water quality). Considering a worst-case scenario, this impact is evaluated to result in an impact of low magnitude in the localised area immediately adjacent to the Site.
  - The resulting effect would be negligible (not significant).

### Additional Identified Surface Water Features

12.6.20 Potential impacts and effects on other surface watercourses from suspended sediments are assessed below:

- Water quality (low importance):
  - Possible highly localised and temporary change in water quality, assuming a very worst-case scenario, impact of low magnitude.
  - The significance of this effect is therefore considered to be negligible (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented).
- Recreation (low importance):
  - There exists the potential for a localised temporary impact on recreational activity, an impact of low magnitude as a worst-case scenario.
  - The significance of this effect is therefore considered to be negligible (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented).
- Biodiversity (medium importance):
  - Possible localised and temporary ecological impact resulting from the effect on water quality, impact of low magnitude.
  - The significance of this effect is therefore considered to be negligible (not significant) (and unlikely to occur based on the impact avoidance measures to be implemented).

### Disturbance of Contaminated Materials

12.6.21 Contaminated material exposed or disturbed during the construction works has the potential to affect surface water or groundwater (as discussed in **Chapter 11: Ground Conditions and Hydrogeology**). As described, there is not a significant risk of impact from contaminated material on surface water and groundwater receptors after the implementation of defined impact avoidance measures. Therefore, the significance of this effect is assessed as negligible. Details are provided in **Chapter 11: Ground Conditions and Hydrogeology**, which should be referred to for further information.

### Groundwater – Accidental Leakage or Spillage of Pollutants

12.6.22 As discussed in relation to impacts on surface water, during the construction phase there is a low risk of leakage or accidental spillage of potential pollutants used during construction, which may then migrate to underlying groundwater (though the impact avoidance measures set out above would minimise the risk).

12.6.23 The Site is underlain by superficial deposits that are classed, predominantly, as a Secondary A Aquifer with soils having a high leaching potential. The superficial deposits would provide limited protection to the Secondary B aquifer (high importance) below however, measures included in **Chapter 11: Ground Conditions and Hydrogeology** and in **Section 12.5** would act to prevent such an incident from occurring. Therefore, it is assumed the impact from an event would be of low magnitude and the significance of effect is assessed as minor adverse (but unlikely to occur) to the Secondary (Undifferentiated) aquifer.

12.6.24 The impact on the water quality and quantity of the shallow groundwater (Secondary A Aquifer of medium importance) would potentially be of medium magnitude, although some attenuation of pollutants would occur in the superficial deposits, and the significance of effect is assessed as minor adverse (but unlikely to occur).

## Opening

- 12.6.25 As discussed in Section 12.4, the baseline conditions for the Opening Baseline Scenario (2026) are not expected to be significantly different to the baseline conditions for the construction phase (2019/ early 2020). The future baseline (Operation (2027 - 2066)) is considered to provide a worst-case scenario for the operational phase of the Proposed Development and is assessed below.

## Operation

- 12.6.26 Once the Proposed Development is open and operational, it is considered that the majority of identified watercourses assessed during the construction phase would not be affected by the Proposed Development.
- 12.6.27 The Proposed Development would utilise the River Trent in terms of surface water (should one of the outfall options be progressed).

### *Surface Water – Leakage from Drainage System*

- 12.6.28 A Conceptual Drainage Strategy has been developed for the Proposed Development, as detailed in **Appendix 12A** (Flood Risk Assessment, Annex 3) (PEI Report Volume II)).
- 12.6.29 There is minimal contaminated wastewater generated from the Proposed Development during operation. Any uncontaminated surface water would be discharged directly to the River Trent either based on Drainage Option 1 - Connection to WBA/ WBB) or Drainage Option 2 - New Outlet into the River Trent –, both restricted rates via attenuation methods. Whilst pollution prevention features would be included in the design as set-out in **Section 12.5**, there always remains the potential for leakage from the system to occur (albeit the risk is very low).
- 12.6.30 The effects of any accidental pollution from site containment systems on different attributes of the identified watercourses are detailed below.

## River Trent

- 12.6.31 Potential impacts and effects on the River Trent from any leakage from the drainage system are assessed below:
- Water quality and WFD status (very high importance):
    - If a leak occurred in the site containment system, considering the dilution potential and current quality of the River Trent, the potential impact would be localised and temporary, and evaluated to be of very low magnitude.
    - No effect on water quality and WFD status would be experienced, the significance of this effect is therefore considered to be minor adverse (not significant) (but is unlikely to occur based on impact avoidance measures to be implemented).
  - Recreation (high importance):
    - There exists the potential for a localised temporary impact on recreational activity, but given the localised nature, such an impact is evaluated to be of very low magnitude as a worst-case scenario.
    - The resulting effect would be negligible (not significant).
  - Biodiversity (high importance):
    - It is possible that the River Trent could experience a localised and temporary impact with the potential to affect ecology (fish, invertebrates etc., resulting from a change in water quality). Considering a worst-case scenario, this impact is evaluated to result in an impact of very low magnitude in the localised area immediately adjacent to the Site.

- The significance of this effect is therefore considered to be negligible (not significant).

### Wheatley Beck

12.6.32 Potential impacts and effects on Wheatley Beck from any leakage from the drainage system are assessed below:

- Water quality and WFD status (high importance):
  - If a leak occurred in the site containment system, considering the importance of the attribute, the potential impact would be localised, temporary and of very low magnitude.
  - The significance of this effect is therefore considered to be negligible (not significant).
- Recreation (medium importance):
  - There exists the potential for a localised temporary impact on recreational activity, but given the localised nature, such an impact is evaluated to be of very low magnitude as a worst-case scenario.
  - The resulting effect would be negligible (not significant).
- Biodiversity (high importance):
  - It is possible that Wheatley Beck could experience a localised and temporary impact with the potential to affect ecology (fish, invertebrates etc., resulting from a change in water quality). Considering a worst-case scenario, this impact is evaluated to result in an impact of very low magnitude in the localised area immediately adjacent to the Site.
  - The resulting effect would be negligible (not significant).

### Catchwater Drain (and associated tributaries)

- Water quality and WFD status (high importance):
  - If a leak occurred in the site containment system, considering the importance of the attribute, the potential impact on Catchwater Drain (and associated tributaries) would be localised, temporary and of very low magnitude.
  - No effect on water quality and WFD status would be experienced, the significance of this effect is therefore considered to be negligible (not significant).
- Recreation (medium importance):
  - There exists the potential for a localised temporary impact on recreational activity, but given the localised nature, such an impact is evaluated to be of very low magnitude as a worst-case scenario.
  - No effect on recreation would be experienced, the significance of this effect is therefore considered to be negligible (not significant).
- Biodiversity (high importance):
  - It is possible that Catchwater Drain and its associated tributaries could experience a localised and temporary impact with the potential to affect ecology (fish, invertebrates etc., resulting from a change in water quality). Considering a worst-case scenario, this impact is evaluated to result in an impact of very low magnitude in the localised area immediately adjacent to the Site.
  - No effect on biodiversity and WFD status would be experienced, the significance of this effect is therefore considered to be negligible (not significant).

### Railway Dyke Drain/Drain to the North of Site

- Water quality and WFD status (medium importance):
  - If a leak occurred in the site containment system, considering the importance of the attribute, the potential impact on the watercourses would be localised, temporary and of very low magnitude.
  - No effect on water quality and WFD status would be experienced, the significance of this effect is therefore considered to be negligible (not significant).
- Recreation (low importance):
  - There exists the potential for a localised temporary impact on recreational activity, but given the localised nature, such an impact is evaluated to be of very low magnitude as a worst-case scenario.
  - The resulting effect on recreation would be negligible (not significant).
- Biodiversity (medium importance):
  - It is possible that Railway Dyke Drain/ Drain to the North of Site could experience a localised and temporary impact with the potential to affect ecology (newts, invertebrates etc., resulting from a change in water quality). Considering a worst-case scenario, this impact is evaluated to result in an impact of very low magnitude in the localised area immediately adjacent to the Site.
  - No effect on biodiversity and WFD status would be experienced, the significance of this effect is therefore considered to be negligible (not significant).

### Additional Identified Surface Water Features

- Water quality and WFD status (low importance):
  - If a leak occurred in the site containment system, considering the importance of the attribute, the potential impact would be localised, temporary and of very low magnitude.
  - No effect on water quality and WFD status would be experienced, the significance of this effect is therefore considered to be negligible (not significant).
- Recreation (low importance):
  - There exists the potential for a localised temporary impact on recreational activity, but given the localised nature, such an impact is evaluated to be of very low magnitude as a worst-case scenario.
  - The resulting effect on recreation would be negligible (not significant).
- Biodiversity (medium importance):
  - It is possible that the surface water features could experience a localised and temporary impact with the potential to affect ecology (newts, invertebrates etc., resulting from a change in water quality). Considering a worst-case scenario, this impact is evaluated to result in an impact of very low magnitude in the localised area immediately adjacent to the Site.
  - No effect on biodiversity and WFD status would be experienced, the significance of this effect is therefore considered to be negligible (not significant).

### Surface Water – Contamination of Site Runoff

12.6.33 The impacts associated with contamination of surface water (with sediments, fuels etc.) are considered to be the same as those assessed in relation to leakage from the drainage system, as any potentially polluting substances would be stored inside buildings as set out below.

Implementation of the measures as described in **Section 12.5** would ensure the risk of contamination of site runoff would be low.

- 12.6.34 Pollution from runoff of contaminated surface water from the Proposed Development entering a watercourse would cause little change to the River Trent due to the level of dilution in the waterbody.

#### River Trent

- Water quality and WFD status (very high importance):
  - Given the distance from the Site to the River Trent, any contaminated run off is likely to infiltrate into the surface layers or pond on the surface, allowing clean up, prior to reaching the watercourse. If, however, a spillage of pollutant did reach the River Trent, or a leak occurred in the site containment system, considering the dilution potential and current quality, the potential impact would be localised and temporary, and evaluated to be of very low magnitude.
  - No effect on water quality and WFD status would be experienced, the significance of this effect is therefore considered to be minor adverse (not significant) (but is unlikely to occur based on impact avoidance measures to be implemented).
- Recreation (high importance):
  - There exists the potential for a localised temporary impact on recreational activity, but given the localised nature, such an impact is evaluated to be of very low magnitude as a worst-case scenario.
  - The resulting effect would be negligible (not significant).
- Biodiversity (high importance):
  - It is possible that the River Trent could experience a localised and temporary impact with the potential to affect ecology (fish, invertebrates etc., resulting from a change in water quality). Considering a worst-case scenario, this impact is evaluated to result in an impact of very low magnitude in the localised area immediately adjacent to the Site.
  - The significance of this effect is therefore considered to be negligible (not significant).

#### Wheatley Beck

- Water quality and WFD status (high importance):
  - Any contaminated run off is likely to infiltrate into the surface layers or pond on the surface, allowing clean up, prior to reaching the watercourse. The surface drainage system would be designed with attenuation features that have the potential to capture any contaminated runoff for treatment. If, however, a spillage of pollutant did reach Wheatley Beck, or a leak occurred in the site containment system, considering the importance of the attribute, the potential impact would be localised, temporary and of very low magnitude.
  - The significance of this effect is therefore considered to be negligible (not significant).
- Recreation (medium importance):
  - There exists the potential for a localised temporary impact on recreational activity, but given the localised nature, such an impact is evaluated to be of very low magnitude as a worst-case scenario.
  - The resulting effect would be negligible (not significant).

- Biodiversity (high importance):
  - It is possible that Wheatley Beck could experience a localised and temporary impact with the potential to affect ecology (fish, invertebrates etc., resulting from a change in water quality). Considering a worst-case scenario, this impact is evaluated to result in an impact of very low magnitude in the localised area immediately adjacent to the Site.
  - The resulting effect would be negligible (not significant).

#### Catchwater Drain (and associated tributaries)

- Water quality and WFD status (high importance):
  - Any contaminated run off is likely to infiltrate into the surface layers or pond on the surface, allowing clean up, prior to reaching the watercourse. The surface drainage system would be designed with attenuation features that have the potential to capture any contaminated runoff for treatment. If, however, a spillage of pollutant did reach Catchwater Drain and its associated tributaries, or a leak occurred in the site containment system, considering the importance of the attribute, the potential impact would be localised, temporary and of very low magnitude.
  - No effect on water quality and WFD status would be experienced, the significance of this effect is therefore considered to be negligible (not significant).
- Recreation (medium importance):
  - There exists the potential for a localised temporary impact on recreational activity, but given the localised nature, such an impact is evaluated to be of very low magnitude as a worst-case scenario.
  - No effect on recreation would be experienced, the significance of this effect is therefore considered to be negligible (not significant).
- Biodiversity (high importance):
  - It is possible that Catchwater Drain and its associated tributaries could experience a localised and temporary impact with the potential to affect ecology (fish, invertebrates etc., resulting from a change in water quality). Considering a worst-case scenario, this impact is evaluated to result in an impact of very low magnitude in the localised area immediately adjacent to the Site.
  - No effect on biodiversity and WFD status would be experienced, the significance of this effect is therefore considered to be negligible (not significant).

#### Railway Dyke Drain/Drain to the North of Site

- Water quality and WFD status (medium importance):
  - Any contaminated run off is likely to infiltrate into the surface layers or pond on the surface, allowing clean up, prior to reaching the watercourse. The surface drainage system would be designed with attenuation features that have the potential to capture any contaminated runoff for treatment. If, however, a spillage of pollutant did reach Railway Dyke Drain/Drain to the North of Site, or a leak occurred in the site containment system, considering the importance of the attribute, the potential impact would be localised, temporary and of very low magnitude.
  - No effect on water quality and WFD status would be experienced, the significance of this effect is therefore considered to be negligible (not significant).
- Recreation (low importance):
  - There exists the potential for a localised temporary impact on recreational activity, but given the localised nature, such an impact is evaluated to be of very low magnitude as a worst-case scenario.

- The resulting effect on recreation would be negligible (not significant).
- Biodiversity (medium importance):
  - It is possible that Railway Dyke Drain/Drain to the North of Site could experience a localised and temporary impact with the potential to affect ecology (newts, invertebrates etc., resulting from a change in water quality). Considering a worst-case scenario, this impact is evaluated to result in an impact of very low magnitude in the localised area immediately adjacent to the Site.
  - No effect on biodiversity and WFD status would be experienced, the significance of this effect is therefore considered to be negligible (not significant).

#### Additional Identified Surface Water Features

- Water quality and WFD status (low importance):
  - Any contaminated run off is likely to infiltrate into the surface layers or pond on the surface, allowing clean up, prior to reaching the watercourse. The surface drainage system would be designed with attenuation features that have the potential to capture any contaminated runoff for treatment. If, however, a spillage of pollutant did reach the land drain, or a leak occurred in the site containment system, considering the importance of the attribute, the potential impact would be localised, temporary and of very low magnitude.
  - No effect on water quality and WFD status would be experienced, the significance of this effect is therefore considered to be negligible (not significant).
- Recreation (low importance):
  - There exists the potential for a localised temporary impact on recreational activity, but given the localised nature, such an impact is evaluated to be of very low magnitude as a worst-case scenario.
  - The resulting effect on recreation would be negligible (not significant).
- Biodiversity (medium importance):
  - It is possible that the surface water features could experience a localised and temporary impact with the potential to affect ecology (newts, invertebrates etc., resulting from a change in water quality). Considering a worst-case scenario, this impact is evaluated to result in an impact of very low magnitude in the localised area immediately adjacent to the Site.
  - No effect on biodiversity and WFD status would be experienced, the significance of this effect is therefore considered to be negligible (not significant).

#### Drainage and Flow to Surface Water and Ground Waters

- 12.6.35 The changes to drainage (should Option 2 be progressed) have the potential to alter the discharge rates from the Site and thus flow dynamics within the River Trent (increase in spate flows, scouring of the stream bed, etc.), along with increasing infiltration to groundwater and, therefore, recharge of the aquifer. Surface water discharge would be restricted to greenfield runoff rates and discharge to the River Trent in line with Environment Agency permit requirements, therefore effects on the River Trent would be minimal.
- 12.6.36 Although the detailed drainage design would not be completed until the detailed design stage, drainage systems would be designed so as not to increase flood risk. These measures allow the design criterion of no flooding during a 1 in a 30 year plus climate change storm to be achieved.

### Flood Risk

- 12.6.37 The FRA for the Proposed Development, included within **Appendix 12A** (PEI Report Volume II), concludes that development of the Site would not increase the risk of flooding from fluvial, tidal, groundwater or overland flow sources.
- 12.6.38 An Outline Drainage Strategy has been developed for the Site and is presented as **Appendix 12A** (Flood Risk Assessment, Annex 3) (PEI Report Volume II)). As detailed in the drainage strategy report surface water discharged from the Proposed Development would be restricted *via* attenuation methods and an appropriate flow control device.
- 12.6.39 Design of the surface water network would be based on the following design rainfall return periods and criteria:
- No surcharging of the network for a 1 in 2 year return period/peak discharge rate restricted to equivalent greenfield rate;
  - No flooding of the network for a 1 in 30 year return period/peak discharge rate restricted to equivalent greenfield; and
  - No flooding off site for a 1 in 100 year return period/peak discharge rate restricted to equivalent greenfield rate/ any flooding to be assessed to determine overland flow routes.
- 12.6.40 The Site would be assessed as part of the detailed drainage design to consider the risk posed by any flooding up to and beyond the 1% (1 in 100 year) flood event. Any flooding would be diverted away from critical infrastructure or access routes and retained on the Site wherever possible.
- 12.6.41 Other SuDs techniques such as swales, permeable paving and soakaways may be considered at the detailed design stage.
- 12.6.42 The outputs of the detailed drainage design would be reported in the ES.

### Groundwater

- 12.6.43 Once the Proposed Development is operational, the probability of any operational activity occurring that would affect groundwater is low. There is, however, the potential for leakage or accidental spillage of potential pollutants (e.g. diesel fuel stored on site or vehicle washing) that may migrate to the underlying groundwater. The Environmental Permit would contain a condition to prevent any contamination of land or groundwater during the operational phase of the Proposed Development.
- 12.6.44 Unless a direct pathway to the underlying Secondary B aquifer is created in the construction phase (and it is assumed that impact avoidance measures incorporated into the design would prevent this from occurring) then it is considered highly unlikely that any contaminant would reach the Secondary B aquifer during site operation and therefore the significance of effect on the Secondary B aquifer would be negligible.
- 12.6.45 The effect of a spillage on the superficial deposits (Secondary A Aquifer) could cause a measurable but localised temporary change in groundwater quality (impact of low magnitude). Given the medium importance of this attribute, the significance of effect on the superficial aquifer would be negligible.

### Rochdale Envelope

- 12.6.46 The Rochdale Envelope design parameters (i.e. the maximum parameters for the Proposed Development and in particular its main buildings and structures) outlined in **Chapter 4**: The Proposed Development influence the parameters used in both the operational and construction assessments presented in this chapter.

- .6.46.1 Specifically, for construction, a worst-case (conservative) assessment has been presented in this chapter that assumes that a temporary coffer dam may need to be installed to enable construction works to take place in the River Trent. If required, measures to minimise environmental effects will be described in the CEMP, including installation during the lower flow periods (for flood risk and hydrodynamic/ erosion/ scour purposes), and pre-construction sediment contamination testing and use of silt curtains (to minimise impacts on water quality).
- 12.6.47 The FRA (**Appendix 12A** PEI Report Volume II) considers the maximum building dimensions shown in the indicative layouts (Figure 4.1a and 4.1b In PEI Report Volume III) to determine the anticipated surface water runoff from the Site.

### Decommissioning

- 12.6.48 Decommissioning of the Proposed Development would be undertaken in accordance with the Environmental Permit. This would include decommissioning of all potentially polluting plant and equipment so that it does not pose an unacceptable risk of contamination.
- 12.6.49 It is assumed that all underground infrastructures would remain in-situ, however, all connection and access points would be sealed or grouted to ensure disconnection.
- 12.6.50 On this basis, decommissioning impacts are expected to be limited to watercourses/groundwater bodies in close proximity to the Site and would be the same as construction impacts, as discussed above.

### Summary of Potential Impacts on WFD Status

- 12.6.51 The WFD status of the River Trent, Wheatley Beck and Catchwater Drain has been considered for each of the potential impacts described as part of this assessment.
- 12.6.52 Given the nature of the impacts (notably that they are largely of temporary nature and/or unlikely to affect the WFD elements), and assuming the measures included in **Section 12.5** would be effectively implemented, there would be no effect on WFD status and objectives.
- 12.6.53 Mitigation measures already in place on the River Trent, Wheatley Beck and Catchwater Drain include the strategic management of sediment, bank rehabilitation, reducing impact of dredging and reducing sediment suspension.
- 12.6.54 Proposed WFD mitigation measures as included within the Humber RBMP include the preservation of marginal aquatic habitat, banks and the riparian zone, improving floodplain connectivity, appropriate vegetation control, set back and the removal of obsolete structures.
- 12.6.55 The Proposed Development is unlikely to significantly impact upon the ability of these mitigation measures to be implemented and for the current mitigation measures to remain. The effect on the WFD status of the River Trent, Wheatley Beck and Catchwater Drain is therefore likely to be negligible.

## 12.7 Mitigation and Enhancement Measures

- 12.7.1 A number of legislative and best practice measures which would be followed during the construction, opening and operation and decommissioning of the Proposed Development are detailed in **Section 12.5**. The design and impact avoidance measures have been taken into account in the assessment and no additional mitigation requirements have been identified.

## 12.8 Limitation or Difficulties

- 12.8.1 The following assumptions have been applied throughout this assessment process, but are not considered to significantly affect the robustness of the assessment:
- A conceptual design for the Proposed Development has been available, but detailed design would not be undertaken until after the planning process has been concluded – as such, the exact locations and dimensions of the structures are subject to change and the Rochdale Envelope has been used in order to define limits of deviation for key buildings and infrastructure (see **Chapter 4**: The Proposed Development).
  - Similarly as no details of construction techniques are available, it is assumed that standard construction techniques would be used.
  - It is assumed that the mitigation measures identified in **Chapters 6 to 15** of this PEI Report would be implemented, which could influence the mitigation strategy proposed by this chapter.
- 12.8.2 Hydrological and hydraulic information for minor local watercourses (ordinary watercourses and IDB drains/watercourses) in the vicinity of the Site is limited; therefore the assessment is based on professional judgement together with information taken from mapping, publically available data sources and local knowledge gained through consultation with statutory consultees.
- 12.8.3 No site visit has been conducted by a water quality or flood risk specialist, but information and photographs have been available from site visits conducted by other environmental specialists and deemed adequate for the purposes of this assessment.

## 12.9 Residual Effects and Conclusions

- 12.9.1 This chapter assesses potential impacts from the Proposed Development on the quality and quantity of groundwater and surface waterbodies, and the effects of these potential changes on key receptors (or attributes). Water features that could potentially be affected include the River Trent, Wheatley Beck and Catchwater Drain, Railway Dyke Drain/Drain north of the Site, minor watercourses and drainage ditches, other identified water features and groundwater. A summary of the impact assessment findings is provided in **Table 12-7**.
- 12.9.2 The standard impact avoidance measures proposed would reduce the risk of many impacts occurring during the construction, operational and decommissioning phases. These include implementation of Environment Agency PPGs, construction staff awareness and training, implementation of pollution plans and the appropriate discharge/disposal of site runoff.
- 12.9.3 The assessment has identified the 'worst-case scenario', such as significant pollution events, which have a low probability of occurrence due to the procedures and measures that would be put in place.
- 12.9.4 Adverse residual effects on the key receptors have predominantly been assessed as minor adverse to negligible and therefore not significant.
- 12.9.5 A moderate adverse residual effect on the River Trent could arise from suspended sediments in site runoff to the River Trent during the construction phase. This would be considered significant. However, through the impact avoidance measures described in **Section 12.5**, which would be implemented through the CEMP, it is considered that this impact would be managed to very low, resulting in a minor adverse effect on the River Trent.
- 12.9.6 The FRA (**Appendix 12A** (PEI Report Volume II)) concludes that development of the Site would not increase the risk of flooding from fluvial, groundwater or overland flow sources.

12.9.7 As no mitigation measures additional to those described within **Section 12.5** have been identified, the residual effects remain as described in **Section 12.6**. It is acknowledged that even with the implementation of impact avoidance measures, there is still a very limited potential for some residual risk to the water environment associated with the construction, operation and decommissioning of the Proposed Development.

**Table 12-7: Residual effects summary table**

Predicted Impact	Sensitivity of resource/ receptor	Mitigation	Magnitude of impact	Classification of effect
<b>Construction</b>				
Contaminated runoff and spillage of pollutants polluting the River Trent	Water Quality – Very High	No additional mitigation required - see <b>Section 12.5.</b>	Very Low	Minor Adverse
	Recreation – High		Low	Minor Adverse
	Biodiversity – High		Very Low	Negligible
Contaminated runoff and spillage of pollutants polluting Wheatley Beck	Water Quality – High	No additional mitigation required - see <b>Section 12.5.</b>	Low	Minor Adverse
	Recreation – Medium		Low	Negligible
	Biodiversity – High		Low	Minor Adverse
Contaminated runoff and spillage of pollutants polluting Catchwater Drain (and associated tributaries)	Water Quality – High	No additional mitigation required - see <b>Section 12.5.</b>	Low	Minor Adverse
	Recreation – Medium		Low	Negligible
	Biodiversity – High		Low	Minor Adverse
Contaminated runoff and spillage of pollutants polluting Railway Dyke Drain/ Drain to the North of Site	Water Quality – Medium	No additional mitigation required - see <b>Section 12.5.</b>	Low	Negligible
	Recreation – Low		Low	Negligible
	Biodiversity – Medium		Low	Negligible
Contaminated runoff and spillage of pollutants polluting Additional Identified Water Features	Water Quality – Low	No additional mitigation required - see <b>Section 12.5.</b>	Low	Negligible
	Recreation – Low		Low	Negligible
	Biodiversity – Medium		Low	Negligible
Suspended sediments in site runoff polluting the	Water Quality – Very High	No additional mitigation required - see	Very Low	Minor Adverse

Predicted Impact	Sensitivity of resource/ receptor	Mitigation	Magnitude of impact	Classification of effect
River Trent	Recreation – High	<b>Section 12.5.</b>	Low	Minor Adverse
	Biodiversity – High		Low	Minor Adverse
Suspended sediments in site runoff polluting Wheatley Beck	Water Quality – High	No additional mitigation required - see <b>Section 12.5.</b>	Low	Minor Adverse
	Recreation – Medium		Low	Negligible
	Biodiversity – High		Low	Minor Adverse
Suspended sediments in site runoff polluting Catchwater Drain (and associated tributaries)	Water Quality – High	No additional mitigation required - see <b>Section 12.5.</b>	Low	Minor Adverse
	Recreation – Medium		Low	Negligible
	Biodiversity – High		Low	Minor Adverse
Suspended sediments in site runoff polluting Railway Dyke Drain/ Drain to the North of Site	Water Quality – Medium	No additional mitigation required - see <b>Section 12.5.</b>	Low	Negligible
	Recreation – Low		Low	Negligible
	Biodiversity – Medium		Low	Negligible
Suspended sediments in site runoff polluting Additional Identified Water Features	Water Quality – Low	No additional mitigation required - see <b>Section 12.5.</b>	Low	Negligible
	Recreation – Low		Low	Negligible
	Biodiversity – Medium		Low	Negligible
Disturbance of Contaminated Materials	Shallow Groundwater Vulnerability – Medium	No additional mitigation required - see <b>Section 12.5.</b>	Low	Negligible
	Deep Groundwater Vulnerability – High		Very Low	Negligible

Predicted Impact	Sensitivity of resource/ receptor	Mitigation	Magnitude of impact	Classification of effect
Accidental leakage or spillage of pollutants polluting groundwater	Shallow Groundwater Vulnerability – Medium	No additional mitigation required - see <b>Section 12.5.</b>	Medium	Minor Adverse
	Deep Groundwater Vulnerability – High		Low	Minor Adverse
<b>Opening/ Operation</b>				
Leakage from drainage system polluting the River Trent	Water Quality – Very High	No additional mitigation required - see <b>Section 12.5.</b>	Low	Minor Adverse
	Recreation – High		Very Low	Very Low
	Biodiversity – High		Very Low	Negligible
Leakage from drainage system polluting Wheatley Beck	Water Quality – High	No additional mitigation required - see <b>Section 12.5.</b>	Very Low	Negligible
	Recreation – Medium		Very Low	Negligible
	Biodiversity – High		Very Low	Negligible
Leakage from drainage system polluting Catchwater Drain (and associated tributaries)	Water Quality – High	No additional mitigation required - see <b>Section 12.5.</b>	Very Low	Negligible
	Recreation – Medium		Very Low	Negligible
	Biodiversity – High		Very Low	Negligible
Leakage from drainage system polluting Railway Dyke Drain/ Drain to the North of Site	Water Quality – Medium	No additional mitigation required - see <b>Section 12.5.</b>	Very Low	Negligible
	Recreation – Low		Very Low	Negligible
	Biodiversity – Medium		Very Low	Negligible

Predicted Impact	Sensitivity of resource/ receptor	Mitigation	Magnitude of impact	Classification of effect
Leakage from drainage system polluting Additional Identified Water Features	Water Quality – Low	No additional mitigation required - see <b>Section 12.5.</b>	Very Low	Negligible
	Recreation – Low		Very Low	Negligible
	Biodiversity – Medium		Very Low	Negligible
Contaminated runoff and spillages of pollutants polluting the River Trent	Water Quality – Very High	No additional mitigation required - see <b>Section 12.5.</b>	Very Low	Minor Adverse
	Recreation – High		Very Low	Negligible
	Biodiversity – High		Very Low	Negligible
Contaminated runoff and spillages of pollutants polluting Wheatley Beck	Water Quality – High	No additional mitigation required - see <b>Section 12.5.</b>	Very Low	Negligible
	Recreation – Medium		Very Low	Negligible
	Biodiversity – High		Very Low	Negligible
Contaminated runoff and spillages of pollutants polluting Catchwater Drain (and associated tributaries)	Water Quality – High	No additional mitigation required - see <b>Section 12.5.</b>	Very Low	Negligible
	Recreation – Medium		Very Low	Negligible
	Biodiversity – High		Very Low	Negligible
Contaminated runoff and spillages of pollutants polluting Railway Dyke Drain/ Drain to the North of Site	Water Quality – Medium	No additional mitigation required - see <b>Section 12.5.</b>	Very Low	Negligible
	Recreation – Low		Very Low	Negligible
	Biodiversity – Medium		Very Low	Negligible
Contaminated runoff and spillages of pollutants polluting Additional Identified Water Features	Water Quality – Low	No additional mitigation required - see <b>Section 12.5.</b>	Very Low	Negligible
	Recreation – Low		Very Low	Negligible
	Biodiversity – Medium		Very Low	Negligible

Predicted Impact	Sensitivity of resource/ receptor	Mitigation	Magnitude of impact	Classification of effect
Accidental leakage or spillage of pollutants polluting groundwater	Shallow Groundwater Vulnerability – Medium	No additional mitigation required - see <b>Section 12.5.</b>	Low	Negligible
	Deep Groundwater Vulnerability – High		Very Low	Negligible
Potential impact on WFD status		No additional mitigation required - see <b>Section 12.5.</b>		No effect
<b>Decommissioning – considered to be same as construction stage as detailed above</b>				

## 12.10 References

- Ref. 12-1 Commission of the European Communities, (2000) Directive 2000/60/EC The Water Framework Directive.
- Ref. 12-2 Her Majesty's Stationery Office, (HMSO), (1991) The Water Resources Act.
- Ref. 12-3 HMSO (2010) Flood and Water Management Act 2010.
- Ref. 12-4 HMSO, (2003) The Water Act.
- Ref. 12-5 HMSO, (2014) The Water Act.
- Ref. 12-6 HMSO, (1995) Environment Act.
- Ref. 12-7 HMSO, (1990) Environmental Protection Act.
- Ref. 12-8 HMSO, (1991) The Land Drainage Act.
- Ref. 12-9 HMSO, (2003) The Water Environment (Water Framework Directive) (England and Wales) Regulations.
- Ref. 12-10 HMSO, (2015) The Water Environment (WFD) Regulations.
- Ref. 12-11 HMSO, (2015) The Water Framework Directive (Standards and Classification) Directions.
- Ref. 12-12 HMSO, (1999) The Anti-Pollution Works Regulations.
- Ref. 12-13 HMSO, (2001) The Control of Pollution (Oil Storage) (England) Regulations.
- Ref. 12-14 HMSO, (2009) The Groundwater (England and Wales) Regulations.
- Ref. 12-15 HMSO, (2009) The Environmental Damage Regulations.
- Ref. 12-16 HMSO, (2009) The Flood Risk Regulations.
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- Ref. 12-18 HMSO, (2010) The Environmental Permitting (England and Wales) Regulations.
- Ref. 12-19 HMSO, (2000) The Water Supply (Water Quality) Regulations 2000.
- Ref. 12-20 Cabinet Office, (2008) The Pitt Review. Learning Lessons from the 2007 Floods.
- Ref. 12-21 Department for Energy and Climate Change (2011) Overarching National Policy Statement for Energy (EN-1).
- Ref. 12-22 DECC (2011) National Policy Statement for Fossil Fuel Generating Infrastructure: EN-2. The Stationary Office, London. Communities and Local Government, (2012); National Planning Policy Framework.
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- Ref. 12-28 Department for Environment, Food and Rural Affairs (2011) *UK Marine Policy Statement*.
- Ref. 12-29 Bassetlaw District Council (2011) Bassetlaw District Local Development Framework: Core Strategy & Development Management Policies DPD. Adopted December 2011.
- Ref. 12-30 Department for Environment, Food and Rural Affairs (2012) *Internal Drainage Board Model Land Drainage Byelaws*. Available from: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/522130/internal-drainage-board-model-land-drainage-byelaws.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/522130/internal-drainage-board-model-land-drainage-byelaws.pdf)
- Ref. 12-31 Environment Agency (2000) Pollution Prevention Guidelines 1 General guide to the prevention of pollution.
- Ref. 12-32 Environment Agency (2010) Pollution Prevention Guidelines 2 Above ground oil storage tanks.
- Ref. 12-33 Environment Agency (2007) Pollution Prevention Guidelines 3 Use and design of oil separators in surface water drainage systems.
- Ref. 12-34 Environment Agency (2006) Pollution Prevention Guidelines 4 Treatment and disposal of sewage where no foul sewer is available.
- Ref. 12-35 Environment Agency (2007) Pollution Prevention Guidelines 5 Works and maintenance in or near water.
- Ref. 12-36 Environment Agency (2010) Pollution Prevention Guidelines 6 Working at construction and demolition sites.
- Ref. 12-37 Environment Agency (2004) Pollution Prevention Guidelines 7 Refuelling activities.
- Ref. 12-38 Environment Agency (2007) Pollution Prevention Guidelines 13 Vehicle washing and cleaning.
- Ref. 12-39 Environment Agency (2000) Pollution Prevention Guidelines 18 Managing fire water and major spillages.
- Ref. 12-40 Environment Agency (2009) Pollution Prevention Guidelines 21 Pollution incident response planning.
- Ref. 12-41 CIRIA, (2001) Control of water pollution from construction Sites: Guidance for consultants and constructors. C532.
- Ref. 12-42 CIRIA, (2015); The SuDS Manual. C753.

- Ref. 12-43 Department for Transport (2003) Transport Analysis Guidance. Available at <http://www.webtag.org.uk/>
- Ref. 12-44 Highways Agency (2009) *Design Manual for Roads and Bridges Volume 11, Section 3 Part 10* - Document Number HA 45/09 available at <http://dft.gov.uk/ha/standards/dmrb/index.htm>
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- Ref. 12-48 JBA (2010) Bassetlaw District Council Strategic Flood Risk Assessment. Final Report.
- Ref. 12-49 JBA (2011) Nottinghamshire Preliminary Flood Risk Assessment.
- Ref. 12-50 Site Surveying Services Ltd drawing No. sss-7478-West Burton Power Station, dated 6<sup>th</sup> June 2017.
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- Ref. 12-52 Environment Agency, (2016) Flood Risk Assessments: Climate Change Allowances. Updated April 2016. Available at: <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>
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## 13. Socio-economics

### 13.1 Introduction

13.1.1 This chapter of the Preliminary Environmental Information (PEI) Report addresses the potential socio-economic impacts of the Proposed Development. This considers employment opportunities during construction and operation of the Proposed Development, as well as the wider implications of the associated demand on local services.

13.1.2 This chapter is supported by **Appendix 13A: Human Health** (PEI Report Volume II).

### 13.2 Legislation, Planning Policy and Guidance

#### National Planning Policy Context

##### *National Policy Statements for Energy Infrastructure*

13.2.1 The Overarching National Policy Statement (NPS) for Energy (EN-1) (paragraph 4.1.3) requires the decision maker to take into account of the proposed developments' *'potential benefits including its contribution to meeting the need for energy infrastructure, job creation and any long-term or wider benefits'*.

13.2.2 NPS-EN1 paragraph 5.12.2 states:

*"Where the project is likely to have socio-economic impacts at local or regional levels, the applicant should undertake and include in their application an assessment of these impacts as part of the ES."* (see Section 4.2)

13.2.3 NPS-EN1 paragraph 5.12.3 states:

*"This assessment should consider all relevant socio-economic impacts, which may include:*

- the creation of jobs and training opportunities;*
- the provision of additional local services and improvements to local infrastructure, including the provision of educational and visitor facilities;*
- effects on tourism;*
- the impact of a changing influx of workers during the different construction, operation and decommissioning phases of the energy infrastructure. This could change the local population dynamics and could alter the demand for services and facilities in the settlements nearest to the construction work (including community facilities and physical infrastructure such as energy, water, transport and waste). There could also be effects on social cohesion depending on how populations and service provision change as a result of the development; and*
- cumulative effects – if development consent were to be granted to for a number of projects within a region and these were developed in a similar timeframe; there could be some short-term negative effects, for example a potential shortage of construction workers to meet the needs of other industries and major projects within the region."*

13.2.4 NPS-EN1 paragraph 5.12.4 states *'Applicants should describe the existing socio-economic conditions in the areas surrounding the proposed development and should also refer to how the development's socio-economic impacts correlate with local planning policies'*.

- 13.2.5 NPS-EN1 paragraph 5.12.5 states ‘Socio-economic impacts may be linked to other impacts, for example the visual impact of a development is considered in Section 5.9 but may also have an impact on tourism and local businesses’.
- 13.2.6 Error! Reference source not found.-1 provides a summary of relevant NPS advice and signposting to where matters are considered within this chapter.

**Table 13-1: Summary of relevant NPS advice regarding socio-economics**

Summary of NPS	Consideration within the Chapter
<b>NPS EN-1</b>	
Paragraph 4.1.3 requires the Planning Inspectorate (PINS) to take into account of the proposed developments’ <i>‘potential benefits including its contribution to meeting the need for energy infrastructure, job creation and any long-term or wider benefits’.</i>	Addressed in <b>Section 13.6</b>
Paragraph 5.12.2 states ‘Where the project is likely to have socio-economic impacts at local or regional levels, the applicant should undertake and include in their application an assessment of these impacts as part of the ES’.	Addressed in <b>Section 13.6</b>
Paragraph 5.12.3 states: “This assessment should consider all relevant socio-economic impacts, which may include: <ul style="list-style-type: none"> <li>- The creation of jobs and training opportunities;</li> <li>- The provision of additional local services and improvements to local infrastructure, including the provision of educational and visitor facilities;</li> <li>- Effects on tourism;</li> <li>- The impact of a changing influx of workers during the different construction, operation and decommissioning phases of the energy infrastructure. This could change the local population dynamics and could alter the demand for services and facilities in the settlements nearest to the construction work (including community facilities and physical infrastructure such as energy, water, transport and waste). There could also be effects on social cohesion depending on how populations and service provision change as a result of the development; and</li> <li>- Cumulative effects – if development consent were to be granted to for a number of projects within a region and these were developed in a similar timeframe; there could be some short-term negative effects, for example a potential shortage of construction workers to meet the needs of other industries and major projects within the region.”</li> </ul>	Addressed in <b>Section 13.6</b>
Paragraph 5.12.4 states that ‘Applicants should describe the existing socio-economic conditions in the areas surrounding the proposed development and should also refer to how the development’s socio-economic impacts correlate with local planning policies’.	Addressed in <b>Section 13.4</b>
Paragraph 5.12.5 states that ‘Socio-economic impacts may be linked to other impacts, for example the visual	No direct effects on tourism visitors or local businesses are predicted.

<p><i>impact of a development is considered in Section 5.9 but may also have an impact on tourism and local businesses’.</i></p>	<p>Any inter-relationships will be identified as part of the ES that accompanies the application for development consent, but these may relate to landscape and visual, noise, transport (disruption) and air quality matters.</p>
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**National Planning Policy Framework (NPPF)**

- 13.2.7 NPPF paragraph 17 states that planning should proactively drive and support sustainable economic development to deliver the homes, business and industrial units, infrastructure and thriving local places that the country needs.
- 13.2.8 NPPF paragraphs 18 to 21 outline the Government’s commitment to securing economic growth through the planning system. Accordingly local authorities should:
  - set out a clear economic vision and strategy for their area which positively and proactively encourages sustainable economic growth;
  - set criteria, or identify strategic sites, for local and inward investment to match the strategy and to meet anticipated requirements over the plan period;
  - support existing business sectors, taking account of whether they are expanding or contracting and, where possible, identify and plan for new or emerging sectors likely to locate in their area. Policies should be flexible enough to accommodate needs not anticipated in the plan and to allow a rapid response to changes in economic circumstances;
  - plan positively for the location, promotion and expansion of clusters or networks of knowledge driven, creative or high technology industries; and
  - identify priority areas for economic regeneration, infrastructure provision and environmental enhancement.

**Local Policy**

**Bassetlaw Core Strategy**

- 13.2.9 The Core Strategy, adopted in 2011, has strategic objectives linked to economic development, namely:
  - SO2 – To provide a range and choice of employment sites in Worksop, Retford, Harworth Bircotes (including the A1 corridor), Carlton-in-Lindrick/Langold and Tuxford.
  - SO4 – To enhance and protect the vitality and viability of the centres of Worksop, Retford, Harworth Bircotes and Tuxford, through environmental improvements and provision of increased town centre retail, employment and leisure development.
  - SO5 – To ensure the continued viability of Bassetlaw’s rural settlements through the protection, and enhancement in the levels, of local services and facilities and support for enterprises requiring a rural location.
- 13.2.10 The Core Strategy states that particular support will be given to economic development proposals that:
  - *“Guarantee employment programmes for local residents that provide opportunities for training and development and will contribute to raised workforce skills levels within the District”;*
  - *“Deliver, or contribute to, opportunities for the growth of indigenous businesses”;*

- “Bring significant, good quality inward investment opportunities to the District” (Policy DM7).

13.2.11 The Core Strategy will be replaced by the Bassetlaw Plan, which will be the new Local Plan for Bassetlaw and establish the long-term approach to development in the District up to the year 2034.

**Derby, Derbyshire, Nottingham and Nottinghamshire (D2N2) Local Enterprise Partnership (LEP) Strategic Economic Plan**

13.2.12 The D2N2 LEP states ‘To achieve our ambitions, D2N2 needs an economic infrastructure which can enable and accommodate significant employment and population growth’.

13.2.13 Employment and skills are a strategic theme and a ‘cornerstone’ of the Strategic Economic Plan. D2N2 LEP is committed to increasing the number of jobs within the economy and ensuring that our businesses can access the skilled workers they need, both now and in the future.

### 13.3 Assessment Methodology and Significance Criteria

#### Consultation

13.3.1 **Table 13-2** summarises the consultation responses of relevance to socio-economics.

**Table 13-2: Consultation summary table**

Consultee or organisation approached	Date and nature of consultation	Method	Summary of Response
West Lindsey District Council	May 2017 The approach in section 5.10 of the SR appears to be acceptable.	Scoping Opinion	Noted.
Planning Inspectorate	May 2017 The SoS recommends that the scope of the socio-economic assessment addresses the matters set out in NPS-EN1 Section 5.12, where appropriate.	Scoping Opinion	Noted in <b>Section 13.2</b> .
	Types of jobs generated should be considered in the context of the available workforce in the area, this applies equally to the construction and operational stages.		Construction and operational jobs considered in <b>Section 13.6</b> and structure of workforce considered in <b>Section 13.4</b> .
	The SoS recommends that the detailed assessment criteria are agreed with BDC.		Assessment undertaken using relevant national standards. We would welcome any feedback from BDC on the assessment criteria.
	The SoS recommends that the Applicant carries out consultation with local, sub-regional and, if necessary, regional stakeholders to gain the most up to date and accurate baseline information, as referred to in paragraph 5.10.7.		Baseline ( <b>Section 13.4</b> ) completed using most recent data from recognised data sources. We would welcome comments from stakeholders on the baseline review in <b>Section</b>

Consultee or organisation approached	Date and nature of consultation	Method	Summary of Response
			<b>13.4.</b>
	Scoping Report paragraph 5.10.9 references use of professional judgement in the assessment of significant effects. The Applicant is advised that any assessments based on professional judgement should be fully evidenced.		Noted.
	The socioeconomic effects arising from decommissioning should be considered and described in the ES.		Decommissioning is considered in <b>Section 13.6.</b>
The Applicant is advised that BIS no longer exists as an entity and that its functions and responsibilities now largely rest with the Department for Business, Energy and Industrial Strategy (BEIS).		Noted.	

### Assessment Methods

- 13.3.2 This assessment considers the role of the Proposed Development in the generation of direct and indirect employment opportunities at the local and regional level, during its construction and operation, as well as the potential effect on local services.
- 13.3.3 The assessment has been carried out using a number of recognised data series from the Office for National Statistics (ONS) (2015) Census 2011 (Ref 13-6). ONS statistical geographies have been used to define the study area.
- 13.3.4 Where possible, the socio-economic impacts of the Proposed Development have been appraised against relevant national standards; such as those provided by HM Treasury, BEIS, and the Homes and Communities Agency (HCA). Where relevant standards do not exist, professional experience and judgement have been applied.

### Study Area

- 13.3.5 ONS statistical geographies have been used to define the study area for the socio-economics assessment presented herein.
- 13.3.6 The Proposed Development falls within the 'Sturton Ward', hereafter defined as the Direct Impact Area. The socio-economics assessment also makes comparisons to Bassetlaw, the East Midlands and the whole of England. Key indicators include: population and labour force; skills and unemployment; industry and the economy.
- 13.3.7 In considering the socio-economic impacts on employment, this socio-economics chapter also takes into account the principal labour market catchment area of the travel to work area (TTWA). TTWAs contain at least 75% of the area's workforce that both live and work in the area. TTWAs have populations of at least 3,500 people. The Proposed Development falls within the Worksop and Retford TTWA.

## Significance Criteria

13.3.8 The socio-economics impact assessment presented within this chapter determines the:

- sensitivity of socio-economics receptors;
- magnitude of impacts; and
- the consequent significance of effects associated with construction, operation and decommissioning of the Proposed Development.

13.3.9 These aspects are considered in the sections below.

## Assessment of Value (Sensitivity)

13.3.10 The sensitivity of socio-economic receptors is assessed as high, medium, low or very low based on the criteria and definitions presented in **Table 13-3**.

**Table 13-3: Criteria for assessing socio-economic receptor sensitivity**

Level of Sensitivity	Description
<b>High</b>	<ul style="list-style-type: none"> <li>• there are limited/no comparable and accessible alternatives that exist within the relevant catchment area; and/or</li> <li>• receptors have limited ability to absorb the change; and/or</li> <li>• receptors are generally travelling from greater distances (nationally) to use the facility; and/or</li> <li>• there are higher numbers utilising the facility; and/or</li> <li>• identified as a high priority in published policy and strategy.</li> </ul>
<b>Medium</b>	<ul style="list-style-type: none"> <li>• there are limited comparable and accessible alternatives within the relevant catchment area; and/or</li> <li>• receptors have limited ability to absorb the change; and/or</li> <li>• receptors are generally travelling from relatively far distances (regionally) to use the facility; and/or</li> <li>• there are moderate numbers utilising the facility; and/or</li> <li>• identified at a sub-regional and/ or local level as policy/strategy priorities.</li> </ul>
<b>Low</b>	<ul style="list-style-type: none"> <li>• receptors are able to relatively easily absorb the change; and/or</li> <li>• there are some comparable and accessible alternatives that exist within the relevant catchment area; and/or</li> <li>• receptors are mainly travelling from nearby (local/within the study area) to use the facility; and/or</li> <li>• there are low numbers utilising the facility; and/or</li> <li>• referenced in policy and strategy but do not accord a high priority.</li> </ul>
<b>Very Low</b>	<ul style="list-style-type: none"> <li>• receptors are able to relatively easily absorb the change; and/or</li> <li>• there are many comparable and accessible alternatives that exist within the relevant catchment area; and/or</li> <li>• receptors are travelling from nearby (local/within the study area) to use the facility; and/or</li> <li>• there are low numbers utilising the facility.</li> </ul>

## Assessment of Magnitude

13.3.11 Socio-economics impact magnitude is assessed as high, medium, low or very low as per **Table 13-4**. For each grading, a list of characteristics is provided by which to determine the magnitude of the impact.

**Table 13-4: Criteria for assessing impact magnitude**

Magnitude	Description
<b>High</b>	A major adverse/beneficial impact on employment creation or the well-being of receptors and/or constitute a long-term change to baseline conditions (i.e. it would be likely to continue and effectively be permanent and irreversible).
<b>Medium</b>	A moderate adverse/beneficial impact on employment creation or the well-being of receptors and/or constitute a medium-term change to baseline conditions.
<b>Low</b>	A minor adverse/beneficial impact on employment creation or the well-being of receptors constitutes a short-term change to baseline conditions.
<b>Very Low</b>	A slight or no adverse/beneficial impact on employment creation and/or constitutes a very short-term/ temporary change to baseline conditions.

## Assessment of Significance

13.3.12 The scale, permanence and significance of identified effects has been assessed relative to the baseline position. The assessment covers as relevant the direct, indirect, induced impacts of the construction and operation of the Proposed Development.

13.3.13 The socio-economic effects of the Proposed Development are defined as either:

- **beneficial:** an advantageous or beneficial effect on an impact area;
- **negligible:** an imperceptible effects on an impact area; or
- **adverse:** a disadvantageous or negative effect on an impact area.

13.3.14 The magnitude of the impact and the value (sensitivity) of the receptor are used in order to determine the significance of effects (beneficial or adverse), in accordance with **Table 13-5**.

**Table 13-5: Criteria for assessing significance**

Magnitude of impact	Sensitivity/ importance of receptor			
	High	Medium	Low	Very low
<b>High</b>	Major	Major	Moderate	Minor
<b>Medium</b>	Major	Moderate	Minor	Negligible
<b>Low</b>	Moderate	Minor	Negligible	Negligible
<b>Very low</b>	Minor	Negligible	Negligible	Negligible

13.3.15 For the purposes of this assessment, only moderate and major impacts are considered to be significant.

13.3.16 If mitigation is proposed, the residual effect following mitigation would be categorised using the same method in order to identify whether residual effects are significant.

## 13.4 Baseline Conditions

### Population Age Structure

- 13.4.1 The population in Sturton Ward (within which the Proposed Development is located) is 2,289 (Ref 13-8). The ward has an older than average population, with 16 to 24 year olds only comprising just 8.4% of the population compared to 12.1% in the East Midlands and 11.9% in England (**Table 13-6**). This trend towards an older population in Sturton Ward is in evidence at the 45 to 64 age band, which registers 31.8% of the population, compared to a regional level of 26.4% in the East Midlands and 25.4% in England. Sturton Ward also has a large population of over 64s, at 20.2% of the population, compared to 17% and 16.4% in the East Midlands and England respectively. The Sturton Ward features a lower than average central age band of 25 to 44 years (22% of residents), lower than Bassetlaw (24.4%), East Midlands (25.9%) and England (27.5%).

**Table 13-6: Age structure of the population**

Age band	Sturton Ward	Bassetlaw	East Midlands	England
0 to 15	17.5	17.8	18.4	18.9
16 to 24	8.4	10.3	12.1	11.9
25 to 44	22.0	24.4	25.9	27.5
45 to 64	31.8	28.8	26.4	25.4
Over 64	20.2	18.5	17.0	16.4

Source: Census, ONS (2011) (Ref 13-6)

### Qualification Levels

- 13.4.2 Residents of Sturton Ward are better qualified at the highest level compared to the regional and national levels. People with the highest qualification level, National Vocational Qualification 4 and above (NVQ4+), represent 40.1% in the Ward compared with 29.5% in Bassetlaw, 31.3% in East Midlands and 37.9% in England (refer to **Table 13-7**).
- 13.4.3 Fewer Sturton Ward residents are qualified to the NVQ3 level compared to the regional and national levels. The same trend is observed at NVQ2 level. There are more NVQ1-qualified residents in Sturton Ward (13.0%) compared to the East Midlands (12.6%) and England (11.3%) levels.

**Table 13-7: Qualification level of residents**

Qualification	Sturton Ward	Bassetlaw	East Midlands	England
NVQ4+	40.1%	29.5%	31.3%	37.9%
NVQ3	17.3%	16.8%	21.5%	18.8%
NVQ2	13.8%	24.8%	19.6%	17.5%
NVQ1	13.0%	9.9%	12.6%	11.3%
Other qualifications	15.8%*	5.3%	7.5%	6.7%
No qualifications		13.7%	7.5%	7.8%

Qualification	Sturton Ward	Bassetlaw	East Midlands	England
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Source: Annual Population Survey, ONS (2016) (Ref 13-8). \*Breakdown between other and no qualification is not available for Sturton Ward since the group sample size is disclosive.

## Employment Levels

- 13.4.4 In Sturton Ward, the largest employment sector is mining, quarrying and utilities, accounting for 37.6% of employment (Ref 13-7). The mining, quarrying and utilities sector is significantly larger than at the wider regional and national levels, which account for 1.7% and 1.1% of employment in the East Midlands and England respectively (refer to **Table 13-88**). The industry that accounts for the greatest proportion of employment in England is health (12.5%), but this only accounts for 2.7% of employment in Sturton Ward. This is also much lower than for Bassetlaw, where the health industry makes up 15.2% of employment.
- 13.4.5 The second largest industry for employment in Sturton Ward is the construction sector (21.5%). This rate is also much larger than Bassetlaw (5.5%), the East Midlands (5.1%) and England (4.6%), indicating the importance of the industry to Sturton Ward. The next highest employment industry is in the manufacturing industry, accounting for 15.9% in Sturton Ward. Despite being lower than Bassetlaw's manufacturing employment (17.1%), it is still larger than the East Midlands (13.1%) and England (8%).

**Table 13-8: Employment of residents by industry**

Industry (% of employment)	Sturton Ward	Bassetlaw	Worksop & Retford TTWA	East Midlands	England
1: Agriculture, forestry & fishing	0.0	0.3	0.2	1.8	1.3
2: Mining, quarrying & utilities	37.6	2.7	2.9	1.7	1.1
3: Manufacturing	15.9	17.1	17.7	13.1	8.0
4: Construction	21.5	5.5	5.2	5.1	4.6
5: Motor trades	0.3	1.9	1.6	2.1	1.8
6: Wholesale	0.2	3.7	3.4	4.5	4.1
7: Retail	1.1	13.7	13.6	10.5	9.9
8: Transport & storage (including postal)	2.0	5.8	5.5	5.0	4.7
9: Accommodation & food services	2.5	4.7	4.6	5.6	7.0
10: Information & communication	1.3	1.4	1.4	2.2	4.3
11: Financial & insurance	0.0	1.0	1.0	1.7	3.5
12: Property	0.7	1.4	1.2	1.3	1.9
13: Professional, scientific	2.8	5.1	4.9	6.1	8.8

Industry (% of employment)	Sturton Ward	Bassetlaw	Worksop & Retford TTWA	East Midlands	England
& technical					
14: Business administration & support services	1.1	6.1	6.1	10.1	9.0
15: Public administration & defence	0.1	2.9	3.1	3.6	4.0
16: Education	4.7	8.1	8.4	9.1	9.0
17: Health	2.7	15.2	15.5	12.4	12.5
18: Arts, entertainment, recreation & other services	5.5	3.4	3.5	3.9	4.5
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Source: Business Register and Employment Survey, ONS (2015) (Ref 13-7)

## Occupation

- 13.4.6 Sturton Ward features a large number of residents in the most senior occupation category, managers, directors and senior officials (refer to **Table 13-9**). This stands at 14.0% compared to 10.5% for Bassetlaw, 10.6% for the East Midlands and 10.9% for England. The most common occupations in Sturton Ward fall into the professional category, with 16.3% of the workforce. This is greater than the percentage for Bassetlaw and East Midlands.
- 13.4.7 There are fewer individuals within the lower-level occupations in Sturton Ward than most of the wider areas. The least common category is sales and customer services occupations, which is significantly below East Midlands and England (both 8.4%). The percentage of residents in elementary occupations is lower in Sturton Ward (7.9%) than the comparator areas.

**Table 13-9: Occupations of residents**

Occupation (%)	Sturton Ward	Bassetlaw	East Midlands	England
1: Managers, directors and senior officials	14.0	10.5	10.6	10.9
2: Professional occupations	16.3	12.8	15.2	17.5
3: Associate prof & tech occupations	10.0	9.6	11.3	12.8
4: Administrative and secretarial occupations	12.3	9.8	10.9	11.5
5: Skilled trades occupations	16.7	13.2	12.1	11.4
6: Caring, leisure and other service occupations	10.0	10.7	9.5	9.3

Occupation (%)	Sturton Ward	Bassetlaw	East Midlands	England
7: Sales and customer service occupations	5.4	8.0	8.4	8.4
8: Process, plant and machine operatives	7.4	11.3	9.3	7.2
9: Elementary occupations	7.9	14.0	12.7	11.1

Source: Census (2011) – Occupation by sex (Ref 13-6)

## Economic Activity

- 13.4.8 There are approximately 2,289 economically active residents of Sturton Ward (refer to **Table 13-10**). Sturton Ward features a greater level of economic activity than at a local, regional and national level. The Ward's 82.7% economy activity rate is larger than the East Midland's (78.1%) and England's (78.1% rate). Sturton Ward's economic activity rate is also greater than Bassetlaw district's (75.9%).

**Table 13-10: Economic activity rates**

Economic Activity	Sturton Ward	Bassetlaw	East Midlands	England
Percentage	82.7%	75.9%	78.1%	78.1%
Number	2,289	52,300	2,282,500	26,975,800

Source: Annual Population Survey, ONS (2016) – Economic activity rate aged 16-64. (Ref 13-8)

## 13.5 Development Design and Impact Avoidance

- 13.5.1 No measures applicable to socio-economics impact avoidance have been included in the Proposed Development design, rather its construction, operation and decommissioning would be supportive of the local economy through the creation of jobs.

## 13.6 Likely Impacts and Effects

- 13.6.1 The socio-economics assessment is based upon assumptions in relation to the likely design of the Proposed Development and the way in which it would be constructed, operated and decommissioned. These allow hypotheses to be advanced so that the assessment of the likely impacts of the Proposed Development can be made. The EIA process will test and confirm the hypotheses and assessments contained in this PEI Report, allowing the Environmental Statement (ES) that forms part of the Application for development consent to be completed.
- 13.6.2 This section analyses the scale, permanence (short, medium, long-term) and significance of socio-economic effects relative to the baseline established in **Section 13.4**.

### Construction

- 13.6.3 The Proposed Development would represent an opportunity to create a range of jobs during the construction period, both directly and indirectly, and across a wide range of sectors and skills.

- 13.6.4 Construction of the Proposed Development would be expected to be undertaken in up to three phases over a period of up to 6 years between Q2 2020 and 2026<sup>1</sup>. Based on experience of similar projects, the Proposed Development is anticipated to create an average of approximately 95 temporary construction jobs during the construction period. Although these jobs would be temporary, they represent a positive economic impact that can be estimated as a function of the scale and type of construction. The direct expenditure involved in the construction period would lead to increased output generated in the Worksop and Retford TTWA economy.
- 13.6.5 There are a number of other factors that also have an influence on this figure to give net construction employment numbers. These factors are considered in the sections below and provide a preliminary assessment of the net impact of the Proposed Development in terms of temporary construction jobs on the local economy.

#### *Leakage*

- 13.6.6 Leakage effects refer to the proportion of jobs that are filled by residents living outside the Worksop and Retford TTWA. Overall, it is assumed that the majority of the employment generated could theoretically be taken by people living within the Worksop and Retford TTWA. Leakage has been set at 30.4% in line with the proportion of jobs taken by non-residents of the Worksop and Retford TTWA. A 30.4% discount is, therefore, applied to the 95 gross jobs created and as such, it is estimated that approximately 29 people from outside the Worksop and Retford TTWA and approximately 66 people from within the TTWA could theoretically benefit from working at the Proposed Development during the construction period. However, it is recognised that in practice, the appointed contractor(s) may require specialist support or support from their wider supply chain that necessitates additional personnel to be employed from outside the Worksop and Retford TTWA. Therefore, the above number represent a theoretical calculation of potential local employment opportunities, in order to benchmark this against workforce availability in the area.

#### *Displacement*

- 13.6.7 Displacement measures the extent to which the benefits of a project are offset by reductions of output or employment elsewhere. Any additional demand for labour cannot simply be treated as a net benefit, it removes workers from other posts and the net benefit is reduced to the extent that this occurs.
- 13.6.8 Overall it is assumed that due to the flexibility of a typical construction workforce (i.e. they quickly move from project to project) displacement effects are considered to be low. The HCA Additionality Guide (Ref 13-5) suggests 25% as a 'ready reckoner' for low levels of displacement (i.e. there are expected to be some displacement effects, although only to a limited extent). Applying this level of displacement to total gross direct employment in the Worksop and Retford TTWA results in a net direct employment potential of approximately 71.

#### *Multiplier Effect*

- 13.6.9 In addition to the direct construction employment generated by the Proposed Development itself, there would be an increase in local employment arising from indirect and induced effects of the construction activity. Employment growth would arise locally through manufacturing services and suppliers to the construction process (indirect or supply linkage multipliers). Additionally, part of the income of the construction workers and suppliers would be spent in the Worksop and Retford TTWA, generating further employment (induced or income multipliers).
- 13.6.10 The impact of the multiplier depends on the size of the geographical area that is being considered, the local supply linkages and income leakage from the area. The HCA Additionality Guide (Ref 13-5) provides 'ready reckoners' of composite multipliers – the combined effect of indirect and induced

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<sup>1</sup> This construction programme is based on a "worst case scenario" with the potential for a single, shorter construction programme over 2-3 years. While a shorter construction programme would reduce the length of the short-term positive impact associated with construction employment, this would not impact the subsequent assessment of significance.

multipliers. It has been assumed that the Worksop and Retford TTWA has ‘average’ supply linkages based on the scale of its economy. Therefore, a multiplier of 1.3 is determined using the HCA guidance. Applying this multiplier generates the potential for an additional 15 indirect and induced jobs in the Worksop and Retford TTWA.

### Net Construction Employment

- 13.6.11 Based on the gross construction worker requirements in the construction schedule and the additionality factors outlined above, approximately 93 net construction jobs could be generated, of which approximately 64 could theoretically be from the Worksop and Retford TTWA.
- 13.6.12 **Table 13-11** presents the theoretical short-term employment created by the Proposed Development taking leakage, displacement and multiplier effects into account.

**Table 13-11: Theoretical net construction employment in Worksop and Retford TTWA (average no. of workers onsite per year)<sup>2</sup>**

	Worksop and Retford TTWA	Outside Worksop and Retford TTWA	Total
Gross direct employment	66	29	95
Displacement	17	7	24
Net direct employment	50	22	71
Indirect & induced employment	15	6	21
<b>Total net employment</b>	<b>64</b>	<b>28</b>	<b>93</b>

- 13.6.13 The magnitude of impact associated with the creation of short-term employment is considered to be low, as employment relating to the Proposed Development could represent less than 1% of the TTWA’s construction workforce (2,618 in 2015) (Ref 13-7). The value/sensitivity of receptors is assessed as medium, based on the economic profile of the region being less robust than the national averages. As such, it would be expected that receptors within the TTWA would be sensitive to changes in employment and unemployment. The direct, indirect and induced employment created by the construction phase of the Proposed Development is therefore likely to have a minor short-term and, therefore, an insignificant effect on the Worksop and Retford TTWA’s economy.

### Opening

- 13.6.14 The opening of the Proposed Development is not anticipated to have a socio-economic impact.

### Operation

- 13.6.15 During the Proposed Development operational period, employment would be generated in operative, management and maintenance roles in relation to the electricity generating element of the Proposed Development and its maintenance.
- 13.6.16 Operation of the Proposed Development is anticipated to create up to 15 operational roles, which may be new jobs or integrated with other EDF Energy operations. Temporary and contractor employees associated with maintenance activities would also be employed as required.

<sup>2</sup> Totals may not equal due to rounding.

### *Leakage*

- 13.6.17 As with the construction employment impact, leakage has been set at 30.4% in line with the proportion of jobs potentially taken by non-residents of the Worksop and Retford TTWA. A 30.4% discount is, therefore, applied to the 15 operational roles created if they were new jobs, and as such it is estimated that approximately five people from outside the Worksop and Retford TTWA and 10 people from within the TTWA could potentially benefit from working at the Proposed Development, once operational. Notwithstanding, in practice the Proposed Development could result in continuation of employment of current workers at the West Burton Power Station Site.

### *Displacement*

- 13.6.18 Depending on the degree of integration with the existing power stations, the operational roles may be new jobs or roles undertaken by personnel from the existing power stations. Taking this into account, displacement levels are set to low.

### *Multiplier*

- 13.6.19 Again it has been assumed that the Worksop and Retford TTWA has 'average' supply linkages based on the scale of its economy. Therefore, a multiplier of 1.3 is determined from the HCA guidance (Ref 13-5). Applying this multiplier generates the theoretical potential for an additional one indirect and induced job in the Worksop and Retford TTWA.

### *Net Operational Employment*

- 13.6.20 Based on the operational worker requirements and the additionality factors outlined above, up to 15 operational roles could be generated, of which some are expected to be from the existing West Burton Power Station employees.
- 13.6.21 The magnitude of impacts is considered to be very low, due to the small amount of net employment to be generated within the TTWA once the Proposed Development is operational. The value/sensitivity of receptors is assessed as medium based on the economic profile of the region than the national averages. As such, the operational effect is assessed as being negligible (not significant).

### *Decommissioning*

- 13.6.22 The people employed to decommission the Proposed Development would have a positive effect on the economy by spending their wages, in the same way as those employed during construction and operation. Current plans are for the Proposed Development to not be decommissioned until circa 2066; at this stage the significance of the employment effects is uncertain due to limited information available regarding decommissioning methods, timescales and associated staffing requirements.

### *Rochdale Envelope*

- 13.6.23 The Rochdale Envelope (i.e. the maximum parameters for the Proposed Development and in particular its main buildings and structures) does not affect this assessment because technological changes in the design of the Proposed Development and variations in building size or layout within the defined parameters set out in **Chapter 4: The Proposed Development** are not likely to change socio-economic impacts, as the variations maintained within the project design do not affect the number or type of jobs and benefits generated by the Proposed Development.
- 13.6.24 As noted, a shorter construction programme, if adopted, has the effect of reducing the length of the short-term positive impact associated with construction employment. However, this would not impact the subsequent assessment of significance presented in this chapter.

## 13.7 Mitigation and Enhancement Measures

- 13.7.1 Given that no adverse socio-economic effects have been identified, no specific mitigation measures are considered necessary.

## 13.8 Limitation or Difficulties

- 13.8.1 This socio-economic impact assessment is based on data available at the time of writing, with secondary data having a time lag and therefore not perfectly representative of current conditions.
- 13.8.2 The assessment is based on an indicative Proposed Development construction programme and operational details as available at the time of writing. Decommissioning phase socio-economic effects are uncertain given uncertainties regarding the decommissioning methods, timescales and associated staffing requirements.

## 13.9 Residual Effects and Conclusions

- 13.9.1 This chapter has analysed the potential socio-economic impacts of the Proposed Development compared to baseline conditions. In summary, it is assessed that the Proposed Development would have an overall positive impact on the economy in the study area, through the provision of employment and through associated multiplier effects. However, in light of the scale of these impacts and the prevailing economic conditions within the study area, these positive effects are not deemed to be significant.

## 13.10 References

- Ref 13-1 Department for Communities and Local Government (DCLG) (2012) *National Planning Policy Framework*. DCLG, London.
- Ref 13-2 Department for Business, Innovation and Skills (BIS) (2009) *Research to Improve the Assessment of Additionality*.
- Ref 13-3 HM Treasury (2011) *The Green Book – Appraisal and Evaluation in Central Government*.
- Ref 13-4 HM Treasury (2011) *The Magenta Book – Guidance for Evaluation*.
- Ref 13-5 Homes & Communities Agency (HCA) (2014) *Additionality Guide (4th Edition)*.
- Ref 13-6 Office for National Statistics (ONS) (2011) *Census 2011*.
- Ref 13-7 Office for National Statistics (ONS) (2015) *Business Register for Employment and Skills 2015*.
- Ref 13-8 Office for National Statistics (ONS) (2016) *Annual Population Survey*.

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## 14. Cultural Heritage

### 14.1 Introduction

- 14.1.1 This chapter of the Preliminary Environmental Information (PEI) Report addresses the potential effects of the Proposed Development on cultural heritage assets. It identifies the location, type and significance of cultural heritage assets and their setting, and reports on the predicted impacts of the Proposed Development on these resources. Thereafter, this chapter assesses the likely significance of effects upon cultural heritage assets by reference to their significance and the magnitude of any impacts.
- 14.1.2 Heritage assets are defined within the National Planning Policy Framework (NPPF) (Ref 14-1) as: *'A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest'* (NPPF, Annex 2, Glossary). Heritage assets include those that are designated under legislation (such as listed buildings and scheduled monuments), as well as those that are non-designated. Non-designated heritage assets are assets that are considered to have a degree of local interest or significance usually recognised by local authorities either by their inclusion within the local Historic Environment Record (HER) or by local listing.
- 14.1.3 This chapter is supported by **Appendix 14A: Desk Based Assessment** (PEI Report Volume II) and **Figures 14.1** and **14.2** (PEI Report Volume III).

### 14.2 Legislation, Planning Policy and Guidance

#### Legislative Background

- 14.2.1 Relevant legislation considered as part of this cultural heritage impact assessment comprises the following:
- Ancient Monuments and Archaeological Areas Act (1979) (Ref 14-2);
  - National Heritage Act (1983) (Ref 14-3) (legislation that details how Britain's national heritage assets are managed and protected); and
  - Planning (Listed Buildings and Conservation Areas) Act (1990) (Ref 14-4).

#### ***The Ancient Monuments and Archaeological Areas Act (1979)***

- 14.2.2 The Ancient Monuments and Archaeological Areas Act imposes a requirement for Scheduled Monument Consent for any works of demolition, repair, and alteration that might affect a Scheduled Monument. For non-designated archaeological assets, protection is afforded through the development management process as established both by the Town and Country Planning Act 1990 (Ref 14-5) and the NPPF (Ref 14-1).

#### ***Planning (Listed Building and Conservation Areas) Act 1990***

- 14.2.3 The Planning (Listed Buildings and Conservation Areas) Act 1990 (the Act) (Ref 14-6) sets out the principal statutory instruments which must be considered in the determination of any application affecting either Listed Buildings or Conservation Areas.
- 14.2.4 Section 66 of the Act states that in considering whether to grant planning permission for development which affects a Listed Building or its setting, the local planning authority or, as the case may be, the Secretary of State, shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses.

By virtue of Section 1(5) of the Act, a Listed Building includes any object or structure within its curtilage.

- 14.2.5 Recent case law makes it clear that the duty imposed in the Act means that in considering whether to grant permission for development that may cause harm (substantial or less than substantial) to a designated asset (Listed Building or Conservation Area) or its setting, the decision maker should give particular weight to the desirability of avoiding that harm. There is still a requirement for a planning balance, but it must be informed by the need to give considerable weight to the desirability of preserving the asset and its setting, including those within a Conservation Area.

## Planning Policy Context

### *Overarching National Policy Statement for Energy (EN-1)*

- 14.2.6 Overarching National Policy Statement (NPS) for Energy (EN-1) (Department for Energy and Climate Change, 2011) recognises that the construction, operation and decommissioning of energy infrastructure has the potential to result in adverse impacts on the historic environment and sets out principles for assessing such impacts.
- 14.2.7 The NPS states that the historic environment results from the interaction between people and places through time, and includes all surviving physical remains of past human activity. NPS paragraph 5.8.2 defines a heritage asset as an element of the historic environment that is of value to present and future generations because of its historic, archaeological, architectural or artistic interest. The sum of these interests is referred to as its significance.
- 14.2.8 NPS paragraph 5.8.3 recognises that some heritage assets have a level of significance that warrants official designation, including World Heritage Sites, Scheduled Monuments, Protected Wreck Sites, Protected Military Remains, Listed Buildings, Registered Parks and Gardens, Registered Battlefields and Conservation Areas. The NPS also recognises that there are non-designated heritage assets that are demonstrably of equivalent significance to Scheduled Monuments, and if the evidence suggests that such an asset may be affected by the proposed development, it should be considered subject to the policies for designated heritage assets (paragraph 5.8.5).
- 14.2.9 NPS paragraph 5.8.6 states that impacts on other non-designated heritage assets should be considered on the basis of clear evidence that they have a heritage significance that merits such consideration, even though the assets are of lesser value than designated heritage assets.
- 14.2.10 NPS paragraph 5.8.8 states that, as part of its assessment, the applicant should provide a description of the significance of the heritage assets affected by the development and the contribution of their setting to that significance. The level of detail should be proportionate to the importance of the heritage asset and no more than is sufficient to understand the potential on the heritage asset. As a minimum, the applicant should consult the relevant Historic Environment Record (HER).
- 14.2.11 Where a development site includes, or has the potential to include, heritage assets of archaeological interest, the applicant should carry out a desk-based assessment and if necessary a field evaluation in order to properly assess the interest (paragraph 5.8.9). Ultimately, the applicant should ensure that the extent of the impact of the proposed development on the heritage assets can be adequately understood from the application and supporting documents (paragraph 5.8.10).
- 14.2.12 The NPS states that the significance and value of heritage assets should be taken into account when considering the impact of a proposed development. The desirability of sustaining or enhancing the significance of heritage assets should also be taken into account, along with the desirability of new development making a positive contribution to the character and distinctiveness of the historic environment. NPS Paragraph 5.8.14 states there should be a presumption in favour of the conservation of designated heritage assets, and loss of significance to any designated

heritage asset should require clear and convincing justification. Substantial harm to or loss of a grade II listed building park or garden should be exceptional. Substantial harm to or loss of designated assets of the highest significance, including Scheduled Monuments; registered battlefields; grade I and II\* Listed Buildings; grade I and II\* registered parks and gardens; and World Heritage Sites, should be wholly exceptional. Any harmful impact on the significance of a designated heritage asset should be weighed against the public benefit of the development (paragraph 5.8.15).

14.2.13 Paragraph 5.8.20 recognises that where loss is justified, based on the merits of the development, the developer should be required to record and advance understanding of the heritage asset before it is lost. Where appropriate, such work will be carried out in accordance with a written scheme of investigation that has been agreed in writing with the local authority (paragraph 5.8.21).

14.2.14 **Table 14-1** provides a summary of relevant NPS advice and signposting to where matters are considered within this chapter.

**Table 14-1: Summary of relevant NPS advice regarding Historic Environment**

Summary of NPS	Consideration within the Chapter
<b>NPS EN-1</b>	
Paragraph 5.8.8 states: <i>“As part of the ES (see Section 4.2) the applicant should provide a description of the significance of the heritage assets affected by the proposed development and the contribution of their setting to that significance. The level of detail should be proportionate to the importance of the heritage assets and no more than is sufficient to understand the potential impact of the proposal on the significance of the heritage asset. As a minimum the applicant should have consulted the relevant Historic Environment Record (or, where the development is in English or Welsh waters, English Heritage or Cadw) and assessed the heritage assets themselves using expertise where necessary according to the proposed development’s impact.”</i>	Section 4 of <b>Appendix 14A</b> (PEI Report Volume II)
Paragraph 5.8.9 states: <i>“Where a development site includes, or the available evidence suggests it has the potential to include, heritage assets with an archaeological interest, the applicant should carry out appropriate desk-based assessment and, where such desk-based research is insufficient to properly assess the interest, a field evaluation. Where proposed development will affect the setting of a heritage asset, representative visualisations may be necessary to explain the impact.”</i>	<b>Appendix 14A</b> (PEI Report Volume II) and Section 14.7
Paragraph 5.8.10 states: <i>“The applicant should ensure that the extent of the impact of the proposed development on the significance of any heritage assets affected can be adequately understood from the application and supporting document”.</i>	<b>Section 14.7</b> , further investigation of archaeological potential needed prior to the submission of the Environmental Statement (ES).

**National Planning Policy Framework (NPPF) (2012)**

14.2.15 The NPPF (Ref 14-1) establishes a set of core land-use planning principles that should underpin both plan-making and decision-taking. The conservation of heritage assets in a manner appropriate to their significance, so that they can be enjoyed for their contribution to the quality of life of this and future generations, is one of these core planning principles (paragraph 17). Section 12 of the

NPPF sets out a series of policies that are a material consideration to be taken into account in development management decisions in relation to the heritage consent regimes established in the Ancient Monuments and Archaeological Areas Act (1979) (Ref 14-2) and the Planning (Listed Buildings and Conservation Areas) Act (1990) (Ref 14-4).

- 14.2.16 The NPPF sets out the importance of being able to assess the significance of heritage assets that may be affected by a development proposal. Significance is defined in Annex 2 as the value of an asset because of its heritage interest. This interest may be archaeological, architectural, artistic or historic and can extend to its setting. The setting of a heritage asset is defined in Annex 2 as *'the surroundings in which a heritage asset is experienced'*. In determining applications, local planning authorities should require an applicant to describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail should be proportionate to the asset's importance and no more than is sufficient to understand the potential impact of the proposal on their significance (paragraph 128). Similarly there is a requirement on local planning authorities to identify and assess the particular significance of any heritage asset that may be affected by a proposal; and that they should take this assessment into account when considering the impact of a proposal on a heritage asset (paragraph 129).
- 14.2.17 In considering planning matters, local planning authorities should take account of the following three points:
- the desirability of sustaining and enhancing the significance of heritage assets and putting them to viable uses consistent with their conservation;
  - the positive contribution that conservation of heritage assets can make to sustainable communities including their economic vitality; and
  - the desirability of new development making a positive contribution to local character and distinctiveness (paragraph 131).
- 14.2.18 Paragraphs 132 to 134 of the NPPF introduce the concept that heritage assets can be harmed or lost through alteration or destruction or development within their setting. This harm ranges from less than substantial through to substantial. With regard to designated assets, paragraph 132 states that the more important the asset, the greater the weight should be on its conservation. Distinction is drawn between those assets of exceptional interest (e.g. grade I and grade II\* Listed Buildings), and those of special interest (e.g. grade II Listed Buildings). Any harm or loss of heritage significance requires clear and convincing justification, and substantial harm or loss should be wholly exceptional with regard to those assets of greatest interest.
- 14.2.19 In instances where development would cause substantial harm to or total loss of significance of a designated asset, consent should be refused unless that harm or loss is *'necessary to achieve substantial public benefits that outweigh that harm or loss'* (paragraph 133). In instances where development would cause less than substantial harm to the significance of a designated asset, the harm should be weighed against the public benefits of the proposal including its optimum viable use (paragraph 134). In relation to non-designated assets, a balanced judgment is required taking into account the scale of harm or loss and the significance of the asset (paragraph 135).
- 14.2.20 Guidance on the application of heritage policy within the NPPF is provided by on-line Planning Practice Guidance (Ref 14-7) and best practice advice is provided by a series of Historic England Advice notes (Ref 14-8 and 14-9).

### **Local Planning Policy**

#### **Bassetlaw District Plan Documents**

- 14.2.21 Bassetlaw District Local Development Framework Core Strategy and Development Management Policies (Ref: 14-10) was adopted in 2011 and sets out the policies for Bassetlaw to 2028. The policies that are relevant to cultural heritage include Policy DM8: The Historic Environment, and

Policy DM10: Renewable and Low Carbon Energy, which link to strategic objectives identified in Bassetlaw's Core Strategy (Spatial Objective SO9 – to protect and enhance Bassetlaw's heritage assets).

14.2.22 Part B of Policy DM8: The Historic Environment states '*There will be a presumption against development, alteration, advertising or demolition that will be detrimental to the significance of a heritage asset*'.

14.2.23 The setting of an asset is an important aspect of its special architectural or historic interest and proposals that fail to preserve or enhance the setting of a heritage asset will not be supported. Where appropriate, regard shall be given to any approved characterisation study or appraisal of the heritage asset. Development proposals within the setting of heritage assets will be expected to consider:

- scale;
- design;
- materials;
- siting; and
- views away from and towards the heritage asset.

#### Sturton Ward Neighbourhood Plan

14.2.24 Policy 4 of the Sturton Neighbourhood Plan (Ref 14-14) relates to the Historic Environment. It states that:

*"Policy 4: Protecting the Historic Environment 1. Planning applications will be supported where they preserve or enhance conservation areas, listed buildings and other heritage assets as set out in Appendix K and where they comply with the following criteria: a) The development or alteration proposed does not have a detrimental effect on the heritage asset concerned; and b) The heritage asset is sensitively and fully incorporated into the development proposal concerned."*

#### West Lindsey, Lincolnshire

14.2.25 Current local planning policy for Lincolnshire is provided by the Central Lincolnshire Local Plan which was adopted in 2012 and replaced the West Lindsey local Plan (Ref: 14-11). Policy LP25: The Historic Environment is relevant as the Proposed Development is close to the boundary of West Lindsey's jurisdiction, where there are cultural heritage assets. It states that development proposals should seek to protect and conserve the historic environment of Central Lincolnshire. Where development would affect the significance of a heritage asset, the following must be undertaken proportionately: assess the significance and setting of said asset; identify impacts to that significance; and provide justification for proposed works. Unless the proposed development meets test set out in NPPF, permission will only be granted if that development does not harm the significance or setting of heritage assets. Proposals will be supported which conserve or enhance the significance of heritage assets.

#### Other Guidance

##### *National Planning Practice Guidance (latest online update 2015)*

14.2.26 The Planning Practice Guidance (PPG) (14-7) is a government produced interactive on-line document that provides further advice and guidance that expands the policy outlined in the NPPF (14-1). It expands on terms such as 'significance' and its importance in decision making. The PPG clarifies that being able to properly assess the nature, extent and the importance of the significance of the heritage asset and the contribution of its setting, is very important to understanding the potential impact and acceptability of development proposals (paragraph 009).

- 14.2.27 The PPG states that in relation to setting, a thorough assessment of the impact on setting needs to take into account, and be proportionate to, the significance of the heritage asset under consideration and the degree to which proposed changes enhance or detract from that significance and the ability to appreciate it (paragraph 013).
- 14.2.28 The PPG usefully discusses how to assess if there is substantial harm. It states that what matters in assessing if a proposal causes substantial harm is the impact on the significance of the asset. It is the degree of harm to the asset's significance rather than the scale of the development that is to be assessed (paragraph 017). Generally harm to heritage assets can be avoided or minimised if proposals are based on a clear understanding of the heritage asset and its setting (paragraph 019).
- 14.2.29 The NPPF indicates that the degree of harm should be considered alongside any public benefits that can be delivered by development. The PPG states that these benefits should flow from the proposed development and should be of a nature and scale to be of benefit to the public and not just a private benefit and would include securing the optimum viable use of an asset in support of its long-term conservation (paragraph 020).

#### **Historic England Planning Guidance Advice Notes (2015)**

- 14.2.30 Historic England has published a series of Good Practice Advice (GPA) of which those of most relevance to this appraisal are GPA2 Managing Significance in Decision-taking (March 2015) (Ref 14-8) and GPA3 The Setting of Heritage Assets (July 2015) (Ref 14-9).
- 14.2.31 GPA2 emphasises the importance of having a knowledge and understanding of the significance of heritage assets likely to be affected by the development and that the *'first step for all applicants is to understand the significance of any affected heritage asset and, if relevant the contribution of its setting to its significance'* (paragraph 4). Early knowledge of this information is also useful to a local planning authority in pre-application engagement with an applicant and ultimately in decision making (paragraph 7).
- 14.2.32 GPA3 provides advice on the setting of heritage assets. Paragraph 3 differentiates the concept of setting from other concepts such as curtilage, character and context. The extent and definition of setting is set out in paragraph 4 within a series of bullet points and the relationship of setting to views is explored in paragraph 5 to 8. Setting is as defined in the NPPF and comprises the surroundings in which a heritage asset is experienced. Elements of a setting can make positive or negative contributions to the significance of an asset and affect the ways in which it is experienced. Historic England state that setting does not have a boundary and what comprises an asset's setting may change as the asset and its surrounding evolve. Setting can be extensive, and particularly in urban areas or extensive landscapes, can overlap with other assets.
- 14.2.33 The contribution of setting to the significance of an asset is often expressed by reference to views and GPA3 in paragraph 6 identifies those views such as those that were designed or those that were intended, that contribute to understanding the significance of assets. An approach to the assessment heritage significance within views is provided in the Historic England guidance *'Seeing the History in the View'* (2011) (Ref 14-12).
- 14.2.34 The relationship between setting and significance is set out in a series of bullets at paragraph 9 covering factors such as change, the appreciation of setting and the setting of buried assets. Setting and significance are not dependent upon public access. Designed settings such as those associated with a historic park can be extensive and project beyond the core elements of the asset. Development within the setting of an asset can be beneficial; it can also be harmful and therefore needs careful assessment.
- 14.2.35 Historic England advocates a stepped approach to assessment. Proportionality is a key consideration in the NPPF (128) (Ref 14-1) and Historic England guidance (Ref 14-9) at Step 1 of the assessment process, suggest various approaches by which there can be selection of those assets for assessment. In assessing the extent to which setting may contribute to the significance

of an asset Step 2; Historic England set out a number of attributes and these include the assets surroundings and the experience of the asset. Step 3 is about assessing effect identifies those attributes of a development such as location, form, appearance and permanence that need consideration.

- 14.2.36 Step 4 is about '*maximising enhancement and minimising harm*' and there are various ways by which development can enhance an assets setting, for instance through replacement or removal of detrimental features or introducing new features or views that add to the public appreciation including better access. Harm can be reduced by relocation of a development, changes to design or management measures. Whilst screening has a part to play in reducing harm, screening can itself be harmful and needs careful design (paragraph 29). The final step of the process is documenting and monitoring outcomes, and learning from past experiences.

## 14.3 Assessment Methodology and Significance Criteria

### Consultation

- 14.3.1 **Table 14-2** summarises the consultation responses of relevance to cultural heritage received.

**Table 14-2: Consultation summary table**

Consultee or organisation approached	Date and nature of consultation	Method of approach	Summary of Response
Nottinghamshire County Council	<p>Section 5.9 Cultural Heritage of the EIA Scoping Report dated April 2017 notes that there are clusters of designated built heritage in nearby villages and has identified two churches as the nearest. It also notes the designated conservation area of Saundby. It would be advisable to ensure that the consideration of impacts on the settings of nearby designated built heritage assets utilises viewpoints within a Landscape and Visual Impact Assessment. A failure to ensure that the Cultural Heritage EIA methodology engages with the LIVA could lead to the requirement for further information to support or demonstrate the conclusions reached in the EIA Cultural Heritage chapter.</p> <p>Section 5.9 of the EIA Scoping Report does not reference non-designated heritage assets. It is important that the EIA takes consideration of the Bassetlaw DC adopted criteria and policies for non-designated heritage assets. West Burton Power Station is identified as a non-designated heritage asset by Bassetlaw DC and has an entry on the Nottinghamshire County Council Historic Environment Record. It is crucial to the understanding of the impacts of the proposals that the heritage significance of the power station is acknowledged and considered within the EIA Cultural Heritage chapter.</p>	<p>The factors that contribute to the significance of West Burton Power Station have been identified in the desk-based assessment report (refer to <b>Appendix 14A</b> PEI Report Volume II).</p>	<p>An assessment of the impact and effect of the Proposed Development on West Burton Power Station's heritage value has been made as part of the assessment included herein.</p>
West Lindsey District Council	<p>The ES should consider the impact on heritage assets within West Lindsey and their setting. Within 15km of the site:</p> <ul style="list-style-type: none"> <li>• Scheduled Monuments (SMs), Grade I and II* Listed Buildings (LBs), Historic Battlefields and Registered Parks and Gardens (RPGs)</li> </ul> <p>Within 5km of the site:</p> <ul style="list-style-type: none"> <li>• Visual impacts on Grade II LBs and Conservation Areas (CAs) Locally-listed parks and gardens of demonstrably equivalent significance to a designated asset (and potentially sensitive to</li> </ul>	<p>The search area for designated assets was taken as 3km due to the scale of the Proposed Development. Designated assets outside this area have been considered where there was the potential for them to be affected by elements of the Proposed Development.</p>	<p>This method also identified the Scheduled Monument of Segelocum Roman town. This cultural heritage asset has therefore also been considered in the assessment of impacts and effects. Given the existing mass and scale of West Burton A (WBA) and West Burton B (WBB) power stations and the much smaller scale of the Proposed Development coupled with the limited</p>

Consultee or organisation approached	Date and nature of consultation	Method of approach	Summary of Response
	<p>visual impacts)</p> <p>These include Listed Buildings to the west of Bridge Street and Lea Road, Gainsborough including Gainsborough Bridge itself and its former Toll Lodge Buildings. Adjacent to the east of the River Trent is the Gainsborough Riverside Conservation Area. The assessment should be supported by the Zone of Theoretical Visibility (ZTV) and representative photomontage viewpoints.</p>		<p>views that would be offered to the Proposed Development, a 15km search radius was considered disproportionate for setting impacts. The cooling towers of WBA offer a useful guide in determining long distance views from the surrounding landscape.</p>
<p>Historic England</p>	<p>A staged process of archaeological investigation should work from consultation with the County Council Historic Environment Record (HER) and the expert advice of the County Council Archaeologist. Such records as survive of the site condition prior to previous works and any on site investigations made at that time should be consulted.</p> <p>Mapping of palaeochannels from air photographic and Lidar sources has been carried in Nottinghamshire and may provide targets for investigation (this is available through the HER. Existing borehole survey data should be assessed and where necessary augmented to provide (alongside other sources such as geophysical survey), a deposit model of the development area. Where new engineering boreholes are planned their methodology should be integrated with archaeological requirements from an early stage. With the benefit of an understanding of the site history and deposit model targeted trial trenching can be focussed on locations where archaeological potential is likely to survive, past experience at Willington Power Station suggests substantial cut features can survive previous operations in this environment. Particular attention should also be paid to the potential for prehistoric timber survival (e.g. boats) in and alongside former channels.</p> <p>Visual impacts upon the significance of designated heritage assets should be assessed within a robust and structured setting assessment. We recommend the use of Historic Environment Good Practice Advice Note 3 <i>Setting of Heritage Assets</i>. We note that the existing A and B</p>	<p>A desk based assessment has been carried out in order to establish the known cultural heritage resource and prevailing ground conditions. Opportunity will arise to address many of these comments during surveys recommended as part of this PEI Report for site evaluation to inform the ES.</p> <p>The search area for designated assets was taken as 3km due to the scale of the Proposed Development. Designated assets outside this area have been considered where there was the potential for them to be affected by elements of the</p>	<p>Mapping palaeochannels: Geotechnical information supported by a site visit indicates that the Site and land to the west and north extending nearly to Gainsborough, is covered by pulverised fuel ash (PFA). This extends to a depth of between 7m and 9m in the area of the Proposed Development and to the north. This presents an entirely man-made landform and mapping using lidar and aerial photographs would not provide identification of any palaeochannels beneath that depth of PFA.</p> <p>This covering of PFA also renders geophysical survey techniques unproductive and introduces significant barriers to trial trenching, both logistically and from a health and safety perspective. Available geotechnical information</p>

Consultee or organisation approached	Date and nature of consultation	Method of approach	Summary of Response
	<p>stations represent a significant intrusion into the setting of nearby assets and as such any study should start from a clear understanding of the present position as baseline to which station C will add. In this case we are content with the 5km radius scope for designated heritage asset setting assessment proposed in para 5.9.6. In some views we anticipate the additional impact may be slight, however efforts should be made to establish the effect on current surviving sight lines that support significance, for instance such as may exist between Lea and Bole.</p>	<p>Proposed Development.</p>	<p>has been used in assessing the potential of the site.</p> <p>Recommendations have been made in the mitigation section for using any subsequent site investigations to further assess the Site's archaeological potential, in particular relating to palaeochannels.</p>

## Assessment Methods

### *Methodology for Determining the Heritage Baseline*

- 14.3.2 A desk-based assessment has been undertaken in order to identify the known cultural heritage resource within defined study areas and the potential for as yet unknown archaeological remains to be present at the Site. The desk-based assessment has built on and updated work carried out for previous studies at the West Burton Power Station Site (Ref 14-13).
- 14.3.3 The study area for the identification of designated assets is defined as 3km radius from the centre point of the Site and 1km for non-designated assets held on the Nottinghamshire HER and the Lincolnshire HER. The 3km study area was determined taking into account the low lying land surrounding the Site and the Proposed Development, and potential setting issues on designated assets and a Conservation Area within the 3km study area. Designated assets that lie outside the study area were also considered where these may have views of the Proposed Development.
- 14.3.4 The following data sources were consulted during the desk-based assessment:
- Nottinghamshire HER for datasets relating to non-designated assets, including known archaeological sites, find spots, historic buildings and previous archaeological works;
  - Lincolnshire HER for datasets relating to non-designated assets, including known archaeological sites, find spots, historic buildings and previous archaeological works;
  - Nottingham Archives;
  - Defence of Britain database;
  - published and unpublished documentary sources (including development control site reports);
  - historic mapping;
  - online sources including British Geological Survey (BGS) Geology of Britain Viewer and borehole viewer;
  - the East Midlands Archaeological Research Framework; and
  - Local Planning Authority Local Plan and other relevant local planning information.
- 14.3.5 A site visit was undertaken on 11th July 2017 in order to assess the condition of known heritage assets and the potential for unrecorded heritage assets that might exist within the Proposed Development Site. The site visit also assessed the setting of designated assets in the 3km study area and beyond where these may have views of the Proposed Development.

### *Methodology for Determining Effects*

#### Significance Criteria

- 14.3.6 The significance (heritage value) of a heritage asset is derived from its heritage interest which may be archaeological, architectural, artistic or historic (NPPF Annex 2, Glossary). The significance of a place is defined by the sum of its heritage values. Taking these criteria into account, each identified heritage asset can be assigned a level of significance (heritage value) in accordance with a three-point scale as set in **Table 14-3**.

**Table 14-3: Criteria for determining the significance (heritage value) of heritage assets**

Significance (heritage value)	Criteria
High	<ul style="list-style-type: none"> <li>• Assets of inscribed international importance, such as World Heritage Sites</li> <li>• Grade I and II* Listed Buildings</li> <li>• Grade I and II* registered historic parks and gardens</li> <li>• Registered battlefields</li> <li>• Scheduled Monuments</li> <li>• Non-designated archaeological assets of schedulable quality and importance</li> </ul>
Medium	<ul style="list-style-type: none"> <li>• Grade II Listed Buildings</li> <li>• Grade II Listed registered historic parks and gardens</li> <li>• Conservation Areas</li> <li>• Locally Listed Buildings included within a Conservation Area</li> <li>• Non-designated heritage assets of a regional resource value</li> </ul>
Low	<ul style="list-style-type: none"> <li>• Non-designated heritage assets of a local resource value as identified through consultation</li> <li>• Locally Listed Buildings</li> <li>• Non-designated heritage assets whose heritage values are compromised by poor preservation or damaged so that too little remains to justify inclusion into a higher grade</li> </ul>

- 14.3.7 Having identified the significance of the heritage asset, the next stage in the assessment is to identify the level and degree of impact to an asset arising from the development. Impacts may arise during construction or operation and can be temporary or permanent. Impacts can occur to the physical fabric of the asset or affect its setting.
- 14.3.8 The level and degree of impact (impact rating) is assigned with reference to a four-point scale as set out in **Table 14.3**. In respect of cultural heritage an assessment of the level and degree of impact is made in consideration of any scheme design mitigation (embedded mitigation).
- 14.3.9 When professional judgement is considered, some heritage assets may not fit into the specified category within **Table 14-4**. Each heritage asset is assessed on an individual basis and takes into account regional variations and individual qualities of sites.

**Table 14-4: Criteria for determining the magnitude of impact on heritage assets**

Magnitude of Impact	Description of Impact
High	Change such that the significance of the asset is totally altered or destroyed. Comprehensive change to setting affecting significance, resulting in a serious loss in our ability to understand and appreciate the asset.
Medium	Change such that the significance of the asset is affected. Noticeably different change to setting affecting significance, resulting in erosion in our ability to understand and appreciate the asset.
Low	Change such that the significance of the asset is slightly affected. Slight change to setting affecting significance resulting in a change in our ability to understand and appreciate the asset.

Magnitude of Impact	Description of Impact
Minimal	Changes to the asset that hardly affect significance. Minimal change to the setting of an asset that have little effect on significance resulting in no real change in our ability to understand and appreciate the asset.

14.3.10 An assessment of the level of effect, having taken into consideration any embedded mitigation, is determined by cross-referencing between the significance (heritage value) of the asset (**Table 14-3**) and the magnitude of impact (**Table 14-4**). The resultant level of effect (**Table 14-5**) can be negligible, adverse or beneficial.

**Table 14-5: Criteria for determining the significance of effect**

Significance (heritage value)	Magnitude of impact			
	High	Medium	Low	Minimal
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Minor
Low	Moderate	Minor	Minor	Negligible

14.3.11 This PEI Report reports the predicted significance of cultural heritage effects. Effects that are assessed as being major or moderate are considered to be significant. Within the NPPF, impacts affecting the significance of heritage assets are considered in terms of harm and there is a requirement to determine whether the level of harm amounts to ‘substantial harm’ or ‘less than substantial harm’. There is no direct correlation between the significance of effect, as reported in this PEI Report, and the level of harm caused to heritage significance. A major effect on a heritage asset would, however, more often be the basis by which to determine that the level of harm to the significance of the asset would be substantial. A moderate effect is unlikely to meet the test of substantial harm and would therefore more often be the basis by which to determine that the level of harm to the significance of the asset would be less than substantial. In all cases determining the level of harm to the significance of the asset arising from the Proposed Development impact is one of professional judgement.

14.3.12 An assessment of the predicted effects is made both prior to the implementation of mitigation and after the implementation of mitigation to identify residual effects. This first highlights where mitigation may be appropriate, whilst the second demonstrates the effectiveness of mitigation and the assessment of residual effects.

## 14.4 Baseline Conditions

### Current Baseline

14.4.1 The desk-based assessment carried out to determine the cultural heritage baseline conditions identified two Scheduled Monuments, 25 Listed Buildings, one Conservation Area, one locally Listed Building and 24 non-designated assets within the defined study areas. The cultural heritage desk-based assessment is provided in **Appendix 14A: Desk Based Assessment** (PEI Report Volume II). Of these, the assets detailed in **Table 14-6** were identified as having the potential to be affected by elements of the Proposed Development (also refer to Figure 2 in **Appendix 14A: Desk Based Assessment** in PEI Report Volume II).

**Table 14-6: Cultural heritage assets with the potential to be affected by the Proposed Development**

Asset ID	Site name	NGR	Site description	Asset Type	Date	Designation
M4946	Deserted village at West Burton	SK 798 853	A deserted village of medieval date. All that now exists within the area is a ruined church.	MON	Medieval to 1865	Scheduled Monument
-	Segelocom Roman town	SK 82274 82806	Located on the north-west of the village of Littleborough is Segelocom Roman Town. The known site extends north-westwards from the present day village over an area of approximately 400m by 300m between the River Trent and the Mother Drain.	MON	Roman	Scheduled Monument
NHLE 1370124	Bole Manor House and attached outbuilding	SK7939287128	Manor house. c.1675.	MON	Post-medieval	Grade II listed
NHLE 1045690	Church of St Martin, Bole	SK 79305 87107	Parish church. 13 <sup>th</sup> , 14 <sup>th</sup> , 15 <sup>th</sup> , 16 <sup>th</sup> century phases. Dressed ashlar and coursed rubble construction.	MON	Medieval – Post-medieval	Grade II listed
NHLE 1156783	The Grove, Saundby	SK 78462 87924	House, formerly rectory, early 19 <sup>th</sup> .	MON	Modern	Grade II listed
NHLE 1156793	Hall Farmhouse, Saundby	SK 78569 88027	A two storey brick farmhouse, built c.1800.	MON	Modern	Grade II listed
NHLE 1045083	Church of St Martin, Saundby	SK 78545 87982	Parish church, 13 <sup>th</sup> , 14 <sup>th</sup> , 15 <sup>th</sup> , 16 <sup>th</sup> century phases.	MON	Medieval – Post-medieval	Grade I listed
-	Saundby Conservation Area	SK 78482 88015	Conservation area covering the historic core of the village of Saundby.	MON	-	Conservation Area
-	WBA Power Station	SK 79188 85568	Coal fired power station built from 1961.	MON	Modern	-

MON - monument

14.4.2 In addition to the known cultural heritage assets identified above, the Site has:

- a low potential for prehistoric or Roman archaeological deposits;
- a moderate potential for medieval deposits likely to relate to medieval agriculture; and
- a moderate potential for alluvial deposits that may contain palaeoenvironmental evidence.

14.4.3 The value of these potential archaeological deposits is unknown.

## Future Baseline

- 14.4.4 The baseline cultural heritage details as presented above and in **Appendix 14A** (PEI Report Volume II) is not anticipated to change in the absence of the Proposed Development.

## 14.5 Development Design and Impact Avoidance

- 14.5.1 The Proposed Development would be constructed on a platform of PFA material approximately 7-8m deep that is already present at the Site (refer to **Chapter 11: Ground Conditions and Hydrogeology**). This would provide a deep buffer above the natural ground surface that would protect any archaeological deposits that may be present within the Site.

## 14.6 Likely Impacts and Effects

- 14.6.1 The following aspects of the Site have been considered in assessing the likely impacts and effects of the Proposed Development:

- power plant site;
- construction laydown area;
- northern and southern outfall options;
- rail offloading laydown area;
- gas reception facility of WBB;
- electricity connection route and tie in to existing 400kV substation; and
- landscaping and ecological mitigation area.

## Construction

- 14.6.2 Foundations may impact on alluvial deposits with archaeological potential present below the PFA material. The foundation design has not yet been determined and so impacts associated with foundation construction cannot currently be quantified beyond being adverse and permanent. However, as detailed in **Chapter 11: Ground Conditions and Hydrogeology**, a site investigation will be undertaken within the Site – this will inform the foundation design and also enable the development of an archaeological deposit model for the Site (see **Section 14.7**). This information will enable an assessment of the effect of construction from these elements of the Proposed Development which will be reported within the ES.
- 14.6.3 There may be temporary impacts on the setting of West Burton Deserted Medieval village and the setting of Segelocum Roman town during construction associated with increased visual and noise intrusion. Such impacts would be no more than minor adverse.
- 14.6.4 There may be temporary effects on the setting of built heritage assets during the construction of the Proposed Development. However, these effects are considered to be less than those caused during the operation of the Proposed Development and would be no more than minor adverse and thus considered not significant.
- 14.6.5 As detailed in **Chapter 4: The Proposed Development**, surface water drainage options are currently under consideration and subject to an ongoing feasibility assessment. The preference would be to make a connection into the existing WBA or WBB drainage systems and avoid the need for a new outfall to be installed. Existing pipework and associated infrastructure may need to be upgraded as part of the Proposed Development. An alternative solution would be for site drainage to be discharged at a new outfall point on the west side of the River Trent (northern outfall option or southern outfall option). New pipework and associated infrastructure would need to be

provided for the new outfall as part of the Proposed Development. A temporary coffer dam may need to be installed to enable such construction works to take place within the River Trent. As a 'worst case' in terms of potential environmental impacts, the EIA reported in this PEI Report has assumed that a temporary coffer dam may need to be installed to enable construction works to take place in the River. Pipelines would be constructed using open cut methods.

### Opening

- 14.6.6 Opening of the Proposed Development is not anticipated to result in any impacts or effects upon cultural heritage assets.

### Operation

- 14.6.7 WBA and WBB power stations lie between the Proposed Development Site and the scheduled monument of West Burton Deserted Medieval Village. The Proposed Development would be smaller in scale than both WBA and WBB and, therefore, would not be visible from the scheduled monument. As a result, the Proposed Development would have no impact on the West Burton Deserted Medieval Village scheduled monument.
- 14.6.8 West Burton Power Station is visible in views from the Segelocum Roman town, with the main visible features being two chimney stacks (each circa 200m high) and the cooling towers of WBA (eight natural draught cooling towers each circa 110m high). Very minor elements of the Proposed Development may be visible above tree screening that is already present. Segelocum Roman town is a scheduled monument and so of high significance (heritage value). The Proposed Development impact would be a minimal permanent visual intrusion. The contribution that the affected view makes to the heritage significance of Segelocum is low. The view is part of the current visual envelope in which the monument is experienced. The resultant effect on the heritage significance of Segelocum Roman town from the Proposed Development is therefore a negligible visual permanent one and thus not significant.
- 14.6.9 The Proposed Development is considered to have the potential to impact upon two built heritage assets, namely Bole Manor House and the Church of St Martin, Bole. Bole Manor House, a grade II listed building located approximately 1km north-west of the Construction Laydown Area. It is considered to be primarily of historic significance, with some architectural features. Its setting is considered to include its gardens and the wider agricultural landscape. There are no designed views from the asset, or key views of it. It is considered that the landscape setting contributes to its significance, but only to a minor extent. As a grade II listed building it is considered to be of medium significance (heritage value). The West Burton Power Station is visible from the building and the Proposed Development would increase the industrial character of these views to a minor extent. The magnitude of impact is, therefore, considered to be no more than minimal. This would result in a minor adverse effect, which is not significant.
- 14.6.10 The Church of St Martin, Bole, is a grade II listed building located approximately 1km north-west of the Construction Laydown Area. It is considered to be of architectural and historic significance. The asset is likely to be designed to be a dominant focal point of the landscape, for which it already competes with the WBA power station. Its setting is considered to include the church yard in which the asset is located, with mature trees largely screening views outward from the asset. As a grade II listed building, it is considered to be of medium significance (heritage value). Views are, however, made to the east towards the current West Burton Power Station and the Proposed Development, and new development would increase the industrial character of these views to a minor extent. Given the existing industrial character of the landscape, the magnitude of impact is considered to be no more than minimal. This would result in a minor adverse effect, which is not significant.
- 14.6.11 WBA power station is recorded on the Nottinghamshire HER as a heritage asset. The asset is located approximately 800m south-south-west of the Site, and is a prominent and commanding focal point of the landscape. As an asset of local importance, the value is low (heritage value).

Given the existing impacts on the asset due to the WBB power station, and the screening effect that WBB would have for the smaller Proposed Development, the Proposed Development would result in a minimal magnitude of impact. Therefore, the effect would be negligible.

- 14.6.12 Heritage assets within the villages of Saundby (including Saundby Conservation Area, Hall Farmhouse and The Grove), Sturton-le-Steeple (The Old Rectory; Boundary Wall, Railing and Gate at Crown Cottage; Crown Cottage; Wesleyan Chapel, Wall and Railing; Mayflower House and Outhouse; Barn and Stable at Cross Street Cottage; West End Farmhouse and Wash House; Pigeoncote and Barn to west of Church Hill Farm House; Church Farm House; Boundary Wall at Church of St Peter and St Paul; Church of St Peter and St Paul; Sturton-le-Steeple War Memorial; Culvert, Gate and Gate Piers at Manor House Memorial; Four Pillars 10m south of Manor House; Culvert, Boundary Wall, Fence and Gate at the Manor House; Manor House; Stable at Manor House dated 1779; Stable at Manor House dated 1846 and Village Shop Occupied by C.H. Bedford), Knaith (Church of St Mary and Knaith Hall), Lea (Church of St Helen; Mellow Cottage and Old Post Office; 1 and 3 Willingham Road; Holly House; The Village Farmhouse; The Cottage; The Old Rectory; Rectory Farmhouse; Gate Piers at the Old Rectory; Outhouse adjacent to and south of Carhouse and Stables at the Old Rectory; Carhouse and Stables at the Old Rectory and Gazebo at the Old Rectory) and Gainsborough have also been considered. These assets have been scoped out from further assessment as it is considered that due to the distances between these assets and the Proposed Development, existing screening, and existing impacts associated with the WBA and WBB power stations, that no further change to the significance of these assets would result from the Proposed Development. Therefore, it is considered that the Proposed Development would have no impact upon them.

### Decommissioning

- 14.6.13 The strategy for eventual Proposed Development decommissioning is not yet known. However, physical impacts, and therefore adverse effects, on buried archaeological deposits could occur from demolition and remediation works. Further information is needed on the decommissioning strategy and archaeological potential of the deposits below the PFA before the impacts and effects from Proposed Development decommissioning can be assessed. Such effects will be considered in the ES following consideration of the results obtained from the geotechnical site investigation as detailed in **Chapter 11: Ground Conditions and Hydrogeology**. This information will enable an assessment of the effect of potential Proposed Development decommissioning activities which will be reported within the ES.

### Rochdale Envelope

- 14.6.14 It is assumed that the majority of the Site (with the exception of areas of vegetation that are to be retained and protected – see **Chapter 10: Landscape and Visual Amenity**) would be cleared and subject to some below ground disturbance during construction, no matter what the final sizing and layout of the buildings and structures is. The Rochdale Envelope parameters (i.e. the maximum parameters for the Proposed Development and in particular its main buildings and structures) therefore do not affect the construction assessment of impacts on heritage assets.
- 14.6.15 The Opening and Operation assessments consider the impacts of the Proposed Development buildings and structures on the setting of heritage assets. A worst-case is assessed in terms of building/structure dimensions and stack height. Therefore, no further discussion of the Rochdale Envelope parameters is provided in this chapter.

## 14.7 Mitigation and Enhancement Measures

- 14.7.1 A programme of archaeological monitoring and associated environmental sampling will accompany planned site investigation works, secured as an archaeology Requirement of the DCO. This will allow a more detailed model of the deposits below the PFA to be developed and palaeo-environmental information gathered. The archaeological strategy will include provision for dating of

deposits and geoarchaeological assessment to provide information on the timeframe of the deposit sequence and the environments in which it was laid down. Depending on the extent of the site investigation works, additional boreholes may be needed to provide a satisfactory deposit model of the Proposed Development Site. The number and spacing of boreholes will be discussed and agreed with Historic England Regional Science Advisor and the Senior Archaeologist for Nottinghamshire County Council. This will enable an assessment of the archaeological potential and value of deposits below the PFA to be made.

- 14.7.2 In the worst case outfall option, a programme of archaeological monitoring and environmental sampling should accompany the site investigation. Additional targeted boreholes would be added to the site investigation works where these are needed to provide detail to the deposit model along the outfall route. As stated in the paragraph above, the archaeological strategy would include provision for dating of deposits and geoarchaeological assessment to provide information on the timeframe of the deposit sequence and the environments in which it was laid down. The results of this archaeological sampling regime would inform any requirements for archaeological monitoring or excavation during construction of the temporary coffer dam and outfall pipe. Depending on the extent of the site investigation works, additional boreholes may be needed to provide a satisfactory deposit model of the Site. The number and spacing of boreholes should be discussed and agreed with Historic England Regional Science Advisor and the Senior Archaeologist for Nottinghamshire County Council.
- 14.7.3 No other mitigation measures are recommended with regard to built heritage assets.

## 14.8 Limitation or Difficulties

- 14.8.1 The desk-based assessment and identification of the cultural heritage baseline is based on information available at the time of writing this PEI Report.
- 14.8.2 The presence of a significant depth of PFA across the Proposed Development Site precludes any productive non-intrusive site prospection techniques and introduces significant logistical and health and safety constraints for intrusive investigation. The assessment of archaeological and palaeoenvironmental potential of the Proposed Development Site is, therefore, based on existing site investigation reports, the known archaeological resource in the surrounding landscape (1km search area) and its topographical location on the floodplain of the River Trent. The archaeological value of any deposits is currently unknown. As detailed in **Section 14.6**, the extent of any foundations and their ability to impact on alluvial deposits with archaeological potential present below the PFA material is currently unknown. Therefore the significance of any effect on buried archaeological remains cannot be assessed at this time. However, as detailed in **Chapter 11: Ground Conditions and Hydrogeology**, a geotechnical site investigation will be undertaken to inform the foundation design and enable the development of an archaeological deposit model for the Site. This information will enable an assessment of the effect of construction from these elements of the Proposed Development which will be reported within the ES accompanying the application for development consent.
- 14.8.3 The strategy for eventual Proposed Development decommissioning is not yet known. However, works are likely to be limited to the demolition and removal of the structures, all of which would result in changes below the surface and therefore would not impact any deposits with the potential to contain archaeological evidence. The worst-case effects on archaeological deposits during decommissioning would be in the event that all structures are removed below the PFA, which may impact on potential archaeological deposits that may be present. In this event further archaeological evaluation would be required to assess the archaeological potential of the Site and devise a suitable mitigation strategy. Mitigation in this case could range from no archaeological work, to an archaeological watching brief or to excavation. A decommissioning Environment Management Plan would be approved by the local planning authority prior to works starting, as controlled by a Requirement of the DCO.

## 14.9 Residual Effects and Conclusions

14.9.1 The residual cultural heritage effects as associated with the Proposed Scheme are summarised in **Table 14-7**.

**Table 14-7: Residual impacts summary table**

Predicted Impact	Duration	Mitigation	Residual Effect
West Burton deserted medieval village	Temporary from construction	None proposed	No more than minor adverse
Minimal visual impact to setting of Segelocom Roman town	Throughout the life of the Proposed Development.	None proposed.	Negligible adverse (not significant)
Removal of archaeological deposits during construction	Permanent	Archaeological borehole survey, geoarchaeological and palaeoenvironmental sampling and assessment. Worst case would include archaeological trial trench evaluation followed by excavation.	Unknown based on current information available.
Minor adverse impact to the setting of Bole Manor House	Throughout the life of the Proposed Development.	None proposed.	Minor adverse (not significant)
Minor adverse impact to the setting of Church of St Martin, Bole	Throughout the life of the Proposed Development.	None proposed.	Minor adverse (not significant)
Negligible impact to WBA power station	Throughout the life of the Proposed Development.	None proposed.	Negligible

## 14.10 References

- Ref 14-1 Department for Communities and Local Government (2012) *National Planning Policy Framework*.
- Ref 14-2 Her Majesty's Stationary Office (1979) *Ancient Monuments and Archaeological Areas Act 1979*.
- Ref 14-3 Her Majesty's Stationary Office (1983) *National Heritage Act 1983*.

- Ref 14-4 Her Majesty's Stationary Office (1990) *Planning (Listed Buildings and Conservation Areas) Act (1990)*.
- Ref 14-5 Her Majesty's Stationary Office (1990) *Town and Country Planning Act 1990*.
- Ref 14-6 Her Majesty's Stationary Office (1990) *Planning (Listed Buildings and Conservation Areas) Act 1990*.
- Ref 14-7 Department for Communities and Local Government (2014) *National Planning Policy Guidance*.
- Ref 14-8 Historic England. 2015. *Historic Environment Good Practice Advice in Planning: 2. Managing Significance in Decision-taking*.
- Ref 14-9 Historic England. 2015. *Historic Environment Good Practice Advice in Planning: 3. The Setting of Heritage Assets*.
- Ref 14-10 Bassetlaw District Council (2011) *Bassetlaw District Local Development Framework Core Strategy and Development Management Policies*. Available from: <http://www.bassetlaw.gov.uk/media/105902/CS1AdoptedCoreStrategy.pdf> [Accessed 28/07/17].
- Ref 14-11 West Lindsey District Council (2012) *Central Lincolnshire Local Plan*. Available from: <https://www.west-lindsey.gov.uk/my-services/planning-and-building/planning-policy/central-lincolnshire-local-plan/> [Accessed 28/07/17].
- Ref 14-12 Historic England (2011) *Seeing the History in the View. A Method for Assessing Heritage Significance Within Views*.
- Ref 14-13 URS (2015) *EDF Energy Heritage Appraisal of WBA*.
- Ref 14-14 Sturton Ward Planning Group (2015) *Sturton Ward Neighbourhood Plan*.

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## 15. Sustainability and Climate Change

### 15.1 Introduction

- 15.1.1 This chapter of the Preliminary Environmental Information (PEI) Report addresses the potential impacts of the Proposed Development on sustainability, including waste and climate change.
- 15.1.2 The chapter considers national, regional and local policy guidance that promotes sustainability principles and considers the potential impacts of the Proposed Development, and the need for appropriate mitigation measures.
- 15.1.3 It should be noted that this chapter considers in-combination effects of key sustainability themes. As a result, many of the sustainability issues considered in this chapter refers to the other specific chapters of this PEI Report, therefore, relevant chapters are referenced to herein where appropriate.

### 15.2 Legislation, Planning Policy and Guidance

#### Legislative Background

##### *Sustainability and Climate Change*

##### Climate Change Act 2008 (Ref 15-1)

- 15.2.1 The Climate Change Act 2008 sets a legally binding target for the UK to reduce its greenhouse gas emissions from 1990 levels by at least 80% by 2050. This overall target is supported by a system of binding five-year '*carbon budgets*' as well as an independent body to monitor progress, the Committee on Climate Change.

##### Planning our Electric Future: a White Paper for Secure, Affordable and Low Carbon Electricity, 2011 (Ref 15-2)

- 15.2.2 This White Paper (Department for Energy and Climate Change (DECC), 2011) identifies a number of '*unprecedented*' challenges to power generation in the UK, including a threat to security of supply as existing coal-fired power stations close, decarbonisation of electricity generation, the likely rise in electricity demand, and expected rise in electricity prices. In response, a strategy has been put forward that includes the introduction of an Emissions Performance Standard (EPS) for UK power generation proposed to be set as an annual limit equivalent to 450 grams of carbon dioxide (CO<sub>2</sub>) per kilowatt hour at baseload.

##### *Waste*

##### Site Waste Management Regulations 2008 (Ref 15-4)

- 15.2.3 The Site Waste Management Plan Regulations 2008 (enacting Clause 54 of the Clean Neighbourhoods and Environment Act 2005) were revoked in December 2013. However, the main requirements of these Regulations, which govern the management of construction waste, are still considered best practice measures and many developers still prepare a Site Waste Management Plan (SWMP) to act as a guide to project/construction personnel on how to manage all types of waste, in accordance with best practice requirements.

### The Waste (England and Wales) Regulations 2011 (as amended) (Ref 15-6)

15.2.4 The Duty of Care related to waste management as directed by the regulations require that anyone in possession of waste must:

- prevent illegal disposal, treatment or storage of waste;
- prevent the escape of wastes;
- ensure transfer of waste to an authorised person;
- provide an accurate written description of the waste in order to facilitate the compliance of others with the Duty and avoidance of the offences under Section 34 of the Environmental Protection Act 1990 via a compulsory system of waste information in respect of the transfer of controlled waste; and
- all those subject to the Duty should confirm conformance by others '*in the chain*' to the requirements of the Duty to an extent which is '*reasonable in the circumstances*' and all breaches of the Duty should be reported to the Environment Agency.

15.2.5 The Regulations also:

- require businesses to confirm that they have applied the waste management hierarchy when transferring waste and to include a declaration on their Waste Transfer Note (WTN) or Hazardous Waste Consignment Note (HWCN);
- requires businesses undertaking waste management activities such as import, production, collection, transportation, recovery and/or disposal to take all reasonable measures to apply the following waste hierarchy:
  - prevention;
  - preparation for reuse;
  - recycling;
  - other recovery such as energy recovery; and
  - disposal.
- introduce a two-tier system for waste carrier and broker registration, which includes those who carry their own waste, and introduces a new concept of a waste dealer;
- make amendments to hazardous waste controls and definition;
- exclude some categories of waste from waste controls, notably animal by-products whilst including a small number of radioactive waste materials; and
- require that Local Authorities who collect waste paper, metal, plastic or glass arrange to collect these waste streams separately.

## Planning Policy Context

### Sustainability and Climate Change

#### Overarching National Policy Statement for Energy (EN-1) (Ref 15-7)

15.2.6 National Policy Statement (NPS) EN-1 emphasises the importance of a diverse mix of energy generating technologies, including renewables, nuclear and fossil fuels, to avoid over-dependence on a single fuel type and so ensure a more secure energy supply. The policy states that developers should consider opportunities for Combined Heat & Power (CHP) and that all commercial scale (at or over 300MW) fossil fuelled generating stations have to be '*carbon capture ready*'. As the output capacity of the Proposed Development is less than 300MW, the Carbon Capture Readiness

(Electricity Generating Stations) Regulations 2013 (Ref 15-8) do not apply to the Proposed Development.

#### National Policy Statement for Fossil Fuel Electricity Generating Infrastructure (EN-2) (Ref 15-9)

15.2.7 NPS EN-2 sets out the additional policy requirements for energy generating capacity of over 50MW, including, for example, those for land use, transport infrastructure, water resources, grid connection, climate adaptation and good design as follows:

- Land use – the choice of a site may be affected the quantity of chemicals that would be required to be stored at the site. This should be considered by an Applicant;
- Transport infrastructure – New generating sites should be sited as close to existing multi modal transport links as possible. This for the delivery and removal of construction materials, fuel, waste, materials and staff to and from the site. Where road transport is required, consideration should be given to upgrading road access as required;
- Water resources – Applicants are required to ensure there is a sufficient water supply of the right quality to meet its anticipated demand;
- Grid connection – information should be provided on the anticipated grid connection and the likely environmental impact of that connection;
- Climate change adaptation – climate resilience should be considered by an Applicant in their Environmental Statement (ES), including how the development would be resilient to higher temperatures for example;
- Good design – EN-2 requires applicants to demonstrate that the development design has taken into consideration potential landscape and visual effects, noise and traffic impacts for example.

15.2.8 The various technical chapters as included within **Chapters 6-14** of this PEI Report provide further details of NPS requirements, and where in the assessment such issues are considered.

#### National Planning Policy Framework (NPPF) (Ref 15-11)

15.2.9 The National Planning Policy Framework (NPPF) was adopted in March 2012 and replaced the majority of the Planning Policy Statements (PPSs) and Guidance Notes. The Department for Communities and Local Government (DCLG) published its Planning Practice Guidance, which consolidated and revised all the practice guidance documents.

15.2.10 The NPPF sets out the Government's planning policies for England and how these are to be applied. Paragraph 3 of the NPPF makes clear that the document does not contain specific policies for determining applications for NSIPs; these are to be determined in accordance with the decision making framework set out in the Planning Act and relevant NPSs, as well as any other matters that are considered both '*important and relevant*'.

15.2.11 Policies of particular relevance to the scope of the assessment as presented herein include those achieving sustainable development (paragraphs 6-17), promoting sustainable transport (paragraphs 29-41); requirements for good design (paragraphs 56-68); promoting healthy communities (paragraphs 69-78); meeting the challenge of climate change and flooding (paragraphs 93-108); conserving and enhancing the natural (paragraphs 109-125) and conserving and enhancing the historic environment (paragraphs 126-141). A number of these applicable policies are detailed in the various topic chapters presented within this PEI Report.

15.2.12 Paragraphs 97 and 98 of the NPPF specifically set out how planning authorities are to promote the use and supply of renewable and low carbon energy – a central pillar of sustainable development.

- 15.2.13 **Section 15.6** herein details how the Proposed Development performs with regard to sustainable development and climate change.

[Bassetlaw Core Strategy \(Ref 15 –12\)](#)

- 15.2.14 The Core Strategy and Development Management Policies DPD was adopted by Bassetlaw District Council (BDC) in December 2011 and forms part of its Local Plan. The Core Strategy is the key Local Development Framework document that sets out a vision for change in Bassetlaw along with the place-specific policy approaches to be taken in order to achieve this vision over a period of 18 years. A small number of more detailed development management policies, are also included.
- 15.2.15 Relevant district wide policies include Policy DM10: Renewable and Low Carbon Energy, which states:

*“The Council will be supportive of proposals that seek to utilise renewable and low carbon energy to minimise CO<sub>2</sub> emissions. Proposal for renewable and low carbon energy infrastructure will also need to demonstrate that they... iv. Will not result in unacceptable impacts in terms of visual appearance, noise, shadow flicker, watercourse engineering and hydrological impacts, pollution, or traffic generation.”*

[Sturton Ward Neighbourhood Plan \(Ref 15 –24\)](#)

- 15.2.16 Policy 1 of the Sturton Neighbourhood Plan specifically relates to sustainable development, stating:

*“Policy 1: Sustainable Development*

- 1. All development over the Plan period will be required to minimise its environmental impact and, where applicable, to improve access to the countryside and open spaces for residents.*
- 2. Development proposals will be supported:*
  - a) at a scale and in locations that accord with policies set out in the Sturton Ward Neighbourhood Plan where it can be shown that such development would support the continued sustainability and viability of the Plan area,*
  - b) where it provides new homes of the type and mix required by local people,*
  - c) for new and expanded business premises within and on the edge of the settlements.*
- 3. All development shall be designed and located having regard to the principles and advice set out in this Neighbourhood Plan, and shall not cause material harm to the following factors:*
  - a) The amenity of nearby residential properties; and*
  - b) The character and appearance of the part of the Plan area concerned; and*
  - c) The integrity, character and appearance.”*

- 15.2.17 A number of other policies are also of relevance, such as: Policy 2: Conservation and Enhancement of Existing Natural Features; Policy 3 Design Principals; Policy 4: Protecting the Historic Environment; Policy 6: Economic Development; Policy 12: Reducing the Risk of Flooding; Policy 14: Energy Efficiency and Sustainability. Some of these are detailed in other topic chapters within this PEI Report.

### Other Guidance

#### 2015 UK Greenhouse Gas Emissions, Final Figures (Ref 15-10)

- 15.2.18 This provides the latest estimates of 1990-2015 UK greenhouse gas emissions by source and by end user sector.
- 15.2.19 In 2015, UK emissions of the seven greenhouse gases covered by the Kyoto Protocol were estimated to be 495.7 million tonnes carbon dioxide equivalent (MtCO<sub>2</sub>e). This was 3.8% lower than the 2014 figure of 515.1 MtCO<sub>2</sub>e.
- 15.2.20 Carbon dioxide (CO<sub>2</sub>) is the main greenhouse gas, accounting for 81% of total UK greenhouse gas emissions in 2015. The drivers for the decrease in emissions were in the energy supply sector (down 12.3%), the business sector (2.6%) and the waste management sector (7.1%). The decrease in the energy supply sector is due to the change in the fuel mix for electricity generation, with less use of coal and greater use of nuclear and renewables.

### Waste

#### Government Review of Waste Policy (Ref 15-13)

- 15.2.21 The most recently published national waste strategy is the Government Review of Waste Policy 2011. The Government's principal commitments set out in this review include:
- prioritising efforts to manage waste in line with the waste hierarchy and reduce the carbon impact of waste;
  - developing a range of measures to encourage waste prevention and reuse, supporting greater resource efficiency;
  - developing voluntary approaches to cutting waste, increase recycling, and improve the overall quality of recyclate material, working closely with business sectors and the waste and material resources industry;
  - consulting on the case for higher packaging recovery targets for some key materials;
  - supporting energy from waste where appropriate, and for waste which cannot be recycled;
  - working to overcome the barriers to increasing the energy from waste which Anaerobic Digestion (AD) provides, as set out in the new AD strategy; and
  - consulting on restricting wood waste from landfill and review the case for restrictions on sending other materials to landfill.

#### Waste Management Plan for England (Ref 15-14)

- 15.2.22 The Waste Management Plan for England (the Plan) is a high level document, which is non-site specific. It draws on the Government Review of Waste Policy (Ref 15-13) and provides an analysis of the current waste management situation in England. It evaluates how it will support implementation of the objectives and provisions of the revised Waste Framework Directive (Ref 15-15) (the Waste Directive) as transposed in to UK legislation by way of the Waste (England and Wales) Regulations 2011 (as amended) (Ref 15-6).
- 15.2.23 This Plan sets out an overview of waste management in England to fulfil the revised Waste Directive Article 28 mandatory requirements, and other required content as set out in Schedule 1 to the 2011 Regulations. The Plan, in conjunction with the Government Review of Waste Policy (Ref

15-13), the National Planning Policy for Waste (Ref 15-16) meets the requirements of the Waste Directive by providing:

- an analysis of the current waste management situation and the measures being taken to deliver the hierarchy of re-use, recycling, recovery and disposal of waste including an evaluation of how the plan will support the implementation of the objectives and provisions of the Directive;
- an analysis of the type, quantity and source of waste generated and the waste likely to be shipped from or to England along with an evaluation of the development of waste streams in the future;
- an overview of existing waste collection schemes and waste disposal and recovery installations, including any special arrangements for waste oils, hazardous waste or waste streams addressed by specific European Community legislation;
- an assessment of the need for new collection schemes, the closure of existing waste installations and the need for additional waste installation infrastructure in accordance with Article 16 (on the proximity principle) of the Directive, and, if necessary, the investments related thereto;
- sufficient information on the location criteria for site identification and on the capacity of future disposal or major recovery installations, if necessary; and
- general waste management policies, including planned waste management technologies and methods, or policies for waste posing specific management problems.

#### National Planning Policy for Waste (Ref 15-16)

15.2.24 The National Planning Policy for Waste sets out the Government's ambition to work towards a more sustainable and efficient approach to resource use and management. Positive planning plays a pivotal role in delivering this country's waste ambitions through:

- delivery of sustainable development and resource efficiency, including provision of modern infrastructure, local employment opportunities and wider climate change benefits, by driving waste management up the waste hierarchy;
- ensuring that waste management is considered alongside other spatial planning concerns, such as housing and transport, recognising the positive contribution that waste management can make to the development of sustainable communities;
- providing a framework in which communities and businesses are engaged with and take more responsibility for their own waste, including by enabling waste to be disposed of or, in the case of mixed municipal waste from households, recovered, in line with the proximity principle;
- helping to secure the re-use, recovery or disposal of waste without endangering human health and without harming the environment; and
- ensuring the design and layout of new residential and commercial development and other infrastructure (such as safe and reliable transport links) complements sustainable waste management, including the provision of appropriate storage and segregation facilities to facilitate high quality collections of waste.

15.2.25 The National Planning Policy for Waste sets out detailed waste planning policies. It should be read in conjunction the:

- NPPF (Ref 15-11);
- Waste Management Plan for England (Ref 15-14); and
- National Policy Statement for Hazardous Waste (Ref 15-17).

15.2.26 All local planning authorities should have regard to its policies when discharging their responsibilities to the extent that they are appropriate to waste management.

[Overarching National Policy Statement for Energy \(EN-1\) \(Ref 15-7\)](#)

15.2.27 **Table 15-1** provides a summary of relevant NPS advice regarding waste management and where this is considered in this chapter.

**Table 15-1: Summary of relevant NPS advice regarding waste management**

Summary of NPS	Consideration within the Chapter
<b>NPS EN-1 (Ref 15-7)</b>	
Paragraph 5.14.6 states: <i>“The applicant should set out the arrangements that are proposed for managing any waste produced and prepare a Site Waste Management Plan. The arrangements described and Management Plan should include information on the proposed waste recovery and disposal system for all waste generated by the development, and an assessment of the impact of the waste arising from development on the capacity of waste management facilities to deal with other waste arising in the area for at least five years of operation. The applicant should seek to minimise the volume of waste produced and the volume of waste sent for disposal unless it can be demonstrated that this is the best overall environmental outcome.”</i>	A framework Construction Environmental Management Plan (CEMP) will be included in the ES to support the Application, see <b>Section 15.5</b> .

[Nottinghamshire and Nottingham Replacement Waste Local Plan \(Waste Core Strategy\) \(Ref 15-18\)](#)

15.2.28 The Waste Core Strategy is a plan for managing all of the waste produced in Nottinghamshire and Nottingham up to 2031. It forms part of the formal development plan for the area.

15.2.29 The Waste Core Strategy sets out the County and City Councils’ strategic planning policies for the development of future waste management facilities. This document identifies broad areas where waste management facilities, of different types, are likely to be acceptable, but it does not allocate specific sites for waste management use.

15.2.30 As well as recognising the value of waste as a resource and managing it more sustainably, it states that it is essential to put in place the right infrastructure to manage whatever waste is produced. This means planning to make sure the right types of waste management facilities in the right places to recycle, recover or, where necessary, dispose of our waste.

15.2.31 Nottinghamshire County Council and Nottingham City Council have worked together to produce this Waste Core Strategy which will guide the provision of essential waste management infrastructure over the next 20 years. To help achieve this, the strategy sets a 70% recycling target for all wastes by 2025 and allows for some additional energy recovery, where needed, to reduce what is sent to landfill to no more than 10% of the waste produced.

15.2.32 Policy WCS2 of the Waste Core Strategy states that developments should be:

*“Designed, constructed and implemented to minimise the creation of waste, maximise the use of recycled materials and assist the collection, recycling and recovery of waste arising from the development.”*

### Other Guidance

Designing Out Construction Waste - A Guide for Project Design Teams, Zero Waste Scotland (Ref 15-19)

- 15.2.33 This publically available guide can be applied to construction project across the UK. The guide highlights the opportunities to adopt more circular approaches and to design out waste across the construction process. Importantly, the guide highlights the role of good decision-making throughout the entire construction process, and that design is not just decided by the architect, but is informed by many professionals across many disciplines, including project managers, quantity surveyors, mechanical and electrical engineers, facilities managers and other related disciplines involved in designing and building within the industry.
- 15.2.34 The guide discusses five key principles around how to design out wastes, which like ideas within the theory of circular economy are not discrete, disconnected topics for consideration. Instead, they can all play a part within, and complement, the others:
- design for waste-efficient procurement;
  - design for materials optimisation;
  - design for off-site construction;
  - design for re-use and recovery; and
  - design for deconstruction and flexibility.

## 15.3 Assessment Methodology and Significance Criteria

### Consultation

- 15.3.1 Consultation was undertaken through the formal EIA Scoping stage as part of the ongoing consultation process. A summary of consultation comments relating to sustainability, climate change and waste, and how these have been addressed, is included in **Table 15-2**.

**Table 15-2: Consultation summary table**

Consultee or organisation approached	Date and nature of consultation	Consultee Comments	Summary of Response
Secretary of State (SoS)	June 2017 Response to consultation on EIA Scoping Report	Comments received re. approach to the sustainability and climate change assessment and identifying significance criteria. The SoS recommends that the Applicant specifically address the issue of climate change adaptation and resilience within the ES.	A statement explaining the resilience of the Proposed Development to climate change will be included in the ES to accompany the application for development consent, building upon the assessment as included within this chapter.
		Comments regarding scoping out waste management stated that: <i>it is not considered appropriate to scope out waste management as an issue; however, the SoS considers that provision of relevant information as part of the Scoping Opinion for West Burton C Power Station Sustainability and Climate Change Chapter would be acceptable. In providing this information, the Applicant should have regard to comments from NCC regarding the approach to waste management.</i>	Consideration of waste minimisation, implementation of the waste hierarchy, and waste management plan are presented within this chapter.
Nottinghamshire County Council (NCC)	June 2017 Response to consultation on EIA Scoping Report	<i>The County Council would be keen to see the best practice of waste management for the development. As set out in Policy WCS2 of the Waste Core Strategy, the development should be '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 arising from the development. In terms of the Waste Core Strategy, the site is not close to any existing waste management site (other than that associated with the operation of the power station) and so it does not raise any issues in terms of safeguarding our existing waste management facilities (as per Policy WCS10).</i>	Consideration of waste minimisation is presented within this chapter.

## Assessment Methods

### Sustainability and Climate Change

- 15.3.2 This sustainability assessment provides a mechanism for considering the sustainability of the Proposed Development as a whole and for integrating sustainability considerations throughout its lifecycle. It summarises the features and attributes of the Proposed Development that would contribute to, or affect each of the sustainability themes, and sets out actions, which would be taken during the design, construction and operation that would further assist in delivering sustainability benefits for the local and wider area.
- 15.3.3 Measures are outlined, where feasible, that would be considered for implementation to incorporate and improve sustainability within the Proposed Development design and management.
- 15.3.4 As part of the climate change assessment, greenhouse gas (GHG) emissions have been assessed using a calculation-based methodology as per the below equation:

$$\text{Activity data} \times \text{GHG emissions factor} = \text{GHG emissions value}$$

- 15.3.5 The GHG Assessment is presented as **Appendix 15.1: Greenhouse Gas Assessment** (PEI Report Volume II), whilst **Table 15-3** summarises the carbon footprint of the Proposed Development.

**Table 15-3: Carbon footprint of Proposed Development**

Emissions Source	Annual GHG emissions by Source (tCO <sub>2</sub> e)	
	35% Efficiency	41.6% Efficiency
Emissions from fossil fuel (natural gas) combustion	261,976	220,413
Transport of raw materials	Unable to calculate at the PEI Report stage*	Unable to calculate at the PEI Report stage*
Transport of waste materials	Unable to calculate at the PEI Report stage*	Unable to calculate at the PEI Report stage*
Gas Combusted (well to tank emissions)	35,572	29,929
<b>Total annual GHG emissions (tCO<sub>2</sub>e)</b>	<b>297,549</b>	<b>250,342</b>
<b>Carbon Intensity of generated electricity all scopes (tCO<sub>2</sub>e/GWh)</b>	<b>663</b>	<b>558</b>

\* to be reconsidered during the preparation of the ES that will accompany the Application for development consent

### Waste

- 15.3.6 A waste assessment will be undertaken to identify the likely types and quantities of waste that would be generated during the construction, operation and decommissioning of the Proposed Development. The waste assessment will follow the structure set out below:
- baseline conditions are determined from published data sources and the findings of the WSP geotechnical desk study (Ref 15-19) to provide an estimate of the quantity and type of waste anticipated to be produced and the waste treatment capacity of the immediate area and surrounding region;

- the type and volume of waste likely to be generated and the type and volumes of materials required by the Proposed Development during construction is estimated; and
- the capacity of local and regional facilities in relation to the predicted quantity of waste produced is assessed and any necessary mitigation identified.

15.3.7 The assessment presented herein comprises a preliminary assessment, given that information to enable the types and quantities of waste during the construction phase are not yet available. Such details will be presented in the ES. The assessment presented in Chapter describes the management routes available for dealing with the waste that would be generated and provides a preliminary assessment of whether there are likely to be any significant effects as a result of the Proposed Development.

15.3.8 The assessment also outlines mitigation measures that would be adopted to minimise waste generation; facilitate reuse or recycling of wastes; and prevent exposure to potentially harmful material and nuisance during the collection, temporary storage and transportation of wastes. Significance Criteria

### **Sustainability and Climate Change**

15.3.9 There is no standard methodology for assessing the magnitude of sustainability impacts and the significance of effects of proposed developments. Each project is evaluated according to its individual characteristics. As such, the approach taken has been to systematically and qualitatively consider the Proposed Development against relevant key sustainability themes and policy objectives. References made to other disciplines considered within this PEI Report use the significance criteria detailed in the individual topic chapters referenced.

15.3.10 There is currently no guidance regarding significance levels for GHG emission impacts and effects. All GHG emissions contribute to global climate change and can therefore be considered to have some level of significance. The UK has legally binding GHG reduction targets and, therefore, the assessment of significance considers how the Proposed Development would contribute to the national GHG inventory and if it could impact the UK achieving its GHG reduction targets.

### **Waste**

15.3.11 Assessment of waste management impacts does not follow the approach used for other topics of identifying receptors and determining their sensitivity. Instead, the magnitudes and significance of waste management effects are assessed by:

- establishing the baseline waste generation rate for the relevant planning area;
- estimating the likely types and quantities of waste that would be generated by the Proposed Development; and
- for each category of waste, comparing the likely waste arisings from the Proposed Development to the baseline waste arisings for the relevant area and calculating the likely percentage increase in waste arisings.

15.3.12 Identification of specific receptors and estimation of their significance is not appropriate for waste management effects because:

- waste producers have a legal duty of care to manage their waste in accordance with regulations and to ensure that any waste leaving the site of generation is transferred to a suitably licensed facility for further treatment or disposal;
- facilities transferring, treating or disposing of waste must be either licensed or apply for an exemption from a license, and impacts arising from the operation of waste management facilities are considered as part of the planning and permitting process for these facilities themselves;

- good practice measures to mitigate any local impacts on water resources, air quality, noise or traffic resulting from the generation, handling, on-site temporary storage or off-site transport of waste would be adopted and are described in this chapter. Any residual local impacts (e.g. noise and traffic) are addressed separately in the relevant chapters of this PEI Report.

## 15.4 Baseline Conditions

### Existing Baseline

#### *Sustainability and Climate Change*

- 15.4.1 This chapter draws on information from a number of other chapters in this PEI Report. A summary of baseline conditions is provided below, drawing on baseline information as detailed in the relevant topic chapters referenced throughout this chapter. This should be read in conjunction with the description of the Site, as detailed in **Chapter 3: Description of the Site**.

#### *Waste*

- 15.4.2 **Appendix 11A:** Phase I Geo-environmental Site Assessment (PEI Report Volume II) provides details of whether the material identified for the Proposed Development is likely to pose a risk of contamination to receptors. This is discussed in further detail in **Chapter 11: Geology, Hydrogeology and Land Contamination**.
- 15.4.3 **Chapter 11: Ground Conditions and Hydrogeology** highlights that there may be potential sources of contamination within the Site (e.g. historical PFA deposits, excavations or temporary stockpiles) and outside the Site (typically within 500m). Further investigations will be undertaken to determine ground conditions on the Site and the need for ground treatment.
- 15.4.4 For the purposes of the impact assessment, it has been assumed that the majority of the Site would be cleared. However, as detailed in **Chapter 9: Ecology and Nature Conservation**, the Proposed Development would avoid, as far as possible, areas of high quality habitat, such as mature trees and woodland/wetland habitats associated with Local Wildlife Sites (LWSs) to the east of the Site.
- 15.4.5 The West Burton Plant C – geotechnical desk study prepared by WSP Parsons Brinckerhoff (June 2017) (Ref 15-20) provides an overview of the current conditions of the Site that influence the design. The study recommends that when the locations of the proposed structures are finalised, a site investigation is undertaken in order to determine ground conditions.

### Future Baseline

#### *Sustainability and Climate Change*

- 15.4.6 Climate change has the potential to impact on the future baseline conditions; for example, increased incidences of heavy and prolonged rainfall could increase flood risk from surface water, groundwater and drainage systems. The assessments of flood risk and the drainage design have therefore considered the implications of climate change on the Proposed Development.

#### *Waste*

- 15.4.7 The future baseline for waste is taken to be the waste quantities and types produced during operation. Volumes of material anticipated to be produced will be provided in the ES that will accompany the application for development consent.

## 15.5 Development Design and Impact Avoidance

### Sustainability and Climate Change

15.5.1 The Proposed Development design is based on Best Available Techniques (BAT) for OCGT plants, which aims to minimise impacts on air quality, emissions, and energy and water use. The following sections describe the sustainability impact avoidance measures that have been incorporated into the Proposed Development design, together with mitigation and management actions that would be taken that contribute to sustainability and mitigating the effects of climate change.

### Ecology and Landscape

15.5.2 **Chapter 9:** Ecology and Nature Conservation considers ecological receptors and impact avoidance measures. Ecology and biodiversity are important considerations in relation to the sustainability of the Proposed Development. The following habitats have the potential to be impacted by the Proposed Development and which are assessed as being of local value:

- semi-improved neutral grassland; and
- the River Trent.

15.5.3 There are several protected or notable faunal species identified as present, or potentially present, within the Site, namely great crested newt, bats, badger, grass snake, breeding birds, otter, brown hare, fish, and aquatic invertebrates.

15.5.4 Given the above, a range of impact avoidance measures are set out in **Chapter 9:** Ecology and Nature Conservation. These include compliance with good environmental protection practice during Proposed Development construction to prevent surface and ground water pollution, dust and noise pollution. Such measures would be implemented through a Construction Environmental Management Plan (CEMP). The CEMP would be prepared and implemented by the construction contractor (s). A framework CEMP will be included in the ES to support the Application.

15.5.5 Retained trees would be protected by clearly defined root protection zones to prevent damage/compaction of roots by plant and other machinery during construction, whilst all clearance of suitable vegetation during site preparation work would be undertaken outside the breeding season (typically March-August inclusive for most species), where possible.

15.5.6 **Chapter 10:** Landscape and Visual Amenity considers that the existing vegetation around the Site provides screening for low level views into the Site. The Proposed Development design would use suitable materials for construction to minimise visual impacts. Mitigation of landscape effects is intrinsic within the development proposals which seek to substantially retain existing well established vegetation within the Site.

### Ground Conditions and Hydrogeology

15.5.7 **Chapter 11:** Ground Conditions and Hydrogeology considers the impact of the Proposed Development on ground conditions and hydrogeology. Impact avoidance measures are defined that accord with standard practice in construction and operation, whilst measures are recommended for incorporation into the Proposed Development design. For example, minimising adverse land contamination effects on sensitive receptors by ensuring all earthworks materials are suitable for their proposed use. Measures to manage potential impacts upon ground conditions and hydrogeology during the construction phase would be implemented via the CEMP.

### Air Quality

15.5.8 **Chapter 6:** Air Quality details best practice measures to be applied to manage emissions of dust and particulates by construction activities, the use of construction traffic, as well as air emissions

from Proposed Development operation. The management of dust and particulates and the application of adequate mitigation measures during the construction phase would be enforced through the CEMP. The Considerate Constructors Scheme (CCS) would also be adopted to assist in reducing pollution and nuisance from the Proposed Development. During Proposed Development operation, emissions to air must comply with the Emissions Limit Value requirements regulated by the Environment Agency through an Environmental Permit.

### *Traffic and Transportation*

- 15.5.9 **Chapter 7:** Traffic and Transport details good practice measures that would be implemented to minimise construction traffic impacts. Traffic movements would be controlled during the construction phase to minimise impacts on the surrounding road network. A Construction Worker Travel Plan (CWTP) would be required by the contractor(s) which aims to identifying measures and establish procedures to encourage construction workers to adopt modes of transport which reduce reliance on single occupancy private car use. In addition, the contractor(s) would be required to prepare a Construction Traffic Management Plan (CTMP) to identify a number of measures to control the routing and impact that HGVs would have on the local road network during construction.

### *Noise and Vibration*

- 15.5.10 Mitigation of noise and vibration during construction activities and Proposed Development operation is detailed in **Chapter 8:** Noise and Vibration. Construction mitigation measures include working within construction noise limits through the use of localised screening and modern plant complying with the latest European noise emission requirements. Any noise complaints would be monitored and reported to the contractor for immediate investigation.. The management of noise and vibration and the application of adequate mitigation measures during the construction period would be enforced through the proposed CEMP, controlled by a Requirement of the DCO.
- 15.5.11 In terms of operation, the Proposed Development would be operated in accordance with an Environmental Permit, issued and regulated by the Environment Agency. This would require control of operational noise through use of BAT.

### *Water Resources, Flood Risk and Drainage*

- 15.5.12 The Proposed Development has the potential to impact on surface and groundwater resources in the vicinity of the Site., **Chapter 12:** Water Resources, Flood Risk and Drainage therefore considers potential design and impact avoidance measures to minimise such impacts. The CEMP will thus include measures to protect ground and surface waters during construction, including pollution plans, storage of materials, staff awareness training and plans for appropriate water discharge. Measures aimed at preventing the increase of flood risk during the construction works would also be included in the CEMP, including storing construction materials outside of the 1 in 100 year floodplain extent and maintaining connectivity to the River Trent. The contractor(s) would be required to produce a Flood Risk Management Action Plan/Method Statement which would provide details of the response to an impending flood, formally part of the CEMP.
- 15.5.13 During Proposed Development operation, the Site operator's Environmental Management System (EMS) would include impact avoidance measures such as pollution plans and containment measures, whilst the Site would be operated in accordance with the Environmental Permit. A drainage strategy (**Appendix 12A** (Flood Risk Assessment (FRA)) PEI Report Volume II) presents options for the outline drainage design that would be developed through the detailed design process. The drainage design considers high rainfall events of the kind that may become more frequent with climate change.
- 15.5.14 Flood risk has been considered and flood resilience measures would be incorporated into the Proposed Development design to minimise the potential for damage and reduce recovery time. During construction, the opportunity would be taken to adopt flood resilient design techniques for the terrestrial elements of the Proposed Development, this includes placement of main plant and

flood sensitive equipment above the River Trent 1 in 200 year flood level, plus an allowance for climate change. Further details are included within the FRA presented as **Appendix 12A** (PEI Report Volume II).

## Waste

- 15.5.15 As detailed above, a CEMP would be developed by the contractor(s). This would detail the requirements for environmental protection and measures needed to ensure legal compliance as related to waste. Such measures would be included within a waste minimisation plan which forms part of the CEMP. A framework CEMP will be included in the ES to support the Application.
- 15.5.16 The CEMP would require the contractor(s) to adopt good practice in construction waste management that would reduce the quantity of waste generated. The following approaches would be considered within the waste minimisation plan, where practicable, in order to minimise the quantities of waste requiring disposal:
- agreements with material suppliers to reduce the amount of packaging or to participate in a packaging take-back scheme;
  - implementation of a 'just-in-time' material delivery system to avoid materials being stockpiled, which increases the risk of their damage and disposal as waste;
  - attention to material quantity requirements to avoid over-ordering and generation of waste materials;
  - re-use of materials wherever feasible e.g. re-use of excavated soil for landscaping and concrete crushing and re-use;
  - segregation of waste at source where practical; and
  - re-use and recycling of materials off-site where re-use on-site is not practical (e.g. through use of an off-site waste segregation facility and re-sale for direct re-use or re-processing).
- 15.5.17 The following waste management measures would also be considered for incorporation within the waste minimisation plan and implemented where practicable via the CEMP in order to minimise the likelihood of any localised impacts of waste on the surrounding environment:
- damping down of surfaces during spells of dry weather and brushing/ water spraying of heavily used hard surfaces/access points across the Site as required;
  - off-site prefabrication, where practical, including the use of prefabricated structural elements, cladding units, mechanical and electrical risers and packaged plant rooms;
  - burning of waste or unwanted materials would not be permitted on Site;
  - all hazardous materials including chemicals, cleaning agents and solvent containing products to be properly sealed in sealed containers at the end of each day prior to storage in appropriately protected and bunded storage areas;
  - all demolition and construction workers would be required to use appropriate Personal Protective Equipment (PPE) whilst performing activities on-site;
  - any waste effluent would be tested and where necessary, disposed of at the correctly licensed facility by a licensed specialist contractor(s); and
  - materials requiring removal from the Site would be transported using licensed carriers and records would be kept detailing the types and quantities of waste moved, and the destinations of this waste, in accordance with the relevant regulations.

15.5.18 The contractor(s) would use the CEMP, to ensure:

- all waste from the Site would be dealt with in accordance with the waste duty of care in Section 34 of the Environmental Protection Act 1990 (the Duty) (Ref 15-5) and the 2011 Regulations; and
- materials would be handled efficiently and waste managed appropriately.

15.5.19 The key benefits of having a waste minimisation plan within the CEMP for the contractor include:

- providing a structured and forward thinking approach to waste management;
- assisting with compliance of internal quality and environmental management systems and associated performance targets;
- providing greater control of regulatory risks relating to virgin materials, waste storage, handling and disposal at a site level;
- providing greater transparency with interested parties including local authorities and the Environment Agency;
- identifying savings through improved resource efficiency, ordering, materials storage and handling to eliminate waste at source; and
- enhancing waste storage and segregation practices to facilitate higher recycling and recovery potential on site.

15.5.20 Further information on measures to mitigate effects on local air quality, noise and traffic (including those arising from waste) are also included in the following chapters:

- **Chapter 6:** Air Quality;
- **Chapter 7:** Traffic and Transportation; and
- **Chapter 8:** Noise and Vibration.

## 15.6 Likely Impacts and Effects

### Construction

#### *Sustainability and Climate Change*

##### Reducing the Use of Natural Resources in Construction Materials

- 15.6.1 The selection of materials for the construction of the Proposed Development should be informed by sustainability principles, including the prudent and efficient use of natural resources and the use of re-used and recycled materials. A primary principle of sustainable procurement is to question the need/requirement for the commodity in question.
- 15.6.2 To minimise the use of natural resources and unnecessary materials procured for the Proposed Development, suitable infrastructure already associated with the existing wider West Burton Power Station Site would be re-used where possible. For example, the mains water infrastructure and potentially (subject to ongoing feasibility design) the drainage system from the West Burton B (WBB) power station. Re-using existing structures reduces the need for additional raw materials.
- 15.6.3 The CEMP would be prepared prior to commencing construction works, in accordance with a Requirement imposed in the DCO. The CEMP would identify all best practice procedures, including environmental best practice, such as the processing and re-use of all recovered materials onsite where practical.

- 15.6.4 Following implementation of the above design measures, the Proposed Development is expected to result in low magnitude minor adverse effects (not-significant) from the use of natural resources in construction materials.

#### Ecology and Landscape

- 15.6.5 **Chapter 9:** Ecology and Nature Conservation considers the potential impacts and effects of the Proposed Development on ecological receptors. The following potential impacts have been identified:
- new pipework and associated infrastructure would be required and measures to minimise environmental effects would be described in the CEMP including:
    - installation during the summer or during lower flow periods (for flood risk and hydrodynamic/erosion/scour purposes); and
    - pre-construction sediment contamination testing and use of silt curtains (to minimise impacts on water quality).
  - lighting for night-time construction works would be designed so as not to cause a nuisance outside of the Site, in relation to views from residential receptors or light disturbance to ecological receptors.
- 15.6.6 The impact of habitat loss and disturbance during construction is considered in **Chapter 9:** Ecology and Nature Conservation, with regard to great crested newts, bats, badgers, grass snakes Cetti's warbler and hares. With the CEMP and proposed ecological enhancement (see **Figure 9.1** – PEI Report Volume III), the magnitude of impacts would be low or very low, with resultant minor or negligible adverse effects (non-significant). The proposals would also deliver compensatory habitat provision for great crested newt populations (of County Value) to meet EPS licensing requirements.
- 15.6.7 **Chapter 10:** Landscape and Visual Amenity considers that the Proposed Development may affect landscape character during construction due to the introduction of additional built form which is similar in form and smaller in scale to that already within the West Burton Power Station Site. The magnitude of impact would be low or very low, with resultant minor or negligible adverse effects (non-significant).

#### Flood Protection and Water Quality

- 15.6.8 Potential impacts on water quality, water supply, recreation and biodiversity in the water environment are assessed in **Chapter 12:** Water Resources, Flood Risk and Drainage. Following implementation of applicable mitigation measures via the CEMP, the likelihood of water contamination during the construction phase would be low.
- 15.6.9 The assessment has identified the 'worst case scenario', such as significant pollution events, which have a low probability of occurrence due to the procedures and measures that would be put in place. Adverse residual effects on the key receptors (River Trent, Wheatley Beck and Catchwater Drain, Railway Dyke Drain/Drain north of the Site, minor watercourses and drainage ditches, other identified water features and groundwater) have been assessed as minor adverse to negligible and therefore not significant. A potential moderate adverse effect on the River Trent has been identified due to suspended sediments in site runoff during the construction phase which is considered significant, however, this effect is noted to be unlikely to occur based on the impact avoidance measures to be implemented via the CEMP as described in **Chapter 12:** Water Resources, Flood Risk and Drainage; **Section 12.5**.

#### Transport

- 15.6.10 The traffic and transportation assessment is presented in **Chapter 7:** Traffic and Transportation, is supported by a Transport Assessment (**Appendix 7A** – PEI Report Volume II). This includes

assessment of the impacts of HGVs, abnormal loads and construction worker transport. The assessment concludes that the change in total traffic is significantly less than 30% on each link road and therefore is likely to have negligible (not significant) effect.

- 15.6.11 The air quality and noise assessments presented in **Chapter 6: Air Quality** and **Chapter 8: Noise and Vibration** consider how transport affects air quality and noise receptors respectively. During construction, either no change or very low magnitude of noise impact is expected due to changes in traffic flows along all the assessed routes. This would result in no change or negligible adverse effects (not significant) at local residential Noise Sensitive Receptors (NRS). Similarly, the construction phase Annual Average Daily Traffic (AADT) movements are predicted to peak at 112 two-way HGV movements accessing the Site via the existing access point per day, for an estimated maximum of 13 months. The AADT total number of vehicles is predicted to peak at less than 500 two-way movements on Gainsborough Road. On this basis, further quantitative assessment of road traffic impacts associated with the construction phase has not been undertaken, as the screening criteria recommending initiation of a detailed assessment of air quality impacts have not been exceeded (200 HGVs and 1,000 total vehicle movements). The effects of emissions to air from these vehicle movements are, therefore, considered to be not significant (i.e. negligible/minor).

#### Air Quality

- 15.6.12 With the implementation of best practice measures via the CEMP, the effects of emissions to air from construction activities are considered to be not significant on identified sensitive receptors (i.e. negligible/ minor). Further details are provided in **Chapter 6: Air Quality**.

#### Noise

- 15.6.13 **Chapter 8: Noise and Vibration** assesses the potential noise and vibration impacts of the Proposed Development. With the implementation of appropriate mitigation measures via the CEMP, noise effects from Proposed Development construction activities on neighbouring noise-sensitive receptors are predicted to be negligible (not significant).

#### Job Creation

- 15.6.14 As well as environmental demands, sustainable development also considers the social and economic demands. As detailed in **Chapter 13: Socio-Economics**, the Proposed Development would result in the creation of jobs during the construction phase. Based on experience of similar projects, the Proposed Development is anticipated to create average of approximately 95 temporary construction jobs, peaking at approximately 200 temporary construction jobs. The direct, indirect and induced employment created by the construction phase of the Proposed Development is considered to have a minor short-term and therefore an insignificant effect on the local economy. Further details regarding the potential socio-economic impacts of the Proposed Development during the construction phase are presented in **Chapter 13: Socio-Economics**.

#### GHG Emissions

- 15.6.15 Construction emissions have been scoped out of the GHG assessment. There is a demand for increased power infrastructure in the UK and therefore the GHG emissions associated with construction of the Proposed Development would not be an additional impact on the national inventory for the power sector.

#### Waste

- 15.6.16 An assessment of the impacts and effects associated with Proposed Development construction phase will be included in the ES that will accompany the application for development consent, including details of anticipated wastes type and volumes. As detailed in **Section 15.5**, a waste minimisation plan would form part of the CEMP in order to control site activities and minimise

environmental impacts as associated with waste during the construction phase. This would require the contractor to adopt good practice to minimise construction waste and require waste streams to be separated on-site and appropriately monitored.

- 15.6.17 Following implementation of the above design measures, the Proposed Development is expected to result in minor adverse (not significant) waste effects during the construction phase.

## Opening

### *Sustainability and Climate Change*

- 15.6.18 The impacts and potential effects on sustainability and climate change at opening would be the same as those at operation, which are considered below.

### *Waste*

- 15.6.19 The impacts and potential effects on waste at opening would be the same as those at operation, which are considered below.

## Operation

### *Sustainability and Climate Change*

### *Ecology and Landscape*

- 15.6.20 **Chapter 9:** Ecology and Nature Conservation indicates that potential impacts during the Proposed Development operation phase that could result in effects on ecological features are as follows:

- air pollution from emissions - potentially leading to adverse effects on sensitive habitats through increased nitrogen and acid deposition; and
- increased levels of disturbance (noise, vibration, artificial lighting) - potentially resulting in adverse effects on ecological features.

- 15.6.21 As detailed in **Chapter 9:** Ecology and Nature Conservation, the impact sources as detailed above are not predicted to result in any significant ecological effects (with effects being either neutral or negligible).

- 15.6.22 **Chapter 10:** Landscape and Visual Amenity considers that the Proposed Development may affect landscape character during operation through increased built form and structures. Landscape effects are predicted to range from minor adverse to negligible beneficial, and thus landscape effects are not predicted to be significant. With regard to visual effects, Proposed Development operation is predicted to result in visual effects upon selected visual receptors ranging from negligible to moderate adverse (views from Footpath Bole FP4, Bole).

### *GHG Emissions*

- 15.6.23 A GHG Assessment report has been prepared and is included as **Appendix 15A** (PEI Report Volume II). The indicative operational annual carbon footprint of the Proposed Development has been calculated using the Greenhouse Gas Protocol (Ref 15-20), which provides a methodology for calculating the carbon footprint of a project. A summary of the GHG assessment is presented in Table 15-2.

- 15.6.24 Table 15-2 indicates that the total annual carbon footprint of the Proposed Development is calculated to between 250 kilotonnes and 298 kilotonnes CO<sub>2</sub>e (rounded to the nearest thousand tonnes). Assuming that the Proposed Development exports 449 GWh per year (based on peaking

plant for 299 MWe for 1,500 hours), this is equivalent to between 558 and 663 tonnes CO<sub>2</sub>e per GWh electricity generation.

#### Water Use

- 15.6.25 The Proposed Development is not anticipated to require significant volumes of water for cooling processes. The small amount of cooling water needed for auxiliary systems would be maintained in a closed loop system that would be topped up using water from the existing Water Treatment Plant on the WBB power station or from a towns' water supply. Water benchmarking would be undertaken as part of the Environmental Permit application, whilst further information will be provided in the ES on the Proposed Development anticipated water demand.

#### Flood Protection and Water Quality

- 15.6.26 **Chapter 12: Water Resources, Flood Risk and Drainage** sets out the conclusions of the FRA (which is included at **Appendix 12A** (PEI Report Volume II), as well as measures to minimise water pollution. Once the Proposed Development is open and operational, it is considered that identified watercourses would not be significantly affected by the Proposed Development. However, the Proposed Development would utilise the River Trent in terms of surface water (should one of the outfall options be progressed).
- 15.6.27 The operator's EMS would include impact avoidance measures such as accidental pollution plans and provision of spillage kits, containment measures such as bunds. An Outline Drainage Strategy has been produced as part of the FRA (**Appendix 12A** - PEI Report Volume II) – this would be developed through detailed design. The drainage scheme would be designed to ensure any potentially contaminated wastewater would be discharged directly to a foul sewer and that any uncontaminated surface water would be discharged directly to the River Trent (based on Drainage Option 1 New Outlet into the River Trent) or Drainage Option 2 – Connection to the WBB power station, both at restricted rates via attenuation methods.
- 15.6.28 The FRA for the Proposed Development, included within **Appendix 12A** (PEI Report Volume II) concludes that development of the Site would not increase the risk of flooding from fluvial, groundwater or overland flow sources.
- 15.6.29 Following implementation of the above design measures, the likelihood of water contamination is low. Potential impacts on water quality, water supply, recreation and biodiversity in the water environment are found to be of low magnitude with minor adverse or negligible effects (not significant) for Proposed Development operation (see **Chapter 12: Water Resources, Flood Risk and Drainage** and **Chapter 11: Ground Conditions and Hydrogeology**).

#### Energy Efficiency

- 15.6.30 The design of the Proposed Development is based on BAT for OCGT plants. The GHG assessment (**Appendix 15A** (PEI Report Volume II)) has been modelled for between 35% and 41.6% thermal efficiency.
- 15.6.31 The consideration of alternatives and plant design is being undertaken with the aim of preventing or reducing adverse environmental effects, while maintaining operational efficiency and cost-effectiveness.
- 15.6.32 The Proposed Development plant would be subject to regular planned maintenance in order to optimise the efficiency of the equipment on-site.
- 15.6.33 Following implementation of the above design measures, the Proposed Development is not expected to result any significant effects with regard to energy efficiency.

#### Air Quality

15.6.34 The Proposed Development would comply with the European Industrial Emissions Directive (IED) (Ref 15-22). This requires minimisation of the impact of emissions to air, soil, surface and ground water, to the environment and human health.

15.6.35 **Chapter 6:** Air Quality has considered the human health and ecological receptors that may be affected by Proposed Development operation – this indicates that Proposed Development operation is considered to have negligible effect on receptors and thus operational air quality effects are considered to be not significant.

#### Transport

15.6.36 The traffic and transport impacts of the Proposed Development are considered in **Chapter 7: Traffic and Transportation** and is supported by a Transport Assessment (**Appendix 7A - PEI Report Volume II**). This confirms that once operational, there would be very low traffic flows resulting from the Proposed Development, and that these would be significantly lower than those anticipated during the construction phase. Such traffic flows are considered to be negligible (not significant).

#### Noise

15.6.37 **Chapter 8:** Noise and Vibration considers the potential impacts of Proposed Development operation on noise-sensitive receptors, modelling different scenarios for generating plant under consideration. The 10 different scenarios produce a range of impact magnitudes from very low to high adverse at the seven selected receptor locations. This would result in effects between negligible (not significant) to major adverse (significant). However, the results indicate that a low/very low magnitude of impact is possible at all locations using the lowest operational noise data, which would result in a negligible/minor effect (not significant). However, the higher end of the range of predicted exceedances are potentially demonstrating an exaggerated worst-case at some receptors.

15.6.38 The plant selection and detailed design processes are yet to take place. However, it is considered probable that, most if not all of those options which are currently predicted to exceed the applicable noise criteria, could be mitigated by a combination of the following:

- reducing the breakout noise from the gas turbines (GT), generator and accessory enclosures by containing them within a building;
- reducing the air inlet noise emissions by addition of further in-line attenuation;
- reducing the stack outlet noise emissions by addition of further in-line attenuation;
- reducing fin fan cooler noise emissions by screening, re-sizing, fitting low noise fans or attenuation; or
- screening or enclosing the transformers.

15.6.39 As the design progresses to the detailed design stage, the existing noise model will be refined and additional acoustic assessment will be undertaken in consultation with the designers, to determine the most appropriate mitigation options. The findings of the further assessment will inform the design to achieve no worse than a low magnitude noise impact (daytime and night-time) and thus no worse than a minor adverse effect (not significant).

#### Job Creation

15.6.40 As well as environmental demands, sustainable development also considers the social and economic demands. As detailed in **Chapter 13: Socio-Economics**, current plans suggest that up to 15 operational roles would be created at the Proposed Development, which some may be new jobs or integrated with other EDF Energy operations. This represents a negligible beneficial (not significant) effect.

### Waste

- 15.6.41 During the operation of the Proposed Development, quantities of waste generated are expected to be very small. In contrast to coal, the combustion of gas does not generate any solid residues, which require disposal. Estimated quantities of waste anticipated to be generated during Proposed Development operation comprise:
- 3 tonnes per year of general domestic waste – predominantly of paper, cardboard and plastic; and
  - 12 tonnes per year of general industrial waste – predominantly of paper, cardboard, plastic and wooden packaging material; worn and damaged metal items; various other materials such as stuffing box materials, gaskets etc.; and a small amount of waste oil. Waste oil would be classified as hazardous waste, whereas the other waste is likely to be classified as non-hazardous.
- 15.6.42 Operational waste would be managed in accordance with the 2011 Regulations (Ref 15-6), and consigned via a registered waste carrier for treatment or disposal at a suitably licenced waste facility. Operational phase waste effects are, therefore, assessed to be not significant.

### Decommissioning

- 15.6.43 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 2066. Decommissioning would involve the removal of the plant. The gas and electricity connections would be disconnected and made safe. An OCGT, whether single turbine or multiple aero-derivative units, could either be removed as a unit for reuse elsewhere (depending on its condition) or alternatively dismantled on Site and removed.

### Sustainability and Climate Change

- 15.6.44 The Applicant would produce a Decommissioning Environmental Management Plan (DEMP) prior to the commencement of decommissioning works, setting out measures to manage potential environmental impacts associated with decommissioning and demolition of the Proposed Development.

### Water Use

- 15.6.45 EDF Energy would endeavour to minimise water use of the decommissioning process. No significant water demand is anticipated and thus the effects with regard to water use are not anticipated to be significant.

### Energy Use

- 15.6.46 EDF Energy would endeavour to maximise energy efficiency of the decommissioning process – thus no significant effects are anticipated with regard to energy use.

### Waste Reduction

- 15.6.47 The waste hierarchy would be followed during the decommissioning phase, whilst it is anticipated that a large proportion of the materials resulting from any decommissioning or demolition of the Proposed Development post-2066 would be re-used or recycled. A record would be kept to demonstrate that the maximum level of recycling and reuse was achieved. At this stage there is no certainty on the timing or method of decommissioning, although the measures to be detailed in the Decommissioning Environmental Management Plan (DEMP) would aim to ensure that waste effects would not be significant.

## Transport

- 15.6.48 **Chapter 7:** Traffic and Transportation indicates that traffic movements associated with decommissioning works are not yet known, but are expected to be no greater than those predicted for the construction period. It is thus considered that the overall effects of traffic during decommissioning would be negligible, with appropriate travel plans in place.

## Biodiversity/Ecology

- 15.6.49 **Chapter 9:** Ecology and Nature Conservation indicates impacts associated with the decommissioning of WBC are likely to be of a similar nature to those associated with the construction period and as a result the potential effects on ecological features are not anticipated to differ significantly from those predicted at construction. The extent of habitat loss that is likely to be required during decommissioning is likely to be much less than at construction, and the resulting effects on ecological features are therefore likely to be reduced.

## Air Quality

- 15.6.50 During the decommissioning works of WBC, best practice mitigation measures would be put in place via the DEMP. **Chapter 6:** Air Quality indicates that predicted air quality effects during decommissioning of the Proposed Development are considered to be comparable to, or less than, those assessed for construction activities, and are thus anticipated to be not significant (i.e. negligible/minor).

## Noise

- 15.6.51 The potential noise impacts and effects would require further consideration at the decommissioning of WBC, but potential measures to ensure that appropriate mitigation is in place during the works are discussed in **Chapter 8: Noise and Vibration**.

## Water Quality and Flood Risk

- 15.6.52 The DEMP would include measures to prevent water pollution during decommissioning of WBC. **Chapter 12:** Water Resources, Flood Risk and Drainage indicates that, assuming the removal of all above ground structures to only areas of hardstanding remaining, decommissioning impacts are expected to be limited to close proximity watercourses/ groundwater in close proximity to the Site. Therefore, they would be the same as the assessed construction impacts as discussed above.
- 15.6.53 **Chapter 11:** Ground Conditions and Hydrogeology considers the impact of the Proposed Development on ground conditions and hydrogeology during decommissioning of WBC. It is considered that, with the implementation of the impact avoidance measures and best practice guidance as per the DEMP, there would be a low likelihood of the identified sensitive receptors being impacted. All activities associated with works would be undertaken in accordance with the Environmental Permit issued by the Environment Agency.

## Waste

- 15.6.54 Waste generated during decommissioning of WBC has been scoped out of this assessment because:
- there is no information on waste policies, regional waste arisings or facilities that may be in place when the Proposed Development is decommissioned (as it has an anticipated operational life of 40 years or more, and hence it is not possible to define a baseline);
  - any future decommissioning contractor(s) would be required to comply with relevant legislation and policy at that time;

- the majority of materials generated during future decommissioning would most likely comprise concrete and steel, both of which are likely to be recycled rather than disposed; and
- there is no certainty on the timing or method of decommissioning, and hence it is not possible to determine the quantities or types of waste that may be generated.

## 15.7 Mitigation and Enhancement Measures

### Sustainability and Climate Change

- 15.7.1 In addition to any potential impacts of the Proposed Development on climate change, climate change also has the potential to impact on the design and operation of the Proposed Development. Consequently, adaptation to climate change concerns how the Proposed Development would avoid or reduce its exposure to the effects of future climate change, such as increased temperatures and flood risk.
- 15.7.2 The design, construction and operation of the Proposed Development would seek to mitigate the causes of climate change by contributing to reducing GHG emissions and adapting to the predicted impacts of climate change.
- 15.7.3 EDF Energy's company environmental policy states that the company would '*design, build, engineer, operate and maintain all our facilities and equipment so they are safe, secure and acceptable to local communities and protect the environment*' (Ref 15-23). The statement commits to using best available techniques to tackle environmental impacts and reducing the contribution of their operations to climate change.

### Waste

- 15.7.4 The need for further opportunities for enhancement and additional mitigation measures beyond those detailed in **Section 15.5** will be identified following the analysis of the findings of the proposed ground investigation (refer to **Chapter 11: Ground Conditions and Hydrogeology**). It is anticipated (subject to the findings of the ground investigation) that there would be opportunities to design out waste from the Proposed Development, with further details to be provided in the ES that will accompany the Application.
- 15.7.5 The Proposed Development also presents a clear opportunity to re-use and redevelop a brownfield site; thereby preserving greenfield land, making use of existing infrastructure for the import of gas, export of electricity as well as avoiding generation of waste that would potentially be generated if there was the need to construct new gas pipelines or overhead transmission lines.

## 15.8 Limitation or Difficulties

### Sustainability and Climate Change

- 15.8.1 At this PEI Report stage there is some limitation in detailed design data available, whilst for the GHG assessment it has not been possible to model some smaller sections of the footprint surrounding materials and waste transport and disposal. Such data gaps will be reassessed for inclusion in the ES that will accompany the Application.

### Waste

- 15.8.2 This chapter has presented a preliminary assessment of waste effects using available data. Further details regarding the waste effects of the Proposed Development during the construction phase will be developed following the planned ground investigation. Such information will be used to inform the waste assessment that will be provided in the ES that will accompany the Application.

## 15.9 Residual Effects and Conclusions

### Sustainability and Climate Change

- 15.9.1 The design, construction and operation of the Proposed Development would seek to mitigate the causes of climate change by contributing to reducing GHG emissions associated with waste disposal and electricity generation and adapting to the predicted impacts of climate change.
- 15.9.2 The Proposed Development would provide additional peak power generation capacity, which would contribute to providing a secure energy supply to the national grid. The GHG assessment (**Appendix 15A** (PEI Report Volume II)) demonstrates that the GHG emissions from the Proposed Development compare favourably with UK average fossil fuel power stations (based on 2014 DECC data, published in 2016), producing 68-161 less tonnes of CO<sub>2</sub> per GWH of electricity generated than the average fossil fuel powered station, depending on the efficiency of the Proposed Development.
- 15.9.3 A CHP Readiness Assessment will be undertaken and will form part of the Application. A further Requirement will be in the DCO specifying the submission and approval of further details prior to commissioning of the power station.
- 15.9.4 Design and operational measures to increase the resilience of the Proposed Development to potential effects of climate change would be incorporated in the detailed design, including flood resilience measures.

### Waste

- 15.9.5 No significant residual effects with respect to waste are anticipated as a result of the Proposed Development. However, subject to the findings of the planned ground investigation, there may be the requirement for amendments to the proposals for waste management, which will be detailed in the ES that accompanies the Application.

## 15.10 References

- Ref 15-1 Her Majesty's Stationary Office (2008) *Climate Change Act (2008)*.
- Ref 15-2 Department for Energy and Climate Change (2011) *Planning our electric future: a White Paper for secure, affordable and low carbon electricity*.
- Ref 15-3 7<sup>th</sup> Environment Action Programme (EAP) (Decision No. 1386/2013/EU).
- Ref 15-4 Her Majesty's Stationary Office (2008) *Site Waste Management Regulations (2008)*.
- Ref 15-5 Her Majesty's Stationary Office (1990) *Environmental Protection Act (1990)*.
- Ref 15-6 Her Majesty's Stationary Office (2011) *The Waste (England and Wales) Regulations (as amended) (2011)*.
- Ref 15-7 Department for Energy and Climate Change (2016) *Overarching National Policy Statement for Energy (EN-1)*.
- Ref 15-8 Her Majesty's Stationary Office (2013) *The Carbon Capture Readiness (Electricity Generating Stations) Regulations 2013*.
- Ref 15-9 Department for Energy and Climate Change (2016) *National Policy Statement for Fossil Fuel Electricity Generating Infrastructure (EN-2)*.

- Ref 15-10 Department for Energy and Climate Change (2017) *2015 UK Greenhouse Gas Emissions, Final Figures*.
- Ref 15-11 Department for Communities and Local Government (2012) *National Planning Policy Framework*.
- Ref 15-12 Bassetlaw District Council (2011) *Bassetlaw District Local Development Framework Core Strategy and Development Management Policies*. Available from: <http://www.bassetlaw.gov.uk/media/105902/CS1AdoptedCoreStrategy.pdf> [Accessed 28/07/17].
- Ref 15-13 Department for Environment, Food & Rural Affairs (2011) *Government Review of Waste Policy in England 2011*.
- Ref 15-14 Department for Environment, Food & Rural Affairs (2013) *Waste Management Plan for England*.
- Ref 15-15 Directive 2008/98/EC on waste (Waste Framework Directive).
- Ref 15-16 Department for Communities and Local Government (2014) *National Planning Policy for Waste*.
- Ref 15-17 Department for Environment, Food & Rural Affairs (2013) *National Policy Statement for Hazardous Waste*.
- Ref 15-18 Nottinghamshire County Council and Nottingham City Council (2013) *Nottinghamshire and Nottingham Replacement Waste Local Plan (Waste Core Strategy)* [online] <http://www.nottinghamshire.gov.uk/media/109118/waste-core-strategy-1.pdf> (accessed 31st July 2017)
- Ref 15-19 Zero Waste Scotland (2016) *Designing Out Construction Waste – A Guide for Project Design Teams*.
- Ref 15-20 WSP Parsons Brinckerhoff (2017) *West Burton Plan C – Geotechnical Desk Study*.
- Ref 15-21 World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD) (2005) *Greenhouse Gas Protocol for Project Accounting*.
- Ref 15-22 Directive 2010/75/EU of the European Parliament and the Council on Industrial Emissions (the Industrial Emissions Directive or IED).
- Ref 15-23 EDF Company Environment Policy (2017) [online] [https://www.edfenergy.com/sites/default/files/environment\\_policy.pdf](https://www.edfenergy.com/sites/default/files/environment_policy.pdf) (accessed 4th August 2017)
- Ref 15-24 Sturton Ward Planning Group (2015) *Sturton Ward Neighbourhood Plan*.

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## 16. Cumulative and Combined Effects

### 16.1 Introduction

16.1.1 As detailed in **Section 2.8**, as required by the 2009 EIA Regulations, when considering the potential environmental effects of the Proposed Development, there is a need to consider the potential for cumulative and combined effects. Combined and cumulative effects are defined herein as:

- **Cumulative effects:** effects that may arise where the impacts associated with the Proposed Development have the potential to interact with those associated with one or more other developments located in proximity to the Proposed Development (e.g. interaction of impacts which leads to effects of the same type (e.g. air quality)) on the same receptor.
- **Combined effects:** effects that may arise when several different impacts resulting from the Proposed Development (e.g. decrease in air quality, increase in noise disturbance) have the potential to affect a single receptor.

16.1.2 The Environmental Statement (ES) that will accompany the application for development consent will include an assessment of potential cumulative and combined effects taking into account applicable legislation and guidance (as detailed in **Section 16.2**) and using the methodology as detailed in **Section 16.3**. This chapter also provides details of other proposed schemes in the vicinity of the Proposed Development that may be of relevance to the cumulative assessment, using information that is in the public domain. This includes proposed schemes that have planning applications registered with the local planning authorities and/or already consented developments, that have not yet been constructed or are operational. The cumulative assessment to be included in the ES will not consider developments that are already constructed and operating, as such existing operational facilities are accounted for in the baseline conditions established for the main assessments reported within **Chapters 6 to 15** of this Preliminary Environmental Information (PEI) Report.

16.1.3 This chapter is supported by **Figure 16.1** (PEI Report Volume III) which illustrates the Site location in relation to other developments that may be of relevance to the cumulative assessment.

### 16.2 Legislation, Planning Policy and Guidance

#### Legislative Background

16.2.1 The requirement for cumulative and combined impact assessments is stated in the relevant European Directive and domestic legislation, as detailed below:

- European Directive 2011/92/EU on the assessments of effects of certain public and private projects on the environment requires an assessment of *'the direct effects and any indirect, secondary, cumulative, short, medium and long term, permanent or temporary, positive and negative effects of the project'*; and
- Schedule 4 Part 1 of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2009<sup>1</sup> which apply to an Application (Section 1.5) requires:

*'A description of the likely significant effects of the development on the environment, which should cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the development, resulting from -*

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<sup>1</sup> Schedule 4 of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 states that *"The description of the likely significant effects on the factors specified in regulation 5(2) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development"*.

- a) *The existence of the development;*
- b) *The use of natural resources;*
- c) *The emission of pollutants, the creation of nuisances and the elimination of waste, and the description by the applicant of the forecasting methods used to assess the effects on the environment'.*

## 16.3 Assessment Methodology

### Impact Assessment and Significance Criteria

- 16.3.1 There is no standard prescriptive method for assessing cumulative and combined effects.
- 16.3.2 With regard to cumulative effects, the ability to quantify the extent to which the environmental effects of other schemes can interact with those associated with the Proposed Development depends upon on the level of information available regarding such other schemes. Where environmental assessment information regarding other schemes is not available or is uncertain, the cumulative assessment will be necessarily qualitative and assessed using professional opinion. However, matrices and modelling will be used, where appropriate and where sufficient information is available.
- 16.3.3 With regard to the assessment of combined effects, this will take account of the assessment findings as reported within the technical chapters within the ES and their ability to interact and impact upon common receptors.
- 16.3.4 When considering cumulative and combined effects, the mitigation measures set out in **Chapters 6 to 15** (which will be confirmed or otherwise within the ES) will be taken into account (i.e. only residual (after mitigation) effects of the Proposed Development will be considered within the assessment).
- 16.3.5 Cumulative and combined effects will be assessed to be neutral, minor, moderate or major. Moderate or major effects are considered to be significant, using the methodologies outlined in each technical chapter (refer to **Chapters 6 – 15** of this PEI Report).

### Cumulative Effects

- 16.3.6 Cumulative effects are those that accrue over time and space caused by the interaction of impacts associated with a number of developments. The Planning Inspectorate Advice Note 17 'Cumulative effects assessment relevant to nationally significant infrastructure projects' (Planning Inspectorate, December 2015) (Ref 16-1) sets out a four stage approach to the assessment of cumulative effects:
- Stage 1: identify the Zone of Influence and identify a long list of other schemes;
  - Stage 2: identify short list of other schemes for cumulative assessment;
  - Stage 3: information gathering; and
  - Stage 4: assessment.
- 16.3.7 This approach is being followed when undertaking the cumulative effects assessment, noting that this chapter covers Stages 1 to 3, with Stage 4 to be reported within the ES.
- 16.3.8 The Zone of Influence is discussed in the study area section herein. A long list of schemes in the vicinity of the Proposed Development was identified prior to the submission of the EIA Scoping Report, whilst an initial short list of schemes considered to be of relevance to the cumulative assessment was provided in the Scoping Report (see **Appendix 1A** – PEI Report Volume II). This list has subsequently been reviewed herein - the current short list of other schemes considered to

be of relevance to the cumulative assessment (as at the end of August 2017) is presented in **Section 16.4** of this chapter.

- 16.3.9 In order to assess the potential for cumulative effects to arise in relation to these schemes, there is a need to understand their potential for generating potential environmental effects. Where a planning application has been made, information presented within the ES or environmental reports for the applicable scheme has been obtained and initially reviewed. For schemes that are known to be proposed (either via screening or scoping opinion requests submitted to the local authority/Planning Inspectorate or following presentation of information in the public domain), but where an ES or other environmental reports has not yet been prepared or submitted, any readily available information has been obtained and initially reviewed. This includes communication with local authorities, public consultation material and material available via the internet. Any further information that becomes available following publication of this PEI Report will be taken into account during preparation of the ES.
- 16.3.10 Following information gathering from available sources, the effects of the Proposed Development will be considered in conjunction with the potential effects from other schemes or activities that are both reasonably foreseeable in terms of delivery (e.g. the applicable scheme has planning consent or is in the planning process) and are geographically located in a position where environmental impacts could act together to create an effect that is more (or less) significant overall than the effect of the individual developments alone.
- 16.3.11 Operational impacts are generally long-term, and whilst construction impacts are often short-term and temporary, they can potentially be of a large magnitude. Consequently, cumulative effects that could be associated with construction at one site and operation at another are considered, the difference in duration and reversibility will be reported within the ES.
- 16.3.12 In assessing cumulative effects, it is appropriate to also acknowledge the relative contributions that different schemes make to a cumulative effect, and carefully consider whether a cumulative effect occurs at all. For example, effects associated with a large scale scheme may be significant, and whilst a smaller scheme may contribute to this effect, the cumulative effect of the schemes together may only be considered as being significant if it is of greater significance than the effect of either project in isolation. It follows that if the environmental effects associated with the Proposed Development are assessed as being negligible, cumulative effects could not be generated given that Proposed Development impacts would be very low/low, or the receptor sensitivity would be very low/low.
- 16.3.13 Where applicable, the assessment will consider all other known developments that have the potential to generate cumulative effects with the Proposed Development, thus representing a worst-case assessment.

## Study Area

- 16.3.14 Cumulative effects are generally unlikely to arise unless the other proposed development sites are in close proximity to the Site, recognising that actual distance varies with the nature of the potential effect and the nature of the receptor (e.g. cumulative air quality effects could occur for developments a greater distance apart than say noise effects). Construction projects are, as a matter of routine, required to employ regulatory and managerial controls and good practice to mitigate environmental impacts wherever possible. Nevertheless, consideration will be given to the presence of common pathways from any nearby schemes to a single receptor, and whether there is potential for impacts of a sufficient magnitude whereby a particular receptor could experience cumulative effects.
- 16.3.15 The study area for the consideration of cumulative and combined effects has been developed taking into account the predicted extent of impacts associated with the Proposed Development as detailed within **Chapters 6 – 15** of this PEI Report.

- 16.3.16 The study area for each environmental assessment topic has been defined in the relevant technical chapter of this PEI Report (**Chapters 6 – 15**). Information on the likely extent of impacts associated with other developments in the area has also been considered (refer to **Section 16.4**).
- 16.3.17 The largest study area (i.e. for the landscape and visual impact assessment) has defined the Zone of Influence within which the search for other schemes has been undertaken for the cumulative assessment. Given the generally flat nature of the surrounding landscape, other developments within a 15km Zone of Influence have been identified for consideration.
- 16.3.18 The study area for the consideration of cumulative and combined effects will be reviewed and confirmed within the ES.

### Consultation

- 16.3.19 A summary of consultation activities relevant to the cumulative and combined effects assessment is provided in **Table 16-1**.

**Table 16-1: Consultation summary**

Consultee	Date	Summary of response	Addressed
The Secretary of State (Scoping Opinion)	June 2017	<p>The following comments were made with regards to cumulative assessment:</p> <ul style="list-style-type: none"> <li>• The inter-relationship between aspects of the environments likely to be significantly affected is a requirement of the EIA Regulations 2009 (see Schedule 4 Part 1 of the EIA Regulations 2009). These occur where a number of separate impacts, e.g. noise and air quality, affect a single receptor such as fauna. The SoS considers that the inter-relationships between factors must be assessed in order to address the environmental impacts of the proposal as a whole. This will help to ensure that the ES is not a series of separate reports collated into one document, but rather a comprehensive assessment drawing together the environmental impacts of the Proposed Development. This is particularly important when considering impacts in terms of any permutations or parameters to the Proposed Development.</li> </ul>	<p>Inter-relationships (referred to in this PEI Report as ‘combined effects’) will be assessed and reported within the ES.</p>

Consultee	Date	Summary of response	Addressed
		<p>The potential cumulative impacts with other major developments will need to be identified, as required by the Directive. The significance of such impacts should be shown to have been assessed against the baseline position (which would include built and operational development). In assessing cumulative impacts, other major development should be identified through consultation with the local planning authorities and other relevant authorities. Applicants should refer to Planning Inspectorate Advice Note 17 Cumulative Effects Assessment for further guidance on the Inspectorate’s recommended approach to cumulative effects assessment.</p>	<p>The methodology for producing the list of other developments is outlined in <b>Section 16.3</b> of this chapter. The local authorities have been consulted on the list of schemes to be considered in the cumulative assessment via the EIA Scoping Report. The cumulative assessment will follow the guidance as set out in Advice Note 17 (Planning Inspectorate, 2015).</p>
		<p>Details should be provided in the ES, including the types of development, location and key aspects that may affect the EIA and how these have been taken into account as part of the assessment will be crucial in this regard.</p> <p>For the purposes of identifying any cumulative effects with other developments in the area, Applicants should also consult consenting bodies in other EU states to assist in identifying those developments (see commentary on transboundary effects below).</p> <p>The ES should give equal prominence to any development which is related with the Proposed Development to ensure that all the impacts of the proposal are assessed.</p>	<p>Details on each of the schemes to be considered in the cumulative assessment are provided in <b>Table 16.2</b>. Potential cumulative effects will be assessed and reported in the ES.</p> <p>A screening matrix which details the potential transboundary effects is provided in <b>Appendix 2A</b> (PEI Report Volume II). This is provided as information to confirm that no potentially significant transboundary effects have currently been identified and thus there is no requirement to consult with other EU states.</p> <p>The cumulative assessment will consider all other current proposals within the site currently being pursued by the Applicant.</p>

Consultee	Date	Summary of response	Addressed
		The SoS recommends that the Applicant should distinguish between the Proposed Development for which development consent will be sought and any other development. This distinction should be clear in the ES.	This distinction has been made throughout the PEI Report.
		The SoS notes that at present three planned developments have been identified within the vicinity of the proposed development. The Applicant states that other developments having the potential for cumulative effects will be identified through consultation with “the relevant local planning authorities”. No other methodological information is provided. The Applicant’s attention is drawn to the Inspectorate’s Advice Note 17: Cumulative Effects Assessment, which sets out the recommended approach to such assessments.	Local authorities have been consulted on the list of cumulative schemes via the EIA Scoping Report, whilst the cumulative assessment will follow the methodology as set out in Advice Note 17 (Planning Inspectorate, 2015) as detailed in <b>Section 16.3</b> .

## 16.4 Cumulative Effects Assessment (Stages 1-3)

### Identification of Short List of Other Developments for Assessment

- 16.4.1 An initial screening exercise (Stage 1 of the cumulative effects assessment) was undertaken to identify potential schemes within the vicinity of the Proposed Development requiring consideration within the cumulative assessment. This process identified potential major developments within a 15km radius of the Proposed Development to create an initial long list for consideration. The long list was subsequently screened based on the potential for interactions with the Proposed Development across the technical disciplines considered within this PEI Report (noting that the potential for cumulative landscape and visual impacts have the potential to occur over a greater distance than, for example, cumulative noise or archaeology impacts). The initial short list of relevant developments was presented in the EIA Scoping Report (**Appendix 1A**) (PEI Report Volume II). This short list has been revised as part of this PEI Report (Stage 2 of the cumulative effects assessment) to reflect the latest information available on other schemes as a result of information obtained from the local authorities.
- 16.4.2 The short list of other schemes identified at Stage 2 of the cumulative effects assessment is presented in **Table 16-2**, with details of their current status and comments regarding their geographical and temporal scope in relation to the geographical and temporal scope of the Proposed Development.
- 16.4.3 All the developments identified in **Table 16-2** are considered to be of such a nature and proximity to the Site to have the potential to generate cumulative effects when considered in context with the Proposed Development. In the ES these will be subject to assessment for each environmental topic. The location of the schemes detailed in **Table 16-2** are shown in **Figure 16.1** (PEI Report Volume III).

**Table 16-2: Refined short list of projects within the 15km Zone of Influence identified at Stage 2 of the cumulative effects assessment**

Name of development	Distance from closest part of the Site	Status (at time of assessment)	Description of development	Overlap in temporal scope with Proposed Development	Cumulative effects to be assessed in the Environmental Statement	Environmental information available to inform assessment
Sub-50MW Power Plant (West Burton D)	Within the Site	Application not yet submitted.	Application for a Sub-50MW power plant.	Construction may occur at the same time as the Proposed Development.	Yes	EIA Scoping Report
Ash processing plant (NCC Application Number: F/3581)	Within the Site	Application submitted in September 2016 and is currently being determined.	Use of ash processing plant equipment.	Construction may occur at the same time as the Proposed Development.	Yes	Planning Statement Flood Risk Assessment Noise Impact Assessment
49MW Battery Storage Facility (SDC Application Number: 16/00954/FUL)	Within the Site	Application was approved in September 2016.	Proposed 49MW battery storage facility.	Construction may occur at the same time as the Proposed Development.	Yes	Planning Statement Transport Assessment Noise Impact Assessment
A quarry access road (16/00354/CDM)	300m south-east of the Site	A variation to a former planning application (46/11/00002/R) was approved in March 2016.	To enable the quarry access road to be constructed in two stages. The initial stage incorporates the construction of a 500m section of bound surface adjacent to Gainsborough Road which shall be used for the removal of the remaining mineral in the permitted reserve.	Construction may occur at the same time as the Proposed Development.	Yes	Site Plans Planning Documentation

Name of development	Distance from closest part of the Site	Status (at time of assessment)	Description of development	Overlap in temporal scope with Proposed Development	Cumulative effects to be assessed in the Environmental Statement	Environmental information available to inform assessment
Residential development of 67 dwellings (WLDC - 136309)	2.4km east of the Site	Application submitted on 05/05/17. Public consultation currently underway.	Outline planning application to erect 67 dwellings - access to be considered and not reserved for subsequent applications.	Construction may occur at the same time as the Proposed Development. Residential properties would be present during Proposed Development operation.	Yes	Planning Statement  Transport Statement

## 16.5 Cumulative and Combined Effects Assessment (Stage 4)

- 16.5.1 The results of the cumulative and combined impact assessment (Stage 4 of the assessment) will be reported within the ES that accompanies the application for development consent.

## 16.6 Limitations and Difficulties

- 16.6.1 The cumulative assessment reported within the ES will be based on information available at the time of the assessment regarding the environmental effects of the other potential or committed schemes in the vicinity of the Site that have been scoped into the assessment.

## 16.7 References

- Ref 16-1 Planning Inspectorate (2015) *Advice Note 17 Cumulative Effects Assessment Relevant to Nationally Significant Infrastructure Projects*.
- Ref 16-2 Planning Inspectorate (2015) *Advice Note 12 Transboundary Impacts*.