USKMOUTH POWER STATION CONVERSION PROJECT

ENVIRONMENTAL STATEMENT

Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017

On behalf of Simec Uskmouth Power Ltd.

Volume 1 – Main Text

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GLOSSARY

Term	Definition
ACT	Advanced Conversion Technology power plant
ADMS	Atmospheric Dispersion Modelling System
AOD	Above Ordnance Datum
APC	Air Pollution Control
AQMA	Air Quality Management Areas
BAT	Best Available Technique
BGS	British Geological Survey
BS	British Standard
BSI	British Standard Institute
CCGT	Combined Cycle Gas Turbine
CERC	Cambridge Environmental Research Consultants
CIEEM	Chartered Institute of Ecology and Environmental Management
CRTN	Calculation of Road Traffic Noise
DCLG	Department for Communities and Local Government
DMRB	Design Manual for Roads and Bridges
EcIA	Ecological Impact Assessment
EIA	Environmental Impact Assessment
EfW	Energy from Waste
EMF	Electromagnetic Fields
EPUK	Environmental Protection UK
ES	Environmental Statement
FEED	Front End Engineering Design
FGT	Flue Gas Treatment
FRA	Flood Risk Assessment
GGAT	Glamorgan Gwent Archaeological Trust
GHG	Greenhouse Gasses
HER	Historic Environment Record
HGV	Heavy Goods Vehicle
IAQM	Institute of Air Quality Management
IEA	Institute of Environmental Assessment
IED	Industrial Emissions Directive
IEFs	Important Ecological Features
LAQM	Local Air Quality Management
LCP	Large Combustion Plant
LDP	Newport Local Development Plan
LHV	Lower Heating Value
LVIA	Landscape and Visual Impact Assessment
NCC	Newport City Council
NLCAs	National Landscape Character Areas
NOx	Oxides of Nitrogen
NRW	Natural Resources Wales
NSR	Noise Sensitive Receptors
PROW	Publics Rights of Way
SRF	Solid Recovered Fuel
SUP	Simec Uskmouth Power Limited
ZTV	Zone of Theoretical Visibility
ZVI	Zone of Visual Influence

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1 INTRODUCTION

1.1 The Uskmouth Power Station Conversion Project (referred to as the Uskmouth Conversion Project) proposes to convert the existing coal fired power plant at Uskmouth Power Station to operate as a plant which would generate electricity through the combustion of waste derived fuel pellets. SIMEC Atlantis Energy Limited (Atlantis) is the developer of the Uskmouth Conversion Project.

1.2 The Uskmouth Power Station is the name of the site of an existing coal fired power station located near Newport in South Wales. Uskmouth Power Station is owned by the Applicant SIMEC Uskmouth Power Limited (SUP), a wholly owned subsidiary of Atlantis. This Environmental Statement (ES) has been prepared by RPS on behalf of SUP.

1.3 The construction phase of the Uskmouth Conversion Project would require the following works:

(i) The proposed operational development (referred to as the "Proposed Development"), which consists of all fuel storage and material handling infrastructure to be constructed external to the existing power station building, further detail is provided in paragraph 1.8: and

(ii) Power Station Upgrade, the works required for fuel combustion equipment conversion and plant life extension to be conducted inside the existing power station buildings (referred to as the Power Station Upgrade) further detail is provided in paragraph 1.31.12.

1.4 Once the Proposed Development works and Power Station Upgrade is completed the Uskmouth Conversion Project will be able to commence operation through the combustion of waste-derived fuel pellets either exclusively or co-fired with other biomass fuels for the sole purpose of electricity generation.

1.5 The ES reports on the findings of the Environmental Impact Assessment (EIA) process and accompanies the planning application for the construction of the Proposed Development that, together with the Power Station Upgrade, would facilitate the delivery of the operational phase of the Uskmouth Conversion Project.

1.6 The Proposed Development site is located on the eastern bank of the River Usk, close to the confluence with the Severn Estuary, around 4 km south of central Newport. The site location is shown on Figure 1.1. The grid reference is ST 32830 83838 and the site address is SIMEC Uskmouth Power Ltd, West Nash Road, Nash, Newport, NP18 2BZ.

1.7 The Proposed Development site is located within the Uskmouth B power station boundary. Figure 1.2 shows the boundary of the Proposed Development site.

Proposed Development – Planning Permission

1.8 SIMEC Uskmouth Power Limited is applying to Newport City Council for planning permission to construct the following infrastructure, which is the extent of the Proposed Development and would comprise the following elements of external construction:

- Construction of fuel storage silos, connecting conveyor systems and a fuel pellet de-dusting building;
- Improved rail unloading facilities for the efficient rail delivery of fuel pellets;
- Altered and updated internal road network and drainage; and
- Vessels and infrastructure for the delivery, storage and removal of flue gas treatment (FGT) reagents and residues.

1.9 The following table highlights the main aspects of the Proposed Development in terms of their purpose, activity and planning permissions required.

Table 1.1: The Proposed Development

Activity	Purpose
Upgrade to existing rail fuel unloading facilities;	Enable the rail transport and delivery of fuel pellets to Uskmouth Power Station
Construction of fuel storage silos, day silos and conveyor systems	Enable the on site storage and conveying the fuel pellets around the site
Construction vessels and infrastructure for the delivery and storage of FGT reagents and transportation of residues (Ash).	Enable the on site storage of FGT reagents
Construction vessels and infrastructure for transportation of residues (Ash).	Enable removal of residues (Ash) by road
Construction of fuel de-dusting building	Fuel de-dusting building Enable collection of dust for combustion.

1.10 The outward appearance of the existing Uskmouth Power Station buildings and exhaust stack would remain unchanged. The visible difference to the appearance of Uskmouth Power Station would be new fuel storage silos as well as new and refurbished conveyors. Primary storage silos would be constructed upon the area previously used for coal storage; the coal has been removed from site. The footprint of primary silos is smaller than that required for the external storage of coal. As a result, parts of the previous coal storage area would be re-vegetated.

1.11 The Uskmouth Power Station has not generated electricity on coal since a technical fault in April 2017. Due to the ongoing nature of planning and design works required to conduct the Uskmouth Conversion Project, repairs were not fully completed. However, since this event staff with critical skills for preservation, maintenance and future operation of the plant have been retained in readiness for return to service. This team has completed the removal of damaged equipment following the technical fault in preparation for the Uskmouth Conversion Project. Significant investments and progress have been made with the Front-End Engineering Design (FEED) to repurpose the existing site to combust waste-derived fuel pellets.

Power Station Upgrade

1.12 The Power Station Upgrade aims to utilise as much of the existing equipment as possible and minimise the need for newly designed equipment. The Power Station Upgrade would include changes to combustion equipment and plant life extension within the envelope of the existing power station buildings.

1.13 In addition to requesting planning permission for the Proposed Development, SIMEC Uskmouth Power Limited is applying to Natural Resources Wales to vary the Environmental Permit (EPR/LP3131SW). This variation seeks to permit a change in the permitted fuel and to consider how, following the changes to the permitted fuel, the facility would comply with the requirements of the Large Combustion Plant (LCP) Best Available Techniques (BAT) conclusions and other requirements.

Table 1.2: Conversion Activities

Activity	Purpose

Upgrade to milling system	Pulverising fuel pellets before combustion
Upgrade to combustion system	Combusting fuel pellets to generate electricity
Upgrade to abatement system	Emissions controlled prior to release

1.14 The operational phase Uskmouth Conversion Project would be made possible completion of:

(i) The Proposed Development - construction of the associated external infrastructure, subject to planning permission.

(ii) Power Station Upgrade - engineering works to convert the existing power station and extension of plant life, subject to the Environmental Permit variation.

1.15 Once the Proposed Development works and Power Station Upgrade are completed, the Uskmouth Conversion Project would be able to commence operation through the combustion of waste-derived fuel pellets either exclusively or co-fired with other biomass fuels for the sole purpose of electricity generation.

Statutory Framework and Purpose of the Environmental Statement

Purpose of EIA

1.16 The Environmental Impact Assessment (EIA) process is a means of identifying and collating information to inform an assessment of the likely significant environmental effects of a project. The findings of the EIA process are reported in an Environmental Statement (ES) in order to inform the relevant planning authority and interested parties as part of the decision-making process.

The EIA Directive

1.17 The legislative framework for EIA is set by European Directive 2011/92/EU, as amended by Directive 2014/52/EU (collectively referred to as the EIA Directive). Directive 2014/52/EU entered into force on 15 May 2014.

The EIA Regulations

1.18 In Wales, the requirements of the EIA Directive have been transposed into legislation through the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017, as amended. These regulations are referred to in this ES as 'the EIA Regulations'.

Need for EIA

1.19 Schedule 1 of the EIA Regulations identifies development types that always require EIA. Schedule 2 identifies development types that require EIA if they are likely to lead to significant effects on the environment by virtue of factors such as their, nature, size or location. Schedule 2 development is defined within the EIA Regulations as development of a description mentioned in Column 1 of the table in Schedule 2 where:

'a) any part of that development is to be carried out in a sensitive area; or

b) any applicable threshold or criterion in the corresponding part of Column 2 of that table is respectively exceeded or met in relation to that development.'

1.20 The Proposed Development could be interpreted as falling within 13(a) of Schedule 2 "*Change or extension to a Schedule 1 development (thermal power station of 300 megawatts or more)*" which, as changed or extended, may have significant effects on the environment.

1.21 A Screening Report was prepared by SUP and accompanied a request for a Screening Opinion from Newport City Council (NCC). In its Screening Opinion, NCC confirmed that the development is Schedule 2 development, category 13(a) 'Change or extension to a Schedule 1 development (thermal power station of 300 megawatts or more)' which, as changed or extended, may have significant effects on the environment. Schedule 2 development requires screening against the criteria set out in Schedule 3 of the Regulations. The criteria include the characteristics of the development, location of development and types and characteristics of the potential impact.

1.22 The site itself is not within a sensitive area as defined in the EIA Regulations although sensitive areas adjoin the wider power station property boundary.

1.23 The Screening Report presented a worst-case scenario in which all waste derived fuel pellets and biomass fuel (if required) were delivered directly to the converted power station through a proposed new access road. The access road was to run from Corporation Road via Liberty Steel Newport (LSN), through a proposed pellet production facility on land adjacent to Uskmouth Power Station and into an unloading facility at Uskmouth Power Station. The access road was required to deliver waste to the pellet plant and fuel pellets into the converted power station. The Screening Opinion provided by NCC in (October 2018 was based on the assumption that, using a 20 tonne Heavy Goods Vehicles (HGV) payload, the 1,040,688 tonnes per annum of fuel pellets would require up to around 52,000 HGVs (104,000 two-way movements) per annum. This has since been revised.

1.24 The screening opinion identified that the key environmental risks were; significant increase of HGVs along Corporation Road and Southern Distributor Road, resulting in increased traffic volumes, with the potential for attendant impacts upon congestion, noise and risk air quality,

1.25 The screening opinion provided by NCC concluded that the proposal was capable of having significant environmental effects due to this access road and constituted an EIA development.

1.26 Since October 2018 the Uskmouth Conversion Project has changed the development significantly in order to mitigate these effects. The pellet production facility would no longer be located on land adjacent to the Uskmouth Power Station and no waste materials would need to be imported into the adjacent site. Additionally, all waste derived fuel pellets would be delivered via rail (not by road) from pellet production facilities located at other sites in the UK, thereby replicating the previous operational activity of the coal fired power station. As a result of these changes, the new LSN access road is not required and does not form part of the Proposed Development.

1.27 These refinements since production of the original Screening Report have reduced the potential for significant effects on road traffic. Nevertheless, the Applicant is aware of the importance of the development for the region has therefore undertaken an EIA to ensure a robust application which fully explains and considers the potential for significant environmental impacts to arise from the Proposed Development, the Power Plant Upgrade and the resulting Uskmouth Conversion Project.

Content of the ES

1.28 This ES has been prepared in accordance with the EIA Regulations. Although there is no statutory provision as to the form of an ES, it must contain the information specified in Regulation 18 and Schedule 4 of the EIA Regulations. For the avoidance of doubt, the specified information within Regulation 17 and Schedule 4 is provided in Appendix 1.1 of this ES.

1.29 This ES provides all information required under Regulation 17 and Schedule 4. The information supplied within this ES is considered to provide a clear understanding of the main and likely significant effects upon the environment of the Proposed Development, the Power Station Upgrade and the resulting Uskmouth Conversion Project.

Structure of the ES

1.30 The ES has been structured in order to allow relevant environmental information to be easily accessible. This volume of the ES (Volume 1) includes the main text of the ES. The description of the Proposed Development, Power Station Upgrade and Uskmouth Conversion Project is provided in Chapter 2. Information relating to the alternative development scenarios considered during the evolution of the Uskmouth Conversion Project is found within Chapter 3. Chapter 4 outlines the approach and methodology adopted for the EIA. The remainder of Volume 1 contains topic by topic environmental information as shown in Table 1.3.

1.31 Figures and appendices to accompany the text of the ES are provided separately in Volumes 2 and 3. Volume 3 includes specialist reports providing relevant background and technical information. A Non-Technical Summary (NTS) of the ES is available as a separate summary document.

Table 1.3: Structure of ES

Structure of ES	
Non-Technical Summary	Summary of the ES using non-technical terminology
Volume 1: Text	
	Glossary
Chapter 1	Introduction
Chapter 2	Description of the Proposed Development
Chapter 3	Need and Alternatives Considered
Chapter 4	Environmental Assessment Methodology
Chapter 5	Geology, Hydrogeology and Ground Conditions
Chapter 6	Hydrology
Chapter 7	Ecology
Chapter 8	Landscape and Visual
Chapter 9	Historic Environment
Chapter 10	Traffic and Transport
Chapter 11	Noise and Vibration
Chapter 12	Air Quality
Chapter 13	Climate Change
Chapter 14	Population and Health
Volume 2: Figures	
Including all figures and drawings to accompany the text.	
Volume 3: Appendices	
Including specialist reports forming technical appendices to the main text.	

1.32 The following table highlights the ES structure and assessments related to the following:

- The ES assessment of construction of the Proposed Development;
- The ES assessment of the construction, operation and decommissioning of the Uskmouth Conversion Project;
- The ES assessment of components of construction of the Power Station Upgrade.

Table 1.4: Content of the ES

Chapter	Title	Proposed Development	Uskmouth Conversion Project and Power Station Upgrade
1	Introduction	Proposed Development is outlined	Uskmouth Conversion Project is outlined

			Power Station Upgrade is outlined
2	Project Description	Proposed Development is described	Uskmouth Conversion Project is decribed Power Station Upgrade is described
3	Need and Alternatives Considered	The need for the Proposed Development is considered	The need for the Uskmouth Conversion Project is considered . Altenatives to the converted power station are considered
4	Environmental Assessment Methodology	Sets out the approach taken to EIA of the Proposed Development	Sets out the approach taken to consideration of the Uskmouth Conversion Project and the Power Station Upgrade
5	Geology, Hydrogeology and Ground Conditions	Assesses the environmental effects on controlled waters, geology and soils resulting from construction Proposed Development	Assesses the environmental effects on controlled waters, geology and soils resulting from the operation of the Uskmouth Conversion Project
6	Hydrology	Assesses the environmental effects of the construction of the Proposed Development on hydrology, drainage and flood risk	Assesses hydrology, drainage and flood risk effects during operation and subsequent decommissioning of Uskmouth Conversion Project
7	Ecology	Assesses the environmental effects of construction of the Proposed Development upon terrestrial ecology.	Assesses the effects of operation of the Uskmouth Conversion Project upon terrestrial ecology.
8	Landscape and Visual	Assesses landscape and visual effects resulting from construction of the Proposed Development	Assesses potential landscape and visual effects resulting from operation of the Uskmouth Conversion Project
9	Historic Environment	Assesses effects during the construction of the Proposed Development	Assesses effects during the operation of the Uskmouth Conversion Project
10	Traffic and Transport	Assesses the effects of construction traffic associated with the Proposed Development	Assesses the effects of construction traffic to enable the Power Station Upgrade works. Assesses the effects of operational traffic for the Uskmouth Conversion Project
11	Noise and Vibration	Assesses noise and vibration related to construction works and construction traffic of the Proposed Development	Assesses noise and vibration related to construction works and construction traffic of the Power Station Upgrade Assesses noise and vibration related to operation and operational traffic of the Uskmouth Conversion Project
12	Air Quality	Assesses air quality related to construction effects of Proposed Development	Assesses air quality related to construction effects of Power Station Upgrade Assesses air quality related to operational effects of Uskmouth Conversion Project
13	Climate Change	Considers effect on climate change as a consequence of the impact of greenhouse gas (GHG) emissions	Considers the effect on climate change as a consequence of the impact of greenhouse gas (GHG) emissions resulting from the

		resulting from the construction of the Proposed Development	operation of the Uskmouth Conversion Project
14	Population and Health	Considers the effects upon Human Health related to construction, of the Proposed Development	Considers the effects upon Human Health related to operation of the Uskmouth Conversion Project

The Applicant

1.33 The Applicant is SIMEC Uskmouth Power Limited.

The Assessment Team

1.34 The EIA has been managed by RPS, taking into account information provided by the Applicant and design team. RPS is a registrant of the Institute of Environmental Management and Assessment (IEMA) Quality Mark. All authors of this ES are senior members of RPS. A brief summary of their expertise and experience is provided in Appendix 1.2.

Further Information

1.35 This Environmental Statement has been submitted as part of a planning application for the Proposed Development which facilitates the Uskmouth Conversion Project. The application has been submitted to Newport City Council. The planning application, ES and Non-Technical Summary can be viewed at:

Regeneration, Investment and Housing

Newport City Council

Civic Centre

Newport

NP20 4UR

1.36 Copies of the ES and planning application documents can be viewed on the local planning authority website:

www.newport.gov.uk/planningonline

1.37 Further copies of the ES can be obtained from the following address:

RPS

20 Western Avenue

Milton Park

Abingdon

Oxfordshire

OX14 4SH

1.38 A paper copy of the full ES can be obtained for a cost of £350 plus VAT or an electronic copy (CD) for a cost of £10.

1.39 All comments on the ES (and planning application) should be issued to Newport City Council (planning department) at the address stated in paragraph 1.35.

2 DESCRIPTION OF PROPOSED DEVELOPMENT

Introduction

2.1 This chapter provides a description of the Proposed Development and the Uskmouth Conversion Project. SUP proposes to convert the existing coal fired power plant at Uskmouth Power Station to operate as a plant which would generate electricity through the combustion of waste derived fuel pellets.

2.2 The construction phase of the Uskmouth Conversion Project will require the following works:

(iii) The Proposed Development which consists of all fuel storage and material handling infrastructure to be constructed external to the existing power station building; and

(iv) Power Station Upgrade, the works required for fuel combustion equipment conversion and plant life extension to be conducted inside the existing power station buildings.

2.3 The Proposed Development and the Uskmouth Conversion Project forms the basis for the environmental assessment provided in this Environmental Statement (ES).

2.4 The effects of the Proposed Development and the Uskmouth Conversion Project which it facilitates, have been assessed throughout the ES based upon what is likely. For example, construction information is presented as the 'likely case'. A number of measures which would reduce or avoid adverse environmental effects arising have been included as part of the project design. Details of these measures are provided in this chapter and are set out in each topic chapter. This chapter, together with the subsequent topic chapters, provide the data required to identify and assess the main and likely significant effects of the Proposed Development and the Uskmouth Conversion Project which it facilitates in accordance with Regulation 18 and Schedule 4 of the EIA Regulations.

2.5 This chapter also provides a description of the site and the key components of the Proposed Development and the Uskmouth Conversion Project which it facilitates, including an overview of the approach to construction.

The Site and Surrounding Area

Site Location

2.6 Uskmouth Power Station historically comprised two power plants: Uskmouth A (decommissioned in 1990s) and Uskmouth B coal-fired power stations. The Proposed Development and the Uskmouth Conversion Project which it facilitates would be implemented entirely within the site of the existing Uskmouth B coal-fired power station, referred to as Uskmouth Power Station.

2.7 The Uskmouth Power Station site is located on the eastern bank of the River Usk, close to the confluence with the Severn Estuary, around 4 km south of central Newport. The grid reference is ST 32830 83838 and the site address is Uskmouth Power Station, West Nash Road, Nash, Newport, NP18 2BZ. Figure 1.1 shows the site location while Figure 1.2 shows the Proposed Development redline boundary.

Site History

2.8 The current site comprises:

- the main power station buildings housing furnaces, boilers, steam turbines and electrical generators;
- offices, workshop buildings, storage and car parking;

- two linear banks of cooling towers;
- a single exhaust stack;
- a coal storage area, conveyor systems and pulveriser mills;
- a pulverised fuel ash storage area;
- railway tracks and coal unloading facility;
- electrical export equipment; and
- areas of landscaping and surface water drainage including a large attenuation pond.

2.9 Immediately to the west, the site adjoins the Severn Power combined cycle gas turbine (CCGT) power station, constructed in 2007 on the site of the former Uskmouth A coal-fired power station.

2.10 Immediately to the north is the River Usk and, in the north-east, Newport Uskmouth Sailing Club. To the east is the railway line, a mixture of land with vegetation, hardstanding and a sewage treatment works; and to the south, former ash pits (now vegetated), beyond which is the Newport Wetlands National Nature Reserve.

2.11 The wider site setting is industrialised to the north, with the Liberty Steel works and industrial estates on the east bank of the River Usk stretching from the Proposed Development site to the A48 'Southern Distributor Road' dual carriageway through the outskirts of Newport. Figures 2.1 to 2.3 show the surrounding environmental constraints of Ecology, Heritage, Landscape, Flooding and Air Quality.

2.12 The River Usk and the Severn Estuary lie beyond the CCGT power station, and the Newport Wetlands lie to the west and south. On the west bank of the Usk is Alexandra Docks, with commercial and industrial land-uses.

2.13 To the east, the wider setting is rural, with farmland, minor roads, reens (drainage channels) and individual or small groups of houses. The nearest settlement is the village of Nash, at a little over 1 km from the proposed development site.

2.14 The Uskmouth Power Station has not generated electricity on coal since a technical fault in April 2017. Given the ongoing nature of planning and design works required to carry out the Uskmouth Power Station Conversion, repairs were not fully completed. Figure 2.4 shows the application site as it is today.

2.15 However, since this event, staff with critical skills for preservation, maintenance and future operation of the plant have been retained in readiness for a return to service. The operations team has completed the removal of damaged equipment following the technical fault in preparation for the Uskmouth Conversion Project. Significant investment and progress have been made with the Front End Engineering Design (FEED) to repurpose the existing site to combust waste-derived fuel pellets.

Planning Context

2.16 The site falls within the administrative boundary of Newport City Council (NCC), and as such is subject to the Newport Local Development Plan (LDP) adopted in 2015. The LDP Proposals and Constraints Maps indicate that the site is not allocated for any specific land use. However, it is affected by the following designations:

- Within Urban Boundary (Policy SP5);
- 'The Levels' Archaeologically Sensitive Area (Policy CE6);
- Developed Coastal Zone (Policy CE9);
- Urban Boundary (Policy SP5);

- Flood Risk Zone B; and
- Flood Risk Zone C1.

2.17 The site is also close to the following designations:

- Countryside (Policy SP5);
- Special Landscape Area (Policy SP8 [iv and v]);
- Site of Special Scientific Interest: River Usk (Lower Usk);
- Ramsar and Special Protection Area (Severn Estuary);
- Special Area of Conservation (River Usk); and
- National Nature Reserve;
- Local Nature Reserve; and
- Wales Coastal Path.

2.18 A Lawful Development Certificate for a peaking power plant and advanced conversion technology power plant (ACT, a gasification process for waste) was granted in April 2016 (NCC reference 16/0257) on parts of land within the Uskmouth Power Station site. The peaking power plant has not been constructed. The Applicant considers it unlikely that the ACT development would be constructed.

Development Requiring Planning Permission

2.19 In order that a robust assessment of the Proposed Development is available, the Applicant has carried out an extensive EIA. Chapter 4 outlines the approach and methodology adopted for the EIA, which considers the Proposed Development and the Uskmouth Conversion Project which it facilitates. While reference will be made to the findings of the EIA set out within this Environmental Statement, it should be borne in mind by the decision-maker that the development is an existing site with existing consents and that planning permission for operational development only is sought, namely:

- Construction of fuel storage silos, day silos and conveyor systems;
- Fuel de-dusting building;
- Upgrade to existing rail fuel unloading facilities; and
- Vessels and infrastructure for the delivery and storage of flue gas treatment (FGT) reagents and transportation of residues.

Project Outline

2.20 The Proposed Development entails the construction of auxiliary infrastructure; fuel pellet storage silos, lime silo, de-dusting plant, conveyor upgrades and rail upgrades to enable the Uskmouth Conversion Project. The Uskmouth Conversion Project proposes to convert the existing coal fired power plant at Uskmouth Power Station to operate as a plant which would generate electricity through the combustion of waste derived fuel pellets.

2.21 Uskmouth Power Station has in total three combustion units; 13 ,14 and 15. The Uskmouth Conversion Project intends to refurbish two of the three combustions units, known as Unit 13 (110 MWe) and Unit 14 (110 MWe), to provide 220 MWe (net electrical export capacity). Unit 15 initially will not operate as part of the converted facility and is not considered within this planning application. There is a possibility that Unit 15 could be converted in the future, however if that occurs it will be the subject of a further regulatory applications.

2.22 The operational lifetime of the Proposed Development and the Uskmouth Conversion Project which it facilitates, is expected to be at least 20 years post commissioning. Nevertheless, for the purposes of flood risk and climate change assessments, a lifetime of 40 years has been assumed as a reasonable worst-case.

2.23 The following description outlines the nature of the works to be carried out and the parameters that have been assessed in the EIA. Whilst detailed design work is still ongoing and may be subject to further change up to the point of construction, the parameters used in the assessment have been selected to reflect the realistic worst case so that any refinements at the detailed design stage will fall within the envelope of what has been assessed.

The Uskmouth Conversion Project

2.24 The Uskmouth Conversion Project entails the adaptation of two of the existing three combustion units; Unit 13 (110 MWe net) and Unit 14 (110 MWe net) to generate electricity via the combustion of a waste-derived pellet fuel. Following the Uskmouth Conversion Project, it is intended to operate using 100% fuel pellets, however the technical potential to co-fire with up to 1% biomass is under investigation; this potential use of biomass will be clarified over the coming months by the Front End Engineering Design (FEED) process. The existing Uskmouth Power Station Environmental Permit allows co-firing of coal and biomass and Uskmouth Power Station are seeking to vary the existing permit to allow combustion of waste derived fuel pellets.

2.25 The Uskmouth Conversion Project design process entails a FEED phase, which sets out the engineering design parameters for the conversion. The FEED is used to generate the technical requirements and scope of the Uskmouth Conversion Project which are submitted to the selected conversion contractor for review and iteration of the final detailed design. Contractors will conduct the conversion works to include the construction of Proposed Development and Power Station Upgrade.

2.26 The conversion contractor detailed design will comply with the conditions within the Planning Permission provided by NCC and the Environmental Permit provided by Natural Resources Wales (NRW).

Source of waste for fuel pellets

2.27 Present day recycling techniques cannot recycle all waste materials and as a result, there remains a significant quantity of this waste material sent for disposal. These currently non-recyclable materials are sent to landfill or diverted from landfill to purpose-built Energy from Waste (EfW) facilities or exported for use abroad. It is in this context that the ES and the Planning documents describes this waste that will be used in the fuel pellet processing as ‘non -recyclable’.

2.28 The waste-derived fuel pellets feedstock and manufacturing techniques have been developed to ensure a closely controlled specification which ensures it is a fuel suitable for transport, milling and combustion in a similar way to coal. As a result, key fuel handling, preparation, combustion and emissions generation performance is achieved utilising as much of the existing power station equipment as possible and minimising the need for newly designed equipment.

2.29 This currently non-recyclable waste is used as feedstock to produce the fuel pellets for the Uskmouth Conversion Project. The pellets are processed at off-site facilities and will be transported to Uskmouth Power Station by rail. After the waste has been processed, the fuel pellets are classified by the European Waste Catalogue (EWC) code 19 12 10 – combustible waste (refuse derived fuel).

2.30 The operational phase of the Uskmouth Conversion Project will have the nominal capacity to combust up to 875,000 tonnes per annum (tpa) of fuel pellets, with a maximum throughput capacity of around 1,000,000 tpa.

Power Station Upgrade

2.31 The Power Station Upgrade aims to utilise (where possible) the existing infrastructure for the handling, milling and combustion of fuel; and to reuse or reconfigure existing equipment to accommodate the combustion of the waste-derived fuel pellet. The Power Station Upgrade will entail the following principal changes within the existing power station buildings:

- modification or replacement of milling equipment;
- modification of the pulverised fuel conveying systems;
- new ultra-low NOx burners and overfire air systems;
- upgrade of bottom ash handling systems; and
- an upgrade to the flue gas treatment systems.

2.32 The Uskmouth Power Station will be updated to efficiently combust the fuel pellets (and, if required, biomass) and to limit the emission of gaseous pollutants in line with the NRW Environmental Permit.

Proposed Development – Fuel Delivery

2.33 Fuel pellets will be delivered to Uskmouth Power Station by rail (replicating previous operational coal deliveries by rail) to an existing rail unloading facility which will be upgraded as part of the Proposed Development. Each combustion unit will require up to two train deliveries per day; each train can carry up to 1,000 tonnes of fuel pellets. Within the rail unloading building, the rail cars will be emptied via bottom discharge onto an under-track hopper conveyor. From the rail unloading facility, fuel pellets will be transferred to the primary storage silos via existing (and new) enclosed conveyors. The existing conveyor system will be upgraded. Figure 2.5 shows the proposed site plan.

2.34 Fuel pellets will then be transferred from the primary storage silos via conveyors to the day silos for discharge via a pneumatic transport system to feed the mills. The final design of these processes and the required equipment modifications will be determined during FEED and the detailed design phase by the conversion contractor.

Uskmouth Conversion Project – Operational consumables delivery

2.35 As detailed later in this chapter, operational consumables to be used during the operational phase of Uskmouth Conversion Project will be delivered by road (replicating previous operational consumable deliveries by road). Biomass up to 1% of the total fuel (only if required) may also be delivered by road replicating previous operational biomass deliveries by road).

Proposed Development – Storage

2.36 The fuel pellets will be stored in up to four primary storage silos, each with a volume of up to 18,000 m^3 which will hold up to approximately 10,000 tonnes of pellets. Two smaller day silos will be used during the transfer of the fuel pellets from primary storage silos to the milling process. The capacity of the day silos will be determined during FEED. Figures 2.6 and 2.7 show the silos proposed.

2.37 The storage silos will be sealed as far as is practicable to capture potential fugitive dust generated during filling and discharge. Dust is captured from displaced air by fan-assisted reverse jet filters in the loading and transfer points. The captured dust, which is useable as fuel, will be reintroduced to the storage silo at a controlled rate. The silos will be fitted with level indicators and filling controls to prevent overfilling.

Power Station Upgrade – Milling

2.38 The fuel pellets will be conveyed from the day silos to the mills. The mills will pulverise the fuel pellets (along with biomass, if required) into a suitable particle size for pneumatic transport to the burners. The final design of these processes and required equipment modifications will be determined during FEED and the detailed design phase by the conversion contractor.

Power Station Upgrade – Combustion

2.39 Pulverised fuel from the milling process is pneumatically transported to the burners, where the fuel is injected into the furnace alongside pre-heated combustion air. The fuel then combusts to produce heat energy. Fuel pellets will be fired either alone or co-fired with biomass pellets to raise steam.

Power Station Upgrade – Electricity Generation

2.40 Steam turbo-alternators will convert the kinetic and potential energy of steam into electricity. When steam produced by the boiler reaches a critical temperature and pressure, it is released to the turbine. The steam is then forced through a series of blades fixed to a shaft. The resulting rotation of the shaft drives an electrical generator to produce electricity for export.

Power Station Upgrade – Flue Gas Treatment

2.41 Emissions to air of selected pollutant species will be controlled under the NRW Environmental Permit. In order to ensure compliance with this permit, a range of emissions control practices will be implemented during the conversion project. Each measure will target specified emission species and be designed to ensure performance at or below Emissions Limit Values (ELVs) specified in the permit.

2.42 The generation and emission of oxides of nitrogen (NOx) and products of incomplete combustion (CO, TOC, carbon in ash and polycyclic aromatic hydrocarbons (PAHs)) are largely controlled by minimising their generation through pertinent control of the combustion process.

2.43 Further control of NOx can be achieved using addition of reducing agents via a Selective Non-Catalytic Reduction (SNCR) system. The practicality and necessity of this system will be determined during FEED and detailed design by the conversion contractor.

2.44 Exhaust flue gasses from each boiler pass through an existing flue gas treatment (FGT) unit. Lime (calcium oxide) is injected into the flue gas stream to react with acidic flue gases, this produces Air Pollution Control residue (APCr) composed of fly ash and abatement reaction products. These solids are filtered to remove dust particulate matter using dry bag filtration prior to the flue gas being vented to the atmosphere through a 122 m chimney stack. The abatement system and emissions to air will be controlled under the NRW Environmental Permit.

2.45 Addition of an activated carbon injection system to the FGT system to control heavy metal and PAH emissions will be undertaken.

Uskmouth Conversion Project – Operational Ash removal

2.46 As with the coal-fired power station, ash is a product of the combustion process of fuel pellets, the main solid residues produced by the operational Uskmouth Conversion Project would be fly ash and bottom ash.

2.47 Ash will be removed from the site in sealed tankers by road (replicating previous operational ash removal by road)

Summary of Key Parameters

Buildings

2.48 The Proposed Development would comprise (see Table 2.1 for approximate dimensions):

- construction of fuel storage silos, day silos and conveyor systems;
- construction of fuel de-dusting building;
- upgrade to existing rail fuel unloading facilities; and
- construction of vessels and infrastructure for the delivery and storage of FGT reagents and transportation of ash residues off site.

2.49 The outward appearance of the existing power station buildings and exhaust stack would remain unchanged; changes to existing infrastructure during Power Station Upgrade would be made within the envelope of the existing buildings. The visible difference will be the Proposed Development of; new fuel storage silos connected to the existing plant with new and refurbished conveyors. The primary storage silos would be constructed on the previous coal stockyard. The footprint of fuel pellet storage silos is smaller than that required for the external storage of coal. As a result, sections of the previous coal stockyard will be re-vegetated, please refer to planting proposals.

Table 2.1: Summary of new buildings and approximate dimensions

Building	Approx. Dimensions	Approx. Height above ground level (AGL)
Day Silos (x2)	15 m radius	24 m (31 m including head house)
De-dusting Building	20 m x 20 m	10 m
Lime Silo (external cladding extension)	8.5 m x 5 m	23 m
Primary Storage Silos (x4)	34 m radius	42 m (48 m including head house)
Rail Unloading Facility Extension	40 m x 15 m	8 m

2.50 No demolition is required for the Proposed Development, the existing infrastructure will be reused where possible. Conversion is anticipated to take around 18 months.

Fuel Supply

2.51 The operational phase of the Uskmouth Conversion Project would generate electricity through the combustion of pelletised, waste-derived fuel. The fuel pellets are produced to meet a a closely controlled specification which ensures it is suitable for transport, milling and combustion in a similar way to coal and optionally, other biomass fuel. The intention is to operate the Uskmouth Power Station and generate electricity using 100% waste-derived fuel pellets, but may wish to retain flexibility to introduce a secondary biomass fuel if required for technical or economic reasons. If needed, the biomass fuel reserve would be stored in the existing biomass storage building on site. In the event the fuel pellets are co-fired with biomass, biomass would be added to the fuel pellets for pulverisation within the mills using the existing biomass delivery system

2.52 The fuel pellets have a broadly similar calorific value as the formerly used coal fuel (net CV ranging between 19 and 25 MJ/kg, with a design value of 22 MJ/kg. Up to 65 tonnes per hour (t/h) of fuel pellets would be required for each unit. The storage and logistics strategy have been designed on a reasonably high worst-case scenario of 90% load factor which equates to around 1,000 ktpa for 220 MWe net conversion, equivalent to 500 ktpa per combustion unit.

2.53 The fuel pellets will be supplied directly to Uskmouth Power Station from fuel pellet manufacturing locations in the UK via the existing railway line and upgraded offloading facilities. Biomass fuel, if

required, would also be delivered directly to the power station. It is anticipated that up to 1% or around 10,000 tpa of biomass fuel (at the 90% load factor) for 220 MW conversion may be required.

Access and Logistics

2.54 As with the fuel supply outlined above, access and logistics arrangements described below have been calculated under the assumption that both combustion units are operational. Consequently, the tonnages below and movements listed in Table 2.2 represent the 'high-case scenario'.

2.55 The Uskmouth Conversion Project intends to replicate the operational delivery pathways used by the coal-fired power station:

- fuel pellets delivered by rail – replicating the historic logistics strategy where the majority of coal was delivered by rail;
- operational consumables delivered by road;
- biomass delivered by road; and
- ash transported off site by road.

2.56 Table 2.2 summarises the assumed logistical movements that would be required for: fuel importation (rail), operational consumables including biomass (road) and exports of ash (road).

2.57 It is proposed that road access during the construction and operational phases of Uskmouth Conversion Project will replicate previous transport patterns and be taken through the existing Uskmouth Power Station main gate via West Nash Road and Nash Road.

Fuel Pellet delivery – rail

2.58 The Uskmouth Power Station site has historically received fuel (coal) via the existing rail connection and off-loading facilities. Refurbishment and extension of the existing rail unloading hopper will ensure that bulk deliveries of fuel pellets can be handled in a timely manner. The proposed extension to the existing rail unloading facility would be up to 40 m in length, with height and width matching the existing building (approximately 8 m and 15 m, respectively). Table 2.2 sets out the anticipated rail logistics strategy that is considered in the EIA.

Fuel Pellet delivery – road

2.59 Road delivery of fuel pellets would not be required under normal circumstances. However, road deliveries may be required following major incidents on the rail network. Historically, rail deliveries have been very reliable with only two days un-planned rail network closure over the last 20 years. The proposed primary storage silos would contain up to seven to ten days' worth of fuel suggesting that any future unplanned rail closures are likely to be accommodated without requiring road deliveries.

2.60 Under some circumstances, rail disruption may be as a result of maintenance works to the rail line. However, this would occur on a planned basis, allowing fuel pellets to be stockpiled accordingly.

Biomass fuel delivery – road

2.61 As outlined above, as well as fuel pellets, around 10 ktpa biomass fuel may be required to co-fire along with the fuel pellets. In the event that biomass fuel is required, it would be delivered by road replicating previous biomass deliveries to Uskmouth Power Station (see Table 2.2).

Operational Consumables – road

2.1.1 In addition to mains water, the operational Uskmouth Conversion Project will continue to utilise raw materials in line with the existing Environmental Permit as follows:

- Lime, urea and ammonium sulphate (reagent for FGT);
- Gases, water treatment chemicals and general stores; and
- Gas oil/diesel (auxiliary and back-up fuel).

Lime

2.62 Lime would be used in the flue-gas treatment (FGT) process. It is anticipated that approximately 42,500 tonnes per annum of lime will be delivered to the site. The lime used in the FGT system is removed from site within the APCr composed of fly ash and FGT reaction products.

Ash

2.63 Combustion of the fuel pellets is expected to produce around 15% ash by mass, similar in quantity to the ash production during previous operation at the Uskmouth coal-fired power station. Around 200ktpa of ash and ash abatement products would be produced per annum and will be transported off-site by road.

2.64 The ash is composed of approximately 80% fly ash and 20% furnace bottom ash (referred to as bottom ash).

2.65 Around 174,000 tonnes of APCr, composed of fly ash and abatement products, would be produced per annum. APCr is discharged into enclosed road tankers via a sealed connection and transported off-site by road for disposal.

2.66 Around 31,000 tonnes of bottom ash is produced per annum. The nature of bottom ash handling systems will be determined during FEED and design phases of the conversion contractor. It is anticipated bottom ash will be transported off-site by road for disposal.

Reagents

2.67 In addition to those raw materials listed above, it is anticipated the operational Uskmouth Conversion Project may utilise ammonium sulphate, urea and activated carbon for further FGT.

2.68 It is anticipated that around 2,430 tonnes per annum of urea and 920 tonnes per annum of ammonium sulphate would be required in the FGT process for each combustion unit operating at 90% load. The final design of these processes and required equipment modification will be determined during FEED and the detailed design phase by the conversion contractor.

Operational consumable deliveries

2.69 The converted Uskmouth Power Station will require other operational consumables delivered by Heavy Goods Vehicle (HGV) including fuel oil and other general supplies. The anticipated maximum daily HGV movements are shown in Table 2.2.

Table 2.2: Anticipated logistical movements (both combustion units)

Product	Tonnes per annum @ 90% utilisation	Mode	Movements per day [a]
Fuel pellets	1,024,920	Rail	4
Biomass	10,249	HGV	3
Ash & Lime	204,984	HGV	54
FGT reagents	3,352	HGV	2
Other	N/A	HGV	3

[a] Movements shown here include all logistics vehicle movements, both incoming and outgoing from the Uskmouth Power Station.

Proposed Development – Fuel storage and Conveying

2.70 The new fuel storage silos would be in proportion to the scale of the existing Uskmouth Power Station buildings. Up to four primary storage silos would be located on the site of the previous coal stockyard. The conveyor systems from the primary storage silos would be similar in appearance and scale to the existing coal conveyors.

Primary Storage Silos

2.71 Up to four primary fuel storage silos, each designed to hold 10,000 tonnes, are proposed on the former coal stockyard to the south of the main power station buildings. Each silo would be around 34 m in diameter and up to 48 m in height, including the head house.

2.72 The silos are arranged in a line on a roughly north-south (NNW-SSE) alignment perpendicular to the existing coal conveyor system. New silo reclaim conveyors connect to the existing conveyors to the NNW of the previous coal stockyard. The coal on the coal stockyard area has been sold and transported off site.

Day Silos

2.73 Two smaller day silos (up to 15 m radius x 40 m high) would be constructed in an area immediately adjacent to the west of the main power station building for the purpose of providing 24-hour fuel supply buffer for each unit as a contingency against primary conveyor breakdown. Existing internal road network changes will be made to accommodate the positioning of the day silos.

Lime Silo

2.74 A new lime silo would be constructed adjacent and immediately to the north of the existing lime silo to the east of the exhaust stack. The new lime silo will match the existing and be contained within a clad exterior.

De-dusting Building

2.75 The de-dusting building would be required to remove the excess dust generated from the fuel pellets as they are conveyed to storage. The excess dust is collected for use in the combustion process. The proposed de-dusting building would be up to 20 m by 20 m, with a height of up to 10 m.

Power Station Upgrade

2.76 The ethos behind the construction phase of Uskmouth Conversion Project is to utilise (where possible) the existing power station infrastructure. This is achieved by utilising a fuel pellet produced to a closely controlled specification which ensures it is suitable for transport, milling and combustion in a similar way to coal. The Power Station Upgrade will retain (where practicable) a significant proportion of the existing power station equipment that is expected to be suitable for firing with the fuel pellets and (if required) biomass. The Applicant has conducted a FEED process to confirm suitability of the major components such as furnace, boilers, steam turbines, stack, electricity generators and grid connection are appropriate for fuel pellet combustion. Two of the three combustion units (Unit 13 and Unit 14) will be converted, the third unit (Unit 15) is not considered for conversion within this planning or associated Environmental Permit variation.

2.77 The Power Station Upgrade would be carried out within the envelope of existing buildings.

2.78 The equipment likely to be replaced during the Power Station Upgrade are discrete components of the combustion system including fuel pulverising mills, pneumatic conveying equipment, burners and bottom ash handling equipment to be replaced/augmented with equipment suitable for the combustion of fuel pellets and (if required) biomass fuel. Electrical and monitoring equipment

likely to require repair or replacement during the Power Station Upgrade include electrical switchgear, monitoring equipment (installed in the same locations as the existing) and control systems.

2.79 Components of the FGT and APCr system will be upgraded, repaired or replaced during the Power Station Upgrade (as needed) to ensure compliance with Environmental Permit conditions, and are considered as part of the Environmental Permitting Regulations variation process that the Applicant is conducting with NRW in parallel to this planning application.

Staffing and Shifts

2.80 The operational Uskmouth Conversion Project organisation will have approximately 50 to 100 staff. It is anticipated there will be four operational shifts with staff working a 24/7 shift rota. The remaining personnel will consist of day staff generally working between 7:00am and 5:00pm.

Access and Parking

2.81 Uskmouth Power Station is situated at the end of West Nash Road. The site has one entrance accessed via a 24/7 manned security gatehouse. The Proposed Development does not involve new access routes, pedestrian routes or cycle ways.

2.82 The access roads within the Uskmouth Power Station will be mostly unchanged, except for vehicular access south of the existing pump house, here the road will be diverted around the two proposed day storage silos (refer to Figure 2.5: Proposed Site Plan). Existing car parking facilities will remain unchanged.

Transport Management

2.83 The vast majority of Uskmouth Power Station personnel travel to site by car from the Newport area. The operational consumable traffic deliveries, including van and HGV deliveries are expected to replicate previous Uskmouth Power Station operational activity.

2.84 During the construction phase of the Uskmouth Conversion Project traffic movements will be detailed within a Construction Traffic Management Plan (CTMP) to be developed by the conversion contractor.

Appearance and Design

2.85 The Proposed Development is consistent with the site's industrial character and does not propose any structure taller than the existing main Uskmouth Power Station building or any other structure in the vicinity, many of which are taller or more substantial in terms of scale.

2.86 The appearance of the Proposed Development will be industrial and utilitarian, which is considered appropriate within the context of an industrial power station site and the surrounding industrial context.

2.87 The proposed primary fuel storage silos are situated within the former coal stock yard footprint and will accommodate a broadly similar quantity of fuel. The primary silos are uniform and arranged in an approx. NNW – SSE alignment following the edge of the coal stockyard and making use of the existing coal stockyard drainage network.

2.88 The connecting conveyors are arranged to efficiently utilise the existing rail unloading infrastructure with as little new infrastructure as possible.

Landscape and Biodiversity Enhancement Strategy

2.89 Landscape and biodiversity enhancements are proposed which include the vegetation of the remaining undeveloped coal stockyard as shown on Figure 7.4.

2.90 New habitats would be established in the coal stockyard through a combination of native seeding and natural colonisation supported by the monitoring of developing habitat and targeted management.

2.91 Additional areas of neutral grassland and flower rich ephemeral vegetation would be established, which would extend habitat extent and increase the carrying capacity for invertebrates, upon which a range of species will prey.

2.92 The objective of the landscape and biodiversity strategy would be to create and maintain intricate patchy mosaic of neutral grassland and pioneer grassland with seasonal pooling within part of the coal stockyard. These new habitats would adjoin established neutral grassland, the boundary ditch and established dense scrub creating a more diverse overall habitat mosaic.

2.93 The substrate would be used to create linear banks which would be managed as patches of grassland and ephemeral vegetation. The varied topography and the deliberate creation of multiple niches directly benefits botanical and invertebrate diversity within the application site.

2.94 Specific measures would be included to attract pollinator species including bees with the inclusion of key foodplants and abundant sources of nectar.

2.95 Enhancement of habitats on the wider site will include enhancements to ditches by opening-up channels from overhanging scrub vegetation to remove shading which in turn would promote the diversity of the assemblages of flora and fauna, an approach aligned to ditch habitat management promoted by NRW in the Gwent Levels.

Drainage and Flood Risk

2.96 The new storage silos, associated hardstanding and internal access road spurs would add a small amount of additional impermeable surface relative to the existing Uskmouth Power Station site. The existing drainage system is considered to have adequate capacity to manage runoff from the additional impermeable surface area created as a result of the construction of the Proposed Development. A drainage strategy for the proposed development is appended to Chapter 6 of this ES.

Lighting

2.97 It is not anticipated that the new Proposed Development operational areas; silos, de-dusting building and conveyors will require continuous external lighting during hours of darkness. Consequently, a lighting strategy does not form part of this planning application.

2.98 Task lighting will be associated with silos, de-dusting building and conveyors in the event that operation and maintenance activities are required during the hours of darkness.

2.99 Lighting along the walkways and roads will be comparable to the existing lighting scheme. Uskmouth Conversion Project will avoid lighting to perimeter drainage reens to minimise disturbance to wildlife

2.100 The final lighting strategy will be provided by the detailed design phase by the conversion contractor prior to commencement of construction phase.

Waste

2.101 The waste products of combustion process namely fly ash and bottom ash have been described above.

Use of Natural Resources

2.102 The principal natural resource used at Uskmouth Power Station is mains water usage.

Water

2.103 Uskmouth Power Station receives water supplies from Welsh Water. The mains supply feeds two water systems:

- Towns water; and
- Potable water.

Towns Water

2.104 The towns water system supplies several operational processes before entering the towns water storage tanks. These tanks supply water for firefighting and support the boosted towns water system. The boosted towns water system supplies water to demineralisation plant and other operational utilities.

Potable Water

2.105 The potable water system supplies drinking water and water to showers and toilets.

Cooling system make up water

2.106 Cooling water at Uskmouth Power Station is recycled. This cooling system is subject to operational losses from factors such as evaporation during cooling. The lost water capacity is replaced with semi treated waste effluent supplied from the neighbouring Welsh water sewage treatment facility.

Water consumption post conversion

2.107 No net increase in water usage is anticipated during operational phase Uskmouth Conversion Project.

Residues and emissions

2.108 Details of residues and emissions in relation to discharges to water; air (e.g. dust); noise and vibration; and soil are set out in Chapter 6: Hydrology, Chapter 12: Air Quality; Chapter 11: Noise and Vibration and Chapter 5: Geology, Hydrogeology and Ground Conditions of this ES, respectively. Details of lighting are provided above, and any effects of light emissions are considered within Chapter 7: Ecology and Chapter 8: Landscape and Visual Resources, where relevant. As set out in Chapter 4 of this ES, the project is not likely to give rise to heat or radiation emissions.

Vulnerability to Accidents and Disasters – Operation

2.109 The 2017 EIA regulations state that the EIA must identify, describe and assess in an appropriate manner the direct and indirect significant effects arising from the vulnerability of the Proposed Development to risks of major accidents or disasters. Vulnerability of the Proposed Development to major accidents introduced by the location should be considered as well as risks that are an inherent characteristic of the development.

2.110 The objective of such an assessment is to establish whether the proposed development increases risks to existing receptors or increases the sensitivity of those receptors to the consequences of the hazard. For example, by introducing new links/pathways between a possible hazard and a receptor.

2.111 The coal-fired Uskmouth Power Station operates under an Environmental Permit (EPR/LP3131SW) supplied by NRW. An application to vary the existing Environmental Permit, to permit combustion of waste derived fuel pellets was been submitted to NRW in December 2019. It is not proposed that this EIA will duplicate those permitting controls.

2.112 Assessment of accidents and emergencies is limited at this stage to an Environmental Risk Assessment (ERA) which has been submitted with the Environmental Permit application. The ERA presents a high-level assessment of accident risks, that will then inform an Accident Management Plan (AMP) to be developed for the operational site. An AMP is a requirement for the Environmental Permit and will be developed and updated throughout the lifetime of the Uskmouth Conversion Project

2.113 As the Proposed Development would store waste derived fuel pellets, risk of fire will be managed through a Fire Prevention and Mitigation Plan (FPMP) which is in fact an operational requirement specified within the Environmental Permit.

2.114 Other than fire, the remaining risk to the site comes from tidal flooding. The risks posed by tidal flooding are assessed in Chapter 6 of this ES.

Construction Phase

2.115 This section includes the assumptions made on the construction phase activities and timings for the Uskmouth Conversion Project. The construction assessment is based on a reasonable worst-case construction scenario which considers the construction phase of the Uskmouth Conversion Project that includes the Proposed Development and Power Station Upgrade including ground preparation for silo foundations and rail unloading facility. The Proposed Development is anticipated to utilise standard construction methodologies as outlined below.

Proposed Development Steel erection

2.116 Structural steel columns, beams and flooring will be installed on pre-prepared reinforced concrete foundations. Steel members of this type are usually bolted together to form structures, flooring can be from steel plate or open grid type panels, bolted, clamped or welded into position. Steel roof structures are erected in the same manner.

Proposed Development Building cladding

2.117 Building cladding is composed of: pressed mild steel sheet, plastic or timber. Cladding materials are positioned on the exterior of infrastructure, and fixed using self-tapping screws, bolts or other proprietary fixings.

Proposed Development Reinforced Concrete Foundations

2.118 Foundations are usually constructed by excavating and levelling an area of ground to a pre-determined datum and backfilled with a combination of stone and reinforced concrete. The type of foundation constructed will be determined by the conversion contractor.

Proposed Development Slip Form Silo Construction

2.119 Slip forming is a construction method in which concrete is poured into continuously moving formwork to construct vertical silos. It is anticipated that slip form will be utilised to construct the fuel pellet storage silos. The process relies upon the quick setting properties of concrete. The already set concrete beneath supports the formwork that it is continuously jacked-up as additional steel and concrete are added above.

2.120 Depending on concrete wall thickness, the slip form vertical structures can be constructed at a rate of between 150 to 300 mm per hour, thereby constructing a 30 m tall cylinder in approximately 100 to 200 hours, i.e. 4 to 8 days.

2.121 Slip-forming construction is usually carried out on a 24 hour per day basis, to avoid the need for construction joints. Uskmouth Conversion Project anticipate that slip forming to construct the cylindrical walls of the fuel pellet storage silos would be continuous and this element of the

construction programme would necessarily be undertaken around the clock. The requirement for slip form construction for the silos would be determined by design and will be confirmed by the conversion contractor.

Proposed Development Piling for silos and infrastructure

2.122 The technique of piling is used when the ground bearing pressure cannot support the loads imposed by foundations and structures above. The ground can be piled using a number of techniques. A pile is a slender, columnar element typically made from steel or reinforced concrete driven or augured to a depth where the bearing pressure of the strata is sufficient to carry the loads imposed, this is more often than not bedrock. Uskmouth Conversion Project anticipate that piling will be required to support the foundations of storage silos. The position and number of piles required to support structures is determined by design and will be confirmed by the conversion contractor.

2.123 The construction of the pile itself and the method of driving the pile are determined by design taking into account the condition of the ground and the environmental impact of the technique employed.

2.124 A pre-cast concrete pile driven into the ground is the most cost-effective method of piling. In areas sensitive to noise or vibration augured piling techniques can be employed. The auger technique generates soil arisings that need to be disposed of in an approved manner. The conversion contractor will assess the ground conditions and determine the optimal piling technique for use at Uskmouth Conversion Project.

Uskmouth Conversion Project Construction Works

2.125 This construction assessment represents a robust assessment of a reasonable worst-case construction scenario which considers the construction phase of the Uskmouth Conversion Project that includes the Proposed Development and Power Station Upgrade over 18 months outlined in Table 2.3.

Table 2.3: Outline Construction Programme

Task	Indicative Dates	Activities
Enabling Works & Site Preparation	Q4 2020	Establish Construction Workforce, Facilities & Equipment Proposed Development Ground Preparation Works
Conversion & Plant Re-Lifting	Q1 2021 to Q2 2022	Proposed Development - Construction of Fuel Storage & Materials Handling Plant & Equipment. Power Station Upgrade Remove Redundant & Install New Plant & Equipment Power Station Upgrade Modify & Refurbish Existing Infrastructure, Plant & Equipment
Commissioning	Q2 2022 to Q3 2022	Plant & Equipment Testing

2.126 The high-level sequence of construction phase activities for the Proposed Development is likely to be:

- Establishing main site access for construction vehicles;
- Setting up of working areas and earthworks for the site;
- Infrastructure works, including construction of internal roads, drainage works and sewage pumping station;
- Construction of substructures;

- Erection of superstructures and building finishes; and
- Planting in accordance with the landscape strategy.

2.127 The Proposed Development site would be fenced during construction. It is the intention of the Applicant that the site would be registered under the Considerate Constructors Scheme.

Construction Working Hours

2.128 The majority of construction work will be undertaken within standard working hours would be 07:00 to 19:00 hours Monday to Friday, 07:00 to 13:00 hours on Saturday and at no time on Sundays or on public or bank holidays. Work outside these hours would be kept to a minimum, the local planning authority would be notified of any requirement to deviate from these indicative working hours.

2.129 The construction of the storage silos may require the slip-form casting technique. This construction activity is conducted continuously for the duration of the concrete pouring and progresses 24/7 until complete. The conversion contractor will provide further detail and timings.

Environmental Management During Construction

2.130 Construction would be undertaken in accordance with good practice environmental management procedures that will be set out in more detailed plans and method statements contained within a Construction Environmental Management Plan (CEMP) to be developed by the conversion contractor. The CEMP will set out the key management measures that contractors would be required to adopt and implement. These measures will be developed based upon those issues identified during the EIA process and set out in the topic chapters of this ES. They will include strategies and control measures for managing the potential environmental effects of construction and limiting disturbance from construction activities as far as reasonably practicable.

2.131 The CEMP would be prepared during the pre-construction period once a conversion contractor has been appointed. The final CEMP would be submitted to NCC for approval.

Construction Working Areas

2.132 All construction will be undertaken within the application red line boundary. There is no requirement for construction laydown beyond the area subject to this assessment.

2.133 A number of temporary facilities would be required during construction including:

- Temporary offices and welfare facilities;
- Storage area for materials, fuels, plant and equipment;
- Waste management areas; and
- Car parking facilities.

2.134 As far as possible, storage areas would be located away from site boundaries. Storage areas would be bunded to mitigate any spillages of potential contaminants and would not be located in areas of vegetation or habitat to be retained.

Construction Access

2.135 Access during construction will be via the main existing SUP site entrance, and pursuant to a CTMP approved by NCC prior to the commencement of any construction works.

2.136 Reasonable efforts would be taken to minimise the effects of traffic associated with the construction phase of the Uskmouth Conversion Project. Materials and resources would be sourced locally where possible and deliveries and construction traffic would endeavour to avoid travel during commuter peaks where practicable.

Construction Vehicles

2.137 The type of construction vehicles would be selected by the conversion contractor prior to and during the construction phase, the following vehicles would typically be used during construction:

- Excavators;
- Cranes: Required for assembly and erection;
- Low loaders: Required for transport of construction equipment and plant;
- Concrete lorries;
- Tipper lorries; and
- Construction staff vehicles.

2.138 It is anticipated that peak construction period for traffic would occur in months 9 and 10 of the 18-month construction programme and would require up to approximately 160 construction staff vehicles and up to 15 HGV deliveries, which equates to 30 movements per day. It is not expected that the construction phase would require abnormal loads. In the event that abnormal loads were required, the routing and nature of such loads would be agreed with the highway authority prior to work commencing. Further details of predicted traffic flows associated with the development are provided in Chapter 10 of this ES.

Drainage

2.139 The construction phase would incorporate pollution prevention and flood response measures to ensure that the potential for any temporary effects on water quality or flood risk from construction are reduced as far as practicable.

2.140 The following measures would be considered within the CEMP, and confirmed by the conversion contractor in light of Uskmouth Power Station site specific requirements:

- Installation of wheel washing facilities at the entrance to the construction compounds;
- The use of sediment fences along existing watercourses, when working close to water courses, to prevent sediment being washed into watercourses;
- Covers for lorries transporting materials to/from site to prevent releases of dust/sediment to watercourses/drains;
- Bulk storage areas to be secured and provided with secondary containment (in accordance with the Oil Storage Regulations and best practice);
- Storage of oils and chemicals away from existing watercourses, including drainage ditches or ponds;
- Concrete to be stored and handled appropriately to prevent release to drains;
- Preparation of a flood response plan in the event of flooding during construction works. This would include a procedure for securing or relocating materials stored in bulk;
- Treatment of any runoff water that gathers in the trenches to be pumped via settling tanks or ponds to remove any sediment;
- Obtain consent for any works (e.g. discharge of surface water) that may affect an existing watercourse. The conditions of the discharge consent to ensure that construction does not result in significant alteration to the hydrological regime or an increase in fluvial risk;
- Use of a documented spill procedure and use of spill kits kept in the vicinity of chemical/oil storage;

- Storage of stockpiled materials on impermeable surfaces to prevent leaching of contaminants with use of covers to prevent materials being dispersed and to protect from rain; and
- Stockpiled material to be kept to minimum sizes with gaps to allow movement of surface water runoff.

Construction Waste

2.141 A range of construction waste is anticipated, these include timber, concrete, inert waste, ceramic waste, insulation, plastic, packaging, metal, plaster and cement.

2.142 A Site Waste Management Plan would be developed for the development by the conversion contractor prior to the commencement of construction.

Use of Natural Resources

2.143 The CEMP will consider the main types and quantities of materials required for the development in order to understand the potential for sourcing materials (where possible) in an environmentally responsible way.

2.144 The Considerate Contractors Scheme includes measures relating to the use of resources, including minimising the use of water.

2.145 The construction process would consider the principles of good practice in soil handling and restoration set out in the following documents, to reduce wherever possible damage to soil materials during the construction process:

- Ministry of Agriculture, Fisheries and Food (MAFF) (2000) Soil Handling Guide; and
- Department for Food and Rural Affairs (Defra) (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (including the Toolbox Talks).

2.146 The EIA Directive also refers to the use of natural resources, in particular soil, land, water and biodiversity. Further details are provided in Chapter 7: Ecology and Chapter 5: Ground Conditions of this ES.

Residues and Emissions

2.147 Details of residues and emissions in relation to noise and vibration, air (e.g. dust), soil and water are set out in the relevant chapters of this ES. The project is not likely to give rise to heat or radiation emissions during the construction phase.

Utilities

2.148 On site electrical power will be utilised during the construction phase. It is not anticipated that new utility connections would be required for the construction compound.

Vulnerability to Accidents and Disasters – construction

2.149 Foreseeable construction hazards to the environment could include fire and flooding. Flood risk is assessed at Chapter 6 of this ES and recommendations are made for action plans in the event of flooding during construction. Fire risk is not a novel issue as the site is already covered by a fire protection plan. Fire risks will be addressed by the conversion contractor when formulating the CEMP.

Operation and Maintenance

2.150 The coal-fired Uskmouth Power Station operates under an Environmental Permit (EPR/LP3131SW) supplied by NRW. Uskmouth Power Station is in discussions with NRW to vary

the existing Environmental Permit to permit combustion of waste derived fuel pellets. It is not expected that the LPA will wish to duplicate those permitting controls.

2.151 Assessment of accidents and emergencies for the operational development is limited at this stage to an ERA which has been submitted with the Environmental Permit application. The ERA presents a high-level assessment of accident risks, that will then inform an AMP to be developed for the operational site. An AMP is a requirement for the Environmental Permit and would be developed and updated throughout the lifetime of the development.

2.152 As the proposed development would store waste derived fuel pellets, a Fire Prevention and Mitigation Plan (FPMP) is an operational requirement specified within the Environmental Permit. It is not the intention of this ES to duplicate requirements of the Environmental Permit, NCC are able to rely upon NRW to discharge the permit conditions competently. Therefore, the resilience of the design and the principal emergency management procedures are derived from the ERA.

2.153 The existing Uskmouth Power Station Environmental Management System (EMS) is consistent with the requirements of ISO 14001. Uskmouth Power Station is committed to continue to deliver this high standard of operational environmental management.

2.154 All waste produced by the plant is sent to a relevant waste operation.

2.155 Emissions from the activities shall be free from odour at levels likely to cause complaint beyond the site boundary, as perceived by an authorised officer of NRW.

2.156 Emissions from the activities shall be free from noise and vibration at levels likely to cause pollution outside the site, as perceived by an authorised officer of NRW.

Measures Adopted as Part of the Uskmouth Conversion Project

2.157 In order to avoid or reduce the environmental effects, a number of measures have been designed into the project. Details of these can be found within each topic chapter of the ES, and are summarised in Table 2.4 and Table 2.5.

Table 2.4: Schedule of Measures to be Adopted as Part of the Project during Construction

Topic	Proposed Measures during Construction
General / Design	Construction work will be kept away from sensitive riparian habitats at the periphery of the site. Construction laydown will be on existing operational areas of the power station site.
Historic Environment	Where archaeological remains are found, a programme of archaeological investigation would be agreed with the archaeological advisors to the planning authority. This would enable a better understanding of the presence, nature and date of any archaeological remains within those parts of the project site where construction activities are planned, and allow for the development of an appropriate strategy to avoid, reduce or offset any impacts that could occur as a result of construction. This programme should be a measure to offset the impact and effect on historic assets and archaeological remains if any are found to be present and to be at risk from construction impacts. Standard best practice measures would be implemented to ensure that construction noise impacts would be controlled and managed to avoid significant adverse effects.
Landscape and Visual	Former restored ash tip on the west side of the land holding to be planted with native trees and shrubs to help screen views of the proposed development.
Ecology and Nature Conservation	Habitat retention: • Lamby's Lake and bankside vegetation; • Interceptor ditch and a proportion of the short ephemeral/perennial vegetation; • Southern boundary ditch and adjoining neutral grassland and scrub; and

	• Mature trees and scrub. Habitat protection: • Construction fencing; • A toolbox talk from an Ecological Clerk of Works (ECoW) to the site construction team briefing them on all ecology and nature conservation requirements on site; • Oversight of all works potentially affecting sensitive ecological features by an ECoW; • Best practice measures to prevent and deal with spills and any other discharge that could enter the terrestrial or marine aquatic systems; and • Surface water management measures, with reference to industry and regulatory pollution prevention guidelines. Landscaping: • Restoration of grassland within the working area; • Establishment of grassland in part of the coal stockyard that is currently sparsely vegetated bare ground; and • Restoration of areas of regenerated neutral grassland areas between railway tracks that are disturbed during construction to equivalent value. Species protection: • Protection of marginal habitat around Lamby's Lake (used by nesting birds and grass snakes), dense boundary scrub outside but adjoining the application site (to maintain potential value for use by fauna) and boundary ditch habitats (which support an active water vole population).
Traffic & Transport	Develop and submit a Construction Traffic Management Plan to be agreed by NCC.
Noise and Vibration	Demolition and construction works would follow Best Practicable Means (BPM) outlined in Section 72 of the Control of Pollution Act 1974 (as amended) (HMSO 1974) to minimise noise and vibration effects. Communication with residents/businesses, standard construction hours (07:00 - 19:00), access routes, equipment, worksite, maintenance and piling all outlined in the CEMP to reduce noise and vibration effects.
Air Quality	Dust control measures for the site as a whole and for demolition, earthworks, construction and trackout activities specifically.
Geology, Hydrogeology and Ground Conditions	Adoption and compliance with Pollution Prevention Guidelines and Guidance for Pollution Prevention measures in addition to general good practice measures, a specific building related piling risk assessment and deep excavations phasing, as outlined in the CEMP.
Hydrology and Flood Risk	Implementation of a Surface Water Management Strategy to restrict mean annual run-off and mitigate against water pollution. Implementation of best practice measures detailed in NRW guidance, Pollution Prevention Guidance (which has been withdrawn but still provides useful measures), Ciria guidance and other on-site management strategies.
Climate Change	None
Population and Health	General good practice measures, as outlined in the CEMP.

Table 2.5: Schedule of Measures to be Adopted as Part of the Project during Operation

Topic	Proposed Measures during Operation
General / Design	The Proposed Development will be entirely contained within the existing Uskmouth Power Station Site. New plant items are sited away from sensitive habitats and existing operational areas including the coal stockyard will be returned to green infrastructure.
Historic Environment	None
Landscape and Visual	None
Ecology and Nature Conservation	Habitat protection: • Modern environmental controls in all operational areas; and • Application of existing pollution incident prevention and control procedures would apply to the redeveloped site. Landscaping:

	• Landscaping in areas of the coal stockyard located outside the application site.
Traffic & Transport	The operational SUP development seeks to replicate previous transport patterns, with all fuel pellets delivered by rail (coal delivery by rail). Rail delivery of fuel pellets to SUP will drastically reduce the number of HGV movements generated by SUP. SUP intends to adopt a 7-day working regime to replicate previous Uskmouth B operational activity, this is consistent with all operational power stations. It is anticipated that car parking be provided within the existing parking areas.
Noise and Vibration	The site will be subject to an NRW Environmental Permit Regulations (EPR) and therefore will need to demonstrate that Best Available Techniques (BAT) have been adopted for reducing environmental effects, including noise.
Air Quality	Embedded in the design (e.g. abatement technology) and controlled by the Environmental Permit required to operate.
Geology, Hydrogeology and Ground Conditions	None
Hydrology and Flood Risk	Implementation of: • Surface Water drainage Strategy – to manage flows and reduce risk of surface water flooding; • Flood Evacuation Plan – covering procedures to ensure safety of on-site users; • Drainage Maintenance Plan – to reduce the risk of surface water pollution and maintain the drainage network so that flood risk does not increase; • Flood Management Plan – includes flood warning measures to ensure the safety of on-site users, reduce risk of surface water pollution and maintain the drainage network so that flood risk does not increase; • Emergency Spillage Management Plan – includes emergency measures in the event that spillages should occur; and • Water Quality Monitoring Strategy – ongoing to reduce the risk of surface water pollution and maintain the drainage network so that flood risk does not increase.
Climate Change	None
Population and Health	Embedded in the design (e.g. abatement technology) and controlled by the Environmental Permit required to operate.

References

Department for Food and Rural Affairs (Defra) (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. [Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/716510/pb13298-code-of-practice-090910.pdf]

Ministry of Agriculture, Fisheries and Food (MAFF) (2000) Soils Handling Guide. [Available online at: https://webarchive.nationalarchives.gov.uk/20090317221756/http://www.defra.gov.uk/farm/environment/land-use/soilguid/index.htm]

3 NEED AND ALTERNATIVES CONSIDERED

Introduction

3.1 This chapter of the Environmental Statement (ES) provides a summary of the need for the Uskmouth Conversion Project and the main alternatives considered by the Applicant during the EIA process. It includes a summary of the reasons for the selection of the site, together with a description of the alternative design and layout options that have been considered. Further information is provided in the Planning Statement and Design and Access Statement that accompany the planning application.

3.2 Uskmouth Power Station remains a fully permitted coal fired power station that post conversion intends to provide baseload power for approx. 20 years during the transitional decarbonisation period (to 2050). The proposed Uskmouth Conversion Project will generate electricity by combusting waste derived fuel pellets instead of coal and includes a programme of works to return the existing plant to service and to extend its operating life.

3.3 During the operational phase of the Uskmouth Conversion Project, the power station will operate according to more stringent emissions limits than it has in the past and will need to adhere to the best available techniques (BAT) for controlling emissions under the Industrial Emissions Directive (IED)[1]. This will be achieved through the Power Station Upgrade by renovation, replacement and upgrading of parts of the combustion system to a modern ultra-low NOx pulverised fuel combustion system and the renovation and upgrading of flue gas cleaning systems.

3.4 Present day recycling techniques cannot economically recycle all waste into useful materials. Non-recyclable materials are presently sent to landfill, diverted from landfill to purpose-built energy from waste (EfW) facilities or exported for use abroad. This currently non-recyclable waste stream will be used as feedstock to produce the fuel pellets for the Uskmouth Conversion Project. The pellets will be made from equal proportions of biogenic waste material (paper and cardboard) and plastic waste. The proposed Uskmouth Conversion Project will facilitate an economically viable and sustainable way to recover energy from these waste materials by creating demand for a fuel which is derived from this waste and repurposing an existing coal fired power station to use that fuel.

3.5 The Uskmouth Conversion Project aims to:

(i) contribute to the UK being able to meet the continuing need for underlying 'on demand' generation which is required to supplement generation from intermittent renewable energy sources. Many renewable energy sources cannot be accurately predicted, and we do not currently have the infrastructure to store electricity at large scale to even out differences in generation and demand. Therefore, we need to extend the life of some power stations (or build new ones) which can produce electricity when it is needed. Undertaking this conversion means the power station can work alongside increasing generation from intermittent renewable sources to help make sure demand can be met.

[1] The Best Available Techniques (BAT) Reference Document (BREF) for Waste Incineration is part of a series of documents presenting the results of an exchange of information between EU Member States, the industries concerned, non-governmental organisations promoting environmental protection, and the Commission, to draw up, review and – where necessary – update BAT reference documents as required by Article 13(1) of Directive 2010/75/EU on Industrial Emissions (the Directive).

(ii) Repurpose existing infrastructure and land in a sustainable way and in doing so sustaining and creating long term direct and indirect employment required to convert and operate the power station

(iii) Offer local industry the opportunity to purchase more affordable and sustainable energy facilitating the growth of new and existing industries in the region and preserving and creating long term employment in those industries

(iv) Create demand for a waste derived fuel pellet and through sustainable use of high volumes of this fuel the project makes a significant contribution to diversion of non-recyclable waste away from landfill and provides an efficient and sustainable method for recovering value from the waste

(v) Stimulate the development of other old and outdated coal fired power stations across the UK and further afield to also be repurposed to use waste derived fuel following in the steps of the Uskmouth Conversion Project proving the concept

National Policy Context

3.6 Planning Policy Wales, Edition 10, December 2019 ('PPW') paragraph 1.2 states its primary objective is to ensure that the planning system contributes to the delivery of sustainable development and improves the social, economic, environmental and cultural wellbeing of Wales, as required by the Planning (Wales) Act 2015 and the Well-being of Future Generations (Wales) Act 2015.

3.7 PPW paragraph 3.7 – Environmental Sustainability - states developments should seek to maximise energy efficiency, the efficient use of other resources including land, maximise sustainable movement, minimise the use of non-renewable resources, encourage decarbonisation and prevent the generation of waste and pollution.

3.8 PPW paragraph 3.57 Supporting Infrastructure – states adequate and efficient infrastructure, including electricity and waste management, is crucial for economic, social and environmental sustainability. It underpins economic competitiveness and opportunities for households and businesses to achieve socially and environmentally desirable ways of living and working.

3.9 PPW paragraph 3.59 states development should be located so that it can be well serviced by existing or planned infrastructure. In general, this will involve maximising the use of existing infrastructure. Infrastructure choices should support decarbonisation, socially and economically connected places and the sustainable use of natural resources.

3.10 PPW Figure 10 illustrates the 'Waste Hierarchy'. It illustrates that 'Disposal', or the depositing of waste in landfill or incineration without energy recovery, as the least preferred method of dealing with waste.

3.11 Technical Advice Note 21: Waste, published February 2014 ('TAN 21') section 2.7.4 states that where wastes cannot be recycled, other waste recovery operations should be encouraged. Waste recovery operations result in waste that can serve a useful purpose by replacing primary fossil fuel materials (i.e. coal or gas) which would otherwise have been used to fulfil a particular function in the plant or in the wider economy.

Local Policy Context

3.1.1 Policy SP1 of the Newport Local Development Plan January 2015 – Sustainability – states proposals will be required to make a positive contribution to sustainable development by concentrating in sustainable locations on brownfield land within the settlement boundary. They will be assessed as to their potential contribution to:

1. The efficient use of land;

2. The reuse of previously developed land and empty properties in preference to greenfield sites;
3. Providing integrated transportation systems, as well as encouraging the co-location of housing and other uses, including employment, which together will minimise the overall need to travel, reduce car usage and encourage a modal shift to more sustainable modes of transport;
4. Reducing energy consumption, increasing energy efficiency and the use of low and zero carbon energy sources;
5. The minimisation, re-use and recycling of waste;
6. Minimising the risk of and from flood risk, sea level rise and the impact of climate change;
7. Improving facilities, services and overall social and environmental equality of existing and future communities;
8. Encouraging economic diversification and in particular improving the vitality and viability of the city centre and district centres;
9. Conserving, enhancing and linking green infrastructure, protecting and enhancing the built and natural environment;
10. Conserving and ensuring the efficient use of resources such as water and minerals.

Need for the Development

3.12 The need for the Uskmouth Conversion Project is supported by the following key areas of planning policy:

- Energy security – through the provision of a facility capable of generating sustainable baseload electricity, displacing primary fossil fuels;
- Energy recovery – through the provision of a facility that generates power by combusting waste derived fuel pellets; and
- Zero landfill – through the provision of a facility that creates market demand for fuel derived from non-recyclable waste materials, which would otherwise be destined for landfill or other forms of disposal.

3.13 Sustainability, including:

- Efficient use of land;
- Reuse of previously developed land and transport infrastructure;
- Integrated transport systems and encouraging the co-location of other uses;
- Use of low carbon energy sources;
- Minimisation, re-use and recycling of waste;
- Minimising risk of and from flood, sea level rise and impact of climate change;
- Improving facilities, services and overall social and environmental equality of existing and future communities;
- Encouraging economic diversification; and
- Conserving, enhancing and linking green infrastructure, protecting and enhancing the built and natural environment.

3.14 The need for the Uskmouth Conversion Project and the associated planning policies are discussed in more detail below.

Energy Security

3.15 SUP intends to contribute to UK energy security and the anticipated future increase in electricity demand to 2050 by meeting the continuing need for underlying baseload or 'on demand' generation. Technology has not yet provided a solution to large scale electricity storage to even-out differences in generation and demand. Therefore, there is an ongoing requirement for power stations to provide (baseload) electricity when it is needed. The SUP conversion would provide baseload electricity alongside increasing generation from intermittent renewable sources to ensure that increasing UK electricity demand can be met during this transition towards decarbonisation.

3.16 PPW anticipates up to 30% of Wales' electricity demand to be met by non-renewable sources at 2030 (50% currently, according to Energy Generation in Wales 2018) while the Welsh Government has set a target of a 95% reduction in greenhouse gas emissions by 2050.

3.17 National Grid's Future Energy Scenarios (National Grid, July 2019) anticipates demand for electricity to increase in the future beyond 2018 levels as follows:

Table 3.1: Forecast energy demand in 2050 (National Grid)

Electricity	2018	2050	% increase
Annual demand (TWh)	285	422	48%
Peak demand (GW)	60	82.5	37.5%

3.18 The increase in electricity demand stems from the target to achieve net zero by 2050, which will involve the need to decarbonise direct energy generation as well as the electrification of heating and transportation systems. The figures above demonstrate that considerably more new generation is required between now and 2050.

3.19 The waste used in fuel pellet production would otherwise have to be disposed of for a cost, or 'gate fee' – typically at landfill sites or energy from waste plants, with some being exported. The pellet producer can instead charge this gate fee to receive the raw waste materials needed for production of the fuel pellets.

3.20 Revenues are generated by the pellet producer upon receipt of the waste feedstock required for producing fuel pellets, allowing fuel pellets to be supplied to Uskmouth Power Station at a lower cost than other fuels at a comparable calorific value. When considered in terms of cost per calorific unit of energy, the waste derived fuel pellets are a fraction of the price of bio mass or coal.

3.21 Uskmouth Power Station also aspires to offer affordable and sustainable electricity to local industry. This provides an opportunity to bolster the local economy as local businesses have an opportunity to purchase power from Uskmouth cheaper than they could source otherwise.

3.22 The waste to be utilised for the production of the fuel pellets will be sourced within the UK. This is in contrast to conventional fuels utilised for utility scale thermal power generation, natural gas, coal or biomass which are now almost solely imported from international trade. In the case of natural gas, over 50% of gas utilised in the UK is imported by either pipeline or ship. Biomass wood pellets for a similar sized power plants are sourced almost exclusively from North America and Eastern Europe; domestic supply being limited by the available woodland resources of the UK. Following the decline of the deep mined coal industry in the UK, thermal coal used in the UK is typically imported from Russia, the USA, Columbia, South Africa and Australia among others. Utilising UK resources in the form of waste to produce fuel thus has a positive impact on energy security by reducing the need for the energy sector to import fuel to support flexible or baseload electricity generation.

Zero Landfill

3.23 The Uskmouth Conversion Project tackles the issue of waste by utilising a fuel derived from societal waste thus facilitating the diversion of non-recyclable waste from landfill

3.24 The Landfill Directive (1999/31/EC) aims to reduce reliance on landfill as a disposal option within the European Union (EU) and has recently been supplemented by the Waste Framework Directive (2008/98/EC), which introduced the principle of the 'Waste Hierarchy' identifying disposal in landfill or incineration without energy recovery as the least preferred method of dealing with residual waste. The Waste Framework Directive has influenced the waste planning polices of the UK and Welsh Governments in subsequent years, which follows the waste hierarchy principle.

3.25 Present day recycling techniques cannot economically recycle all waste materials and as a result there remains a significant quantity of material sent for disposal. These non-recyclable materials are presently sent to landfill or diverted from landfill to purpose-built Energy from Waste (EfW) facilities. This currently non-recyclable waste stream would be used as feedstock to produce the fuel pellets for Uskmouth Power Station. The Uskmouth Conversion Project will therefore contribute to the Welsh Government's "Towards Zero Waste (June 2010) Initiative", which sets out that there would be 'no additional landfill for municipal waste in Wales by 2026' and has a long-term aim of eliminating landfilling as far as possible.

3.26 The Uskmouth Conversion Project will therefore contribute to the UK aim of working to minimise where possible non-recyclable waste being sent to landfill. In the event that non-recyclable biodegradable waste was diverted to landfill this in turn could generate the greenhouse gases CO_2 and methane during decomposition. The generation of methane from waste decomposition is avoided in preference to the emission of CO_2 from combustion from the converted power station which, due to the significantly greater global warming potential of methane compared to CO_2, presents greenhouse gas emission benefits.

3.27 The operational Uskmouth Conversion Project is expected to consume approximately 900,000 Tonnes of waste derived fuel pellets annually. It would take about 1,300,000 Tonnes of waste to produce this quantity of pellets due to drying and processing during pellet production.

Climate Change

3.28 There is a requirement to reduce the emission of greenhouse gases as a result of electricity generation as part of wider climate change obligations (including the Paris Agreement 2015 and government declaration of a 'climate emergency' and the setting of a target of 'net zero' greenhouse gas emissions by 2050 in 2019 by the UK Government).

3.29 The overriding advice of the Committee on Climate Change is that significant improvements in climate policy are necessary if the UK is to adhere to its net-zero target. 'Net zero' means that any emissions are balanced by absorbing an equivalent amount from the atmosphere. The Committee has suggested that most sectors across the UK need to be close to net zero greenhouse gas emission without the reliance on carbon offsetting and international carbon credits. With respect to the power sector, the overarching advice from the Committee is for the immediate rollout of low-carbon generation (with low-carbon, non-renewable sources having a role in the transitionary period 2020 to 2050). The Committee also places strong emphasis on the requirement for the rapid and widespread rollout of carbon capture and storage (CCS) technology.

3.30 "On demand" generation, such as that produced by the Uskmouth Conversion Project, supplements generation from intermittent renewable sources. Many renewable sources cannot be accurately predicted, and we do not currently have the infrastructure to store electricity at large scale to even out differences in generation and demand. The Uskmouth Conversion Project can produce electricity when it is needed. Undertaking this conversion means the power station can work alongside increasing generation from intermittent renewable sources to help make sure demand can be met.

3.31 The fuel pellet developed for combustion at Uskmouth Power Station is comprised of non-recyclable materials in the following approximate proportions:

- 50% plastic derived waste containing carbon derived from fossil fuels; and

- 50% biogenic derived waste (paper, cardboard, wood), containing plant derived carbon.

3.32 The fuel pellets contain both 'biogenic' and 'fossil' carbon, both of which are released as CO_2 when the fuel is combusted.

3.33 Only fossil carbon is regarded as causing a net increase in atmospheric CO_2 concentration, having been released from long-term geological storage. Biogenic carbon was drawn down from the atmosphere in the form of CO_2 by parent plant material during growth prior to being released again during combustion. Over this short cycle, CO_2 released at point of use does not change the net atmospheric CO_2 concentration, provided that the carbon content is released as CO_2 and not as methane (CH_4, such as from a decomposition process).

3.34 In order to control other emissions species and thus further limit the impact to both climate and environment, the Power Station Upgrade of the Uskmouth Conversion Project will conduct refurbishment and upgrade works to existing equipment which cleans the power station's flue gas exhaust before release to the atmosphere. The conversion contractors will provide guarantees that the full combustion and emissions control system will meet the conditions of the Uskmouth Power Station Varied Environmental Permit provided by NRW.

Sustainability

3.35 The Well-Being of Future Generations (WBFG) Act 2015 requires "public bodies to do things in pursuit of the economic, social, environmental and cultural well-being of Wales in a way that accords with the sustainable development principle"

3.36 The first Well-Being Goal is "A Prosperous Wales - an innovative, productive and low carbon society which recognises the limits of the global environment and therefore uses resources efficiently and proportionately (including acting on climate change); and which develops a skilled and well-educated population in an economy which generates wealth and provides employment opportunities, allowing people to take advantage of the wealth generated through securing decent work.

Innovative, productive and low carbon society

3.37 The Uskmouth Conversion Project represents a world first, ground-breaking project to convert the coal fired Uskmouth Power Station to generate electricity through the combustion of waste derived fuel pellets.

3.38 The Uskmouth Conversion Project offers the opportunity to generate electricity in an economically viable and sustainable way for a further twenty years. The Uskmouth Power Station operation will be fully compliant with the latest applicable emissions requirements whilst delivering world leading levels of efficient energy recovery.

Using resources efficiently

3.39 The proposed Uskmouth Conversion Project involves the repurposing and reuse of existing valuable infrastructure resulting in carbon and material saving compared with the construction of purpose built EfW plants.

3.40 Traditional energy from waste facilities typically use input waste with a lower calorific value and operate at lower efficiencies. Input fuel for European energy from waste facilities averages 10 MJ/kg in comparison to the design value of 22 MJ/kg for the fuel pellets to be used at Uskmouth Power Station following conversion. Of the 122 existing municipal solid and other non-hazardous waste utilising power generation plants assessed in the Best Available Techniques (BAT) Reference Document for Waste Incineration (WI BREF 2019) all but 9 generating stations achieved a gross electrical efficiency of 30% or less. The converted Uskmouth Power Station will

be designed to achieve a gross electrical efficiency of 36.75%[2] , this is a 22.5% increase over the upper boundary of the range advised by the Waste Incineration Best Available Technology Conclusion (WI BATC 2019) for existing EfW plants of 20-30% and is greater than the upper boundary suggested for new EfW plants which is advised to be 25-35%.

3.41 The increased gross electrical efficiency of the Uskmouth Conversion ensures the greatest possible energy extraction from the combustion of fuel pellets.

Reuse of existing infrastructure to recover energy from presently non-recyclable waste

3.42 Fuel pellets are consistently manufactured to a controlled specification using a mixture of presently non-recyclable biogenic waste and plastic. The pellet manufacturing process sorts waste to a high degree of accuracy, extracting suitable waste materials that are dried, shredded, and pelletised into pellets which can be easily handled and transported. The technology and production process has been proven at an operational pellet plant in the Netherlands and new pellet plants are currently being brought into service in the UK.

Securing long term employment

3.43 Even though Uskmouth Power Station has not generated electricity on coal since a technical fault in April 2017, staff have been retained with critical skills for preservation and maintenance of the plant in readiness for a return to service. Uskmouth Power Station seeks to create further employment and support the local supply chain during the conversion and future operation.

3.44 The proposed Uskmouth Conversion Project aids in the transition of the local economy from one historically reliant on coal to a new sustainable future by supporting the local supply chain and providing local employment opportunities.

3.45 Uskmouth Power Station expect that jobs will be preserved and created by the conversion and operation of the existing Uskmouth Power Station and the construction and running of the fuel processing facilities within the UK. Local industry can also benefit from its close proximity to reliable, affordable and sustainable energy from the converted power station.

Technology roll out

3.46 The Uskmouth Conversion Project could be a template to improve the environmental performance of existing coal fired power stations destined for decommissioning in the UK, Europe and globally. This may have the added benefit of reducing the carbon intensity of electricity generation; potentially assisting in developing waste markets; reducing the disposal of plastic and other wastes at unmanaged waste sites.

Plastic Pollution

3.47 The need to address the problem of waste materials, and plastics in particular, in a way which optimises value recovery and responsible disposal is pressing. There is growing public concern regarding what happens to plastic waste, this will drive measures to reduce non-recyclable packaging and other forms of plastic waste in the medium term.

3.48 The reduction in non-recyclable packaging will take time and in the interim the production of waste derived fuel pellets to replace coal in existing power stations represents an economically viable

[2] 36.75% Gross Electrical Efficiency equates to a 33% Gross Net Net Electrical Efficiency design objective

and sustainable way to put these materials to good use rather than directing the waste to landfill, EfW plants or export.

Alternatives Considered

3.49 A number of alternative projects have been considered by the Applicant for the utilisation of the Uskmouth Power Station site for continued generation of electricity, these Alternatives are described below:

- Uskmouth Conversion Project, conversion of the existing coal fired power station to generate electricity through combustion of waste derived fuel pellets pulverised as a direct replacement for pulverised coal.
- Co-firing of biomass and coal in order to meet the proposed Emissions Performance Standard (EPS) for carbon emissions from new fossil fuel plant and existing coal plant equivalent to 450gCO_2/kWh generated from 2025.
- Biomass Conversion of the existing coal fired power station to combust 100% biomass in place of coal.
- Energy from Waste plant replacement of the existing coal fired power station with a new-build EfW plant, utilising existing land and grid connection capacity.
- Addition of Carbon Capture Storage and Utilisation equipment to the existing coal fired power station to meet the proposed Emissions Performance Standard (EPS) for carbon emissions from new fossil fuel plant and existing coal plant equivalent to 450gCO_2/kWh generated.
- Combined Cycle Gas Turbine (CCGT), replacement of the existing coal fired power station with a new build CCGT gas fired plant, utilising existing land and grid connection capacity.
- Decommissioning, the existing coal fired power station is completely decommissioned, and no alternative projects are developed at the site.

3.50 These alternative projects are discussed in greater detail below:

3.51 **The Uskmouth Conversion Project (I)** – this application relates to the operational development ("Proposed Development") required to facilitate the Uskmouth Conversion Project and as such the elements of operational development and the Uskmouth Conversion Project (which it enables) are described in detail throughout this ES

3.52 The proposed conversion of the existing coal fired power station to combust waste derived fuel pellets in place of coal would meet a number of societal needs t including:

- Energy security – through the provision of a facility capable of generating sustainable baseload electricity, displacing primary fossil fuels;
- Energy recovery – through the provision of a facility that generates power by combusting waste derived fuel pellets
- Zero landfill – through the provision of a facility that creates market demand for fuel derived from non-recyclable waste materials, which would otherwise be destined for landfill or other forms of disposal

3.53 Sustainability, including:

- Efficient use of land;
- Reuse of previously developed land and transport infrastructure;
- Integrated transport systems and encouraging the co-location of other uses;
- Use of low carbon energy sources;
- Minimisation, re-use and recycling of waste;

- Minimising risk of and from flood, sea level rise and impact of climate change;
- Improving facilities, services and overall social and environmental equality of existing and future communities;
- Encouraging economic diversification; and
- Conserving, enhancing and linking green infrastructure, protecting and enhancing the built and natural environment.

3.54 **Biomass & Coal Co-Firing Pulverised Fuel Conversion - Alternative (II)** - is described by the partial replacement of coal with biomass fuels. This practice is known as co-firing and has been undertaken at Uskmouth Power Station to some extent since 2005. In this scenario biomass fuels are either mixed with coal prior to co-pulverisation and injection into the plant's boiler where it combusts for heat release or, a number of the existing pulverisers and burners are modified to utilise biomass only with the remainder utilising coal only.

3.55 The UK Government recognise in their response to consultation that biomass co-firing alongside coal is amongst the most easily and cost effectively implemented option to decarbonise to the level prescribed by the EPS for power generators accredited under the UK Government Office of Gas and Electricity Markets (Ofgem) Renewable Obligation (RO) scheme. All three generating units at Uskmouth Power Station are accredited under the RO, having entered the scheme in 2005. Given the intended carbon emission intensity of no more than 450gCO_2/kWh generated, the quantity of biomass co-fired on an energy input basis would increase beyond levels previously used at Uskmouth Power Station to comply with this.

3.56 Given Uskmouth Power Station's history of biomass utilisation, pre-existing systems for storage and dosing of a portion of biomass alongside coal are available for reutilisation. Enhancement of these systems to meet the biomass co-firing levels required by the EPS would require modest modification, implemented at minimal cost, reduced engineering effort and short time frame. It is envisaged that any such modification would be implemented under Permitted Development Rights, not requiring planning permissions. Furthermore, Uskmouth Power Station is permitted to utilise a range of biomass fuels alongside coal and the enhancement of co-firing levels to meet the proposed EPS would not require a change to the environmental permit.

3.57 Given this, the co-firing of biomass alongside coal to meet the proposed EPS for coal fired plant post 2025 is thought to represent the most likely evolution of the baseline scenario for purposes of comparison. The alternative meets the societal needs associated with energy security and many of the sustainability benefits of the Uskmouth Conversion Project but does not but does not tackle the issue of beneficial utilisation of waste resources (energy recovery) or the drive towards zero landfill

3.58 **100% Biomass Pulverised Fuel Conversion - Alternative (III)** - is described by the complete replacement of all coal firing at the station in preference for biomass fuel. In this scenario, all existing combustion system elements are converted to handle, convey, pulverise and combust biomass only. In addition, the enlargement of biomass storage and handling facilities would be required. This expansion and enhancement work would be significantly more technically challenging and broad ranging than that implemented under Alternative (II).

3.59 It is anticipated that the Biomass conversion would not require planning permission. Given that the existing coalfired power station currently holds an Environmental Permit for biomass and coal co-firing, a variation to the Environment Permit to enable 100% biomass firing would be required.

3.60 The alternative meets the needs associated with energy security and many of the sustainability benefits of the Uskmouth Conversion Project but does not but does not tackle the issue of beneficial utilisation of waste resources (energy recovery) or the drive towards zero landfill.

3.61 Biomass depletes virgin materials and carries more costs over the fuel's lifecycle (e.g. the intensive activity involved in wood harvesting, pellet production and transportation from abroad.

3.62 **New Build Energy from Waste (EfW) - Alternative (IV)** - the wholesale replacement of the existing coal fired power station with a new-build, grate fired, Energy from Waste plant.

3.63 Given the design of typical EfW facilities, a plant of similar footprint to the existing coal fired power station could consist of a maximum of up to 4 boilers, each of thermal capacity around 60 MWth feeding one or two steam turbo-generators. If consuming Refuse Derived Fuel (RDF) with an average NCV of 12 MJ/kg, such a plant could consume circa 570 kT of RDF per year with a utilisation factor of 90%.

3.64 As previously stated, the Uskmouth Conversion would deliver a much higher energy conversion efficiency than a typical EfW facility. Therefore, the construction and operation of an EfW plant would result in an increase in the emission intensity per unit of electricity generated of both carbon and other permitted pollutant species.

3.65 The reduced thermal loading per unit footprint and likely gross electrical efficiency of ~30% would result in a facility with an installed gross electrical capacity of approximately 70 MWe. This is 150 MWe or 68% less than the proposed conversion.

3.66 As such, although the replacement of the existing coal fired power plant with a purpose built EfW facility could aid in the drive toward zero landfill by processing substantial quantities of waste, it would not re-utilise existing infrastructure with the exception of grid connection capacity and, potentially condenser cooling water systems. By comparing respective efficiencies an EfW plant would result in an increase in both carbon and other pollutant intensities per unit of electricity generated and would supply less flexible electricity than the proposed conversion.

3.67 In addition to the above, any proposed new build EfW, although capable of utilising a proportion of the existing rail infrastructure for waste deliveries would also require significant increases in waste delivery using HGV's by road with consequent impact to local residents and the environment.

3.68 It is for these reasons that Alternative (IV) was discounted.

3.69 **Coal with Carbon Capture Storage and Utilisation (CCSU) - Alternative (VI)** - is described by the addition of Carbon Capture Storage and Utilisation equipment to the existing coal fired power plant in order to capture carbon dioxide from the flue gases produced during coal combustion and sequester these emissions either by long term geological storage or by utilisation for product manufacture.

3.70 In their response to consultation BEIS ruled out mandating CCSU technology to be deployed on existing coal power stations. Their assessment suggests the likely relative cost of retro-fitting full-chain CCS on relatively inefficient and in some cases aged power stations will be prohibitive without significant support. In addition, the largely unproven nature of CCS technology at this scale, techno-commercial risk and development time required would lengthen project timelines substantially.

3.71 In their report "Building a low-carbon economy in Wales" the Committee on Climate Change (2017) ruled out the application of CCSU to fossil power stations in the region given that CO2 storage sites are not conveniently situated for sequestration of Welsh emissions.

3.72 It is for these reasons, and the fact that coal plus CCSU is unable to meet needs relating to the efficient utilisation of waste, that Alternative (V) has been ruled out for development at Uskmouth Power Station at this time.

3.73 **Combined Cycle Gas Turbine (CCGT) - Alternative (VI)** - is described by the replacement of the existing coal fired power plant with a new build CCGT fired plant, utilising existing land and grid connection capacity. Although this alternative would offer continued substantial, relatively efficient and flexible power generation from the site, the re-utilisation of infrastructure would not be feasible except in the case of specific elements of the grid connection capacity and potentially condenser cooling water systems (e.g. cooling towers). Furthermore, this alternative would not meet needs associated with the efficient utilisation of waste resources and zero landfill.

3.74 Given its high efficiency and low fuel carbon content, new build CCGTs are able to achieve a carbon intensity of around 380 g/kWh gross generation. This relatively low intensity will make CCGT the chosen technology from flexible fossil fuel fired generation within the transition period toward decarbonised electricity supply. This figure is comparable to the net carbon intensity of the proposed development which is circa 425 g/kWh gross generation, and the proposed development also offers significant added benefits in terms of re-use of existing infrastructure and efficient energy recovery from waste material.

3.75 It is for these reasons that Alternative (VI) CCGT was discounted.

3.76 **Decommissioning - Alternative (VII)** - this 'No Development' would entail the complete decommissioning of the power station, and no alternative projects are developed at the site.

3.77 The 'No Development' scenario is not considered appropriate given the established need for baseload electricity and efficient utilisation of waste resources and zero landfill.

3.78 In addition to this the Uskmouth Power Station site has an established grid connection making it a site of Critical National Infrastructure which would be used in all of the Alternatives outlined above. Uskmouth Power Station also has an existing rail connection which would be extensively utilised by Alternatives (I to V) and to a lesser extent by Alternative (VI) CCGT.

Design Evolution

3.79 The Uskmouth Conversion project has been under development since 2018. A description of the alternative design and layout options that have been considered during the development process is set out below.

Project Inception Stage:

3.80 In late 2018, there were three interdependent development projects underway required to facilitate the Uskmouth Conversion Project: These were led by different organisations who formed part of the integrated project team as follows.

3.81 Development Project 1- Led by Atlantis - Uskmouth Conversion Project to utilise where possible the existing infrastructure for the handling, milling and combustion of fuel; and to reuse or reconfigure existing equipment to accommodate the combustion of the waste-derived fuel pellet. The Uskmouth Power Station plant will be updated to efficiently combust the fuel pellets (and, if required, biomass) and to limit the emission of gaseous pollutants in line with the NRW Environmental Permit.

3.82 Development Project 2- Led by Simec Subcoal Fuels ("SSF") Limited – Newport Pellet Production Plant Utilising land adjacent to Uskmouth Power Station to erect a waste pelleting plant capable of producing approximately 550,000 tonnes of waste derived fuel pellets for combustion at the converted Uskmouth Power Station. For economic reasons associated with the local constraints on transportation of feedstock into the site, development 2 was not progressed. It was decided instead that all fuel should be imported by rail from remote pellet production facilities planned to be built in England.

3.83 Development Project 3 - Led by Liberty Steel Newport ("LSN") – LSN Access Road. Linking the Newport pellet plant and Uskmouth sites to existing road infrastructure. The access road was considered an important requirement to transport feed stock to the proposed SSF pellet production plant and fuel pellets to the Uskmouth Conversion Project. When the development of the SSF pellet production plant was stopped the road was no longer needed for the pellet plant and the project team decided not to continue development of the Access Road for the purpose of delivering fuel to the Uskmouth Conversion Project. It was decided that all fuel pellets should be delivered by rail in keeping with the historic operational delivery method

January 2019 Initial Designs

3.84 Figure 3.1 illustrates the initial design of the site to accommodate the change of fuel at the Uskmouth Power station site.

3.85 The early Uskmouth Conversion Project design comprised a number of Primary Storage Silos, two further Secondary Storage Silos and one or two Day Silos. In addition, a new facility to unload fuel pellets from road vehicles was considered as well as an expansion of the existing rail offloading facility.

3.86 The construction of a Pellet Production Plant was considered on land adjacent to the Uskmouth Power Station site, to the north of the existing road overpass and either side of the railway with road access through the adjoining Liberty Steel Newport (LSN) site, via the proposed new Access Road. The initial layout considered for the Pellet Production Plant is shown on Figure 3.2

3.87 The Pellet Production Plant would have comprised the following elements:

(i) Weighbridge

(ii) Storage bunkers and waste splitting building

(iii) Above ground conveyor system over railway

(iv) Waste processing building

(v) Waste drying and pelleting building

(vi) Two storage silos

3.88 The Pellet Production Plant would have received circa 750,000 Tonnes per annum of non-recyclable waste, imported by HGV via LSN Access Road. Of this, approximately 250,000 Tonnes of waste was likely to have been rejected as being unsuitable for pelletising and exported by HGV via LSN Access Road. This annual waste delivery would have generated circa 117 daily HGV movements.

3.89 These designs were progressed and updated over several months taking into account surveys and specialist inputs until the projects were mature enough to discuss externally through the pre-application advice process.

3.90 In January 2019 a draft route for the LSN Access Road was proposed that ran from Uskmouth Power Station and Pellet Production Plant through the Liberty Steel site linking up with Corporation Road further to the North.

May 2019 Pre-Application Advice Stage

3.91 On 7 May 2019 a pre-application advice enquiry was submitted to Newport City Council regarding the proposals. By this time the design for Brief 1 and Brief 2 was within the scope of fully formed and integrated project team including RPS.

3.92 Figure 3.3 illustrates an extract sketch from the Proposed Site Plan submitted with the pre-application advice enquiry.

3.93 The design shown on Figure 3.3 is similar to the previous iteration albeit that the road unloading facility has been relocated, while the silos have been modified slightly in terms of their arrangement.

December 2019 Environmental Impact Assessment Scoping Stage

3.94 By late 2019, it had been decided not to pursue the Pellet Production Plant for economic reasons and, as a consequence, LSN decided that the proposed Access Road would not be progressed at this juncture.

3.95 The EIA Scoping Request submitted 23 December 2019 described a project similar to that currently proposed with the following elements removed:

a) LSN Access Road

b) Pellet Production Plant

c) Fuel Pellet Road Unloading Facility

d) Secondary Storage Silos

e) Primary Storage Silos – reduced from 12 to 4.

Site Location Alternatives

3.96 This planning application is for the operational development to enable the Uskmouth Conversion Project. The conversion is located at the site of the existing coal fired Uskmouth Power Station. No alternative sites were considered for the Uskmouth Conversion Project because it is a refurbishment of existing power station infrastructure. The site benefits from the existing coal fired power station infrastructure. The project seeks to reuse as much of the existing site and plant as possible to generate 220 MWe, removing the need to utilise resources to construct an entirely new Power Station and associated infrastructure.

3.97 The site also benefits from an existing railway connection, enabling the sustainable transport of fuel pellets to the site.

3.98 The site also benefits from grid connection infrastructure being ready and in place to transmit to the national distribution network without the need for significant new high voltage electrical infrastructure.

3.99 Uskmouth Power Station is also aspiring to sell cheaper electricity to local industry. This provides an opportunity to bolster the local economy as local businesses have an opportunity to purchase power from Uskmouth than they could source otherwise.

References

Directive 1999/31/EC on the landfill of waste, OJ [1999] L182/1

Directive 2008/98/EC on waste, OJ [2008] L312/3

Towards Zero Waste – One Wales: One Planet, Welsh Assembly Government 2010

Planning Policy Wales Edition 10, Welsh Government 2018

Technical Advice Note 21: Waste, Welsh Government 2014

4 ENVIRONMENTAL ASSESSMENT METHODOLOGY

Introduction

4.1 This chapter of the Environmental Statement (ES) sets out the approach taken to the Environmental Impact Assessment (EIA) of the Uskmouth Conversion Project that would, together with the Power Station Upgrade, facilitate the delivery of the operational Uskmouth Conversion Project. The chapter also includes details of the consultation undertaken to date and the overall approach to the assessment of the likely effects of the project. Further details of topic specific methodologies, such as survey methods, are provided in each topic chapter of this ES.

Scoping

4.2 Scoping is the process of identifying the issues to be addressed during the EIA process. Scoping is an important preliminary procedure, which sets the context for the EIA process.

4.3 Regulation 14 of the EIA Regulations allows an applicant to request that the relevant planning authority sets out its opinion (known as a Scoping Opinion) as to the scope and level of detail of the information to be provided in the ES. Whilst there is no formal requirement in the EIA Regulations to seek a Scoping Opinion prior to submission of an ES, it is recognised as best practice to do so.

4.4 A scoping request was submitted to Newport City Council on 24 December 2019. The submitted scoping report is appended to this chapter (Appendix 4.1).

4.5 A Scoping Opinion was provided by the Newport City Council on 13 February 2020 and is appended to this chapter (Appendix 4.2). The consultees and/or organisations that responded as part of the scoping process comprise:

- Natural Resources Wales (NRW);
- Newport City Council (NCC) Highways;
- NCC Ecology; and
- NCC Regeneration/Planning.

4.6 Appendix 4.3 of this ES provides a more detailed overview of the key points raised in the Scoping Opinion or by consultees for each topic area, together with a response to these. The ES topic chapters also provide a summary of the key points raised during consultation with both statutory and non-statutory consultees.

4.7 The scoping exercise highlighted a number of areas that consultees wished to see addressed within the ES. Taking into account the nature, size and location of the project, the information provided within the Scoping Opinion and other consultation responses submitted throughout the EIA process, the following topics have been identified as requiring consideration within this ES:

- Geology, Hydrogeology and Ground Conditions (Chapter 5);
- Hydrology (Chapter 6);
- Ecology (Chapter 7);
- Landscape and Visual (Chapter 8);
- Historic Environment (Chapter 9);
- Traffic and Transport (Chapter 10);
- Noise and Vibration (Chapter 11);
- Air Quality (Chapter 12);

- Climate Change (Chapter 13); and
- Population and Health (Chapter 14).

Topics Scoped Out of the EIA Process

4.8 Taking into account the findings of the above studies, together with knowledge of the site and surrounding area, it is proposed that the following topics are not included in the scope of the ES:

- Planning Policy Context;
- Material Assets;
- Heat and Radiation including electromagnetic fields (EMF);
- Accidents and Emergencies;
- Agriculture and Soils; and
- Socio-economics.

4.9 These topics are discussed in further detail below.

Planning Policy Context

4.10 The ES provides an overview of relevant legislative and planning policy context within each topic chapter. The assessment has regard to national and local policy documents, where relevant. However, a separate chapter on Planning Policy Context is not provided in the ES. The draft guidance on EIA from the Department for Communities and Local Government 'EIA: A Guide to Good Practice and Procedures' (DCLG, 2006) (paragraph 155) states that there is no requirement to provide a discussion on planning policy or a sustainability appraisal within the ES. A separate Planning Statement has been submitted with the planning application and the environmental topic chapters within the ES each set out the policy context relevant to that topic.

Material Assets

4.11 The EIA Regulations refer to 'material assets', including architectural and archaeological heritage. The phrase 'material assets' has a broad scope, which may include assets of human or natural origin, valued for socio-economic or heritage reasons. Material assets are in practice considered across a range of topic areas within an ES, in particular the socio-economic and historic environment chapters. Socio-economics is discussed within this chapter (see below) and historic environment is included at Chapter 9 within the ES. Therefore, no separate consideration of material assets is provided within this ES.

Heat and Radiation including EMF

4.12 The Uskmouth Conversion Project would not be a significant emitter of heat or radiation to the environment. The existing on-site electricity transmission infrastructure would not be altered and is not a significant emitter of electromagnetic fields (EMF) that would be a risk to human health.

Accidents and Emergencies

4.13 The 2017 EIA Regulations state that the EIA must identify, describe and assess expected significant and insignificant effects arising from the vulnerability of the Uskmouth Conversion Project to risks of major accidents and disasters. Vulnerability of the development to major accidents introduced by the location should be covered as well as risks that are an inherent characteristic of the development.

4.14 The objective of such an assessment is to establish whether the Uskmouth Conversion Project increases risks to existing receptors or increases the sensitivity of those receptors to the

consequences of the hazard. For example, by introducing new links/pathways between a possible hazard and a receptor.

4.15 The coal-fired Uskmouth Power Station operates under an Environmental Permit supplied by NRW. The Uskmouth Conversion Project would require an Environmental Permit specific to the proposed operations. It is not proposed that the EIA duplicate those controls.

4.16 Therefore, the assessment of accidents and emergencies is limited to a risk assessment. The resilience of the design is set out and the principal emergency management procedures outlined and appended to Chapter 2 (Project Description) of this ES.

Agriculture and Soils

4.17 The Uskmouth Conversion Project site is a brownfield site in that it has previously been developed for the Uskmouth Power Station. As such, no significant effects in terms of agriculture and soils are anticipated and therefore further assessment has been scoped of the EIA process.

Socio-economics

4.18 The Uskmouth Conversion Project has the potential for significant beneficial economic effects at a local level in relation to employment opportunities and the purchasing of local services by construction workers. However, the effects during construction are not expected to be significant at the regional or national level and would be temporary.

4.19 The number of workers anticipated to be required for the construction of the Uskmouth Conversion Project would not put pressure on local facilities and any effects would be temporary in nature.

4.20 During operation, 50 to 100 staff would work at the site. Therefore, operational socio-economic effects are not likely to be significant beyond a local level. The relatively low number of operation staff are also not likely to put pressure on local facilities.

4.21 Overall, significant socio-economic effects at a regional or national level are not anticipated, and further assessment has been scoped out of the EIA process.

Environmental Assessment Methodology

Relevant EIA Guidance

4.22 The EIA process has taken into account relevant government or institute guidance, including:

- Welsh Office Circular 11/99: Environmental Impact Assessment;
- Department for Communities and Local Government (2014) Planning Practice Guidance at http://planningguidance.planningportal.gov.uk;
- Department of the Environment, Transport and the Regions (DETR) (1997) Mitigation Measures in Environmental Statements. HMSO;
- Highways Agency et al. (2008) Design Manual for Roads and Bridges, Volume 11, Section 2, Part 5. HA 205/08;
- Institute of Environmental Management and Assessment (2004) Guidelines for Environmental Impact Assessment;
- Institute of Environmental Management and Assessment (2011) The State of Environmental Impact Assessment Practice in the UK. Special Report;
- Institute of Environmental Management and Assessment (2015a) Environmental Impact Assessment: Guide to Shaping Quality Development;

- Institute of Environmental Management and Assessment (2015b) Climate Change Resilience and Adaptation;
- Institute of Environmental Management and Assessment (2016) Environmental Impact Assessment: Guide to Delivering Quality Development;
- Institute of Environmental Management and Assessment (2017) Environmental Impact Assessment: Assessing Greenhouse Gas Emissions and Evaluating their Significance; and
- Institute of Environmental Management and Assessment (2017) Health in Environmental Impact Assessment: A Primer for a Proportional Approach.

4.23 Other topic specific legislation and good practice guidance, including the Planning Policy Wales Edition 10 (December 2018) has been considered and details of these can be found in the topic chapters within this ES.

Key Elements of the General Approach

4.24 The assessment of each environmental topic forms a separate chapter of the ES. For each environmental topic, the following have been addressed:

- Methodology and assessment criteria;
- Description of the environmental baseline conditions;
- Measures adopted as part of the project, including mitigation and design measures that form part of the project;
- Identification of likely effects and evaluation and assessment of the significance of identified effects, taking into account any measures designed to reduce or avoid environmental effects which form part of the project;
- Identification of any further mitigation or monitoring measures envisaged to avoid, reduce and, if possible, remedy adverse effects (in addition to those measures that form part of the project); and
- Assessment of any cumulative effects with other developments planned in the area.

Methodology and Assessment Criteria

4.25 Each topic chapter provides details of the methodology for baseline data collection and the approach to the assessment of effects. Each environmental topic has been considered by a specialist in that area.

4.26 Each topic chapter defines the scope of the assessment within the methodology section, together with details of the study area, desk study and survey work undertaken and the approach to the assessment of effects. The identification and evaluation of effects have been based on the information set out in Chapter 2 (Description of the Proposed Development) of this ES, EIA good practice guidance documents and relevant topic-specific guidance where available.

Description of the Environmental Baseline Conditions (Including Future Baseline Conditions)

4.27 The existing and likely future environmental conditions in the absence of the Uskmouth Conversion Project are known as 'baseline conditions'. Each topic chapter includes a description of the current (baseline) environmental conditions. The baseline conditions at the site and within the study area form the basis of the assessment, enabling the likely significant effects to be identified through a comparison with the baseline conditions.

4.28 The baseline for the assessment of environmental effects is primarily drawn from existing conditions during the main period of the EIA work in the period 2018 to 2020.

4.29 The baseline for the assessment should represent the conditions that will exist in the absence of the Uskmouth Conversion Project at the time the development is likely to be implemented. The anticipated start date for construction is Q4 2020. The construction programme would be of approximately 18 months duration (including enabling works). First operation of Uskmouth Power Station's converted boilers has been assumed to take place in 2022. Further information about the construction programme assessed as part of the EIA process can be found in Chapter 2 (Description of the Proposed Development) of this ES.

4.30 Consideration has been given to any likely changes between the time of survey and the future baseline for the estimated 18 months construction of the project starting from Q4 2020 and for operation of the development from 2022. In some cases, these changes may include the construction or operation of other planned developments in the area. Where such developments are built and operational at the time of writing and data collection, these have been considered to form part of the baseline environment. Where sufficient and robust information is available, such as expected traffic growth figures, other future developments have been considered as part of the future baseline conditions. In all other cases, planned future developments are considered within the assessment of cumulative effects.

4.31 The Applicant considers that development and operation of the Uskmouth facility on a coal and biomass fuel mixture is more than theoretically possible and is the most likely and realistic future baseline without the conversion project. Chapter 3 (Need and Alternatives) of the ES describes seven development alternatives for the continued use of Uskmouth Power Station as an electricity generation facility. The coal and biomass fuel mixture baseline has been selected as the most likely to proceed, if the Proposed Development does not, as all consents and permits are currently in place to facilitate this option. Accordingly, this is the future baseline that has been used in this EIA process.

4.32 The consideration of future baseline conditions has also taken into account the likely effects of climate change, as far as these are known at the time of writing. This has been based on information available from the UK Climate Projections project (UKCP18), which publishes data regarding plausible changes in climate for the UK (Environment Agency and Met Office, 2018) and on published documents such as the UK Climate Change Risk Assessment 2017 (Committee on Climate Change, 2016).

4.33 Climate data from the UKCP18 database has been compiled for a 25 km^2 grid square containing the site, based on a medium emissions scenario (RCP6.0)[3]. Mean air temperature and annual average precipitation data for the period 2020 to 2079 have been used to inform the consideration of how environmental conditions may change at the site and within the study area in future.

Limitations of the Assessment

4.34 Each topic chapter identifies any limitations identified in the available baseline data and whether there were any difficulties encountered in compiling the information required.

Mitigation Measures Adopted as Part of the Project

4.35 During the EIA process, environmental issues have been taken into account as part of an ongoing iterative design process. The process of EIA has therefore been used as a means of informing the design.

[3] RCP (representative concentration pathway) is a greenhouse gas concentration trajectory for which four scenarios are modelled for UKCP18: RCP2.6, RCP4.5, RPC6.0 and RCP8.5.

4.36 The development assessed within this ES therefore includes a range of measures that have been designed to reduce or prevent significant adverse effects arising. In some cases, these measures may result in an enhancement of environmental conditions. The assessment of effects has taken into account measures that form part of the project.

4.37 The topic chapters set out the measures that form part of the Uskmouth Conversion Project and that have been taken into account in the assessment of effects for that topic. These include:

- Measures included as part of the project design (sometimes referred to as primary mitigation);
- Measures to be adopted during construction to avoid and minimise environmental effects, such as pollution control measures; and
- Measures required as a result of legislative requirements.

Assessment of Effects

4.38 The EIA Regulations require the identification of the likely significant environmental effects of the Uskmouth Conversion Project. This includes consideration of the likely effects during the construction and operational phases. The assessment is based on consideration of the likely magnitude of the predicted impact and the sensitivity of the affected receptor. The process by which effects have been identified and their significance evaluated is set out within each individual topic chapter. The overarching principles are set out below.

Sensitivity or Value of Receptors

4.39 Receptors are defined as the physical/biological resource or user group that would be affected by a project. For each topic chapter, baseline studies have informed the identification of potential environmental receptors. Some receptors will be more sensitive to certain environmental effects than others. The sensitivity or value of a receptor may depend, for example, on its frequency, extent of occurrence or conservation status at an international, national, regional or local level.

4.40 Sensitivity is defined within each ES topic chapter and takes into account factors including:

- Vulnerability of the receptor;
- Recoverability of the receptor; and
- Value/importance of the receptor.

4.41 Sensitivity is generally described using the following scale:

- High;
- Medium;
- Low; and
- Negligible.

4.42 In some cases, a further category of very high has been used.

Magnitude of Impact

4.43 Impacts are defined as the physical changes to the environment attributable to the project. For each topic, the likely environmental impacts have been identified. For each topic the likely environmental change arising from the project has been identified and compared with the baseline (the situation without the project). Impacts are divided into those occurring during the construction and operational phases.

4.44 The categorisation of the magnitude of impact is topic-specific but generally takes into account factors such as:

- Extent;
- Duration;
- Frequency; and
- Reversibility.

4.45 With respect to the duration of impacts, the following has been used as a guide within this assessment, unless defined separately within the topic assessments:

- Short term: A period of months, up to one year;
- Medium term: A period of more than one year, up to five years; and
- Long term: A period of greater than five years.

4.46 The magnitude of an impact has generally been defined using the following scale:

- High;
- Medium;
- Low; and
- Negligible.

4.47 In some cases, a further category of 'no change' has been used.

Significance of Effects

4.48 Effect is the term used to express the consequence of an impact (expressed as the 'significance of effect'). This is identified by considering the magnitude of the impact and the sensitivity or value of the receptor.

4.49 The magnitude of an impact does not directly translate into significance of effect. For example, a significant effect may arise as a result of a relatively modest impact on a resource of national value, or a large impact on a resource of local value. In broad terms, therefore, the significance of the effect can depend on both the impact magnitude and the sensitivity or importance of the receptor.

4.1.1 Significance levels are defined separately for each topic. Unless separately defined in topic chapters, assessments take into account relevant topic specific guidance, based on the following scale and guidance:

- Substantial: Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process with regard to planning consent. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer the most damaging impact and loss of resource integrity;
- Major: These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process;
- Moderate: These beneficial or adverse effects may be important but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision making if they lead to an increase in the overall adverse effect on a particular resource or receptor;
- Minor: These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project; and
- Negligible: No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

4.50 The terms minor, moderate, major and substantial apply to either beneficial or adverse effects. Effects may also be categorised as: direct or indirect; secondary; short, medium or long term; and permanent or temporary, as appropriate.

4.51 Each topic defines the approach taken to the assessment of significance. Unless set out otherwise within the chapter, topic chapters use the general approach set out in Table 4.1. For some topics, a simplified or quantitative approach is considered appropriate.

Table 4.1: Assessment Matrix

Sensitivity	Magnitude of Impact				
	No Change	Negligible	Low	Medium	High
Negligible	No change	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	No change	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	No change	Negligible or Minor	Minor	Moderate	Moderate or Major
High	No change	Minor	Minor or Moderate	Moderate or Major	Major or Substantial
Very high	No change	Minor	Moderate or Major	Major or Substantial	Substantial

4.52 Unless set out otherwise in each topic chapter, effects assessed as moderate or above are considered to be significant in terms of the EIA Regulations within this assessment.

Further Mitigation and Future Monitoring

4.53 Where required, further mitigation measures have been identified within topic chapters. These are measures that could further prevent, reduce and, where possible, offset any adverse effects on the environment.

4.54 Where relevant and necessary, future monitoring measures have been set out within the topic chapters.

Assessment of Cumulative Effects

4.55 The EIA Regulations require consideration of cumulative effects, which are effects on a receptor that may arise when the project is considered together with other proposed developments in the area.

4.56 The cumulative effects of the project in conjunction with other proposed schemes have been considered within each topic chapter of the ES. Other developments considered within the cumulative assessment include those that are:

- Under construction;
- Permitted, but not yet implemented;
- Submitted, but not yet determined; and
- Identified in the Development Plan (and emerging Development Plans – with appropriate weight being given as they move closer to adoption) recognising that much information on any relevant proposals will be limited.

4.57 It is noted that developments that are built and operational at the time of submission are considered to be part of the existing baseline conditions.

4.58 Details of the developments included as part of the cumulative assessment are provided in Figure 4.1.

Inter-relationships

4.59 Each topic chapter considers whether or not there are any inter-related effects with other topics included within the EIA that have not already been considered in order to identify any secondary, cumulative or synergistic effects.

Summary Tables

4.60 Summary tables have been used to summarise the effects of the project for each environmental topic.

Consultation

4.61 The project team has undertaken consultation with, or requested information from, a number of organisations, including (but not limited to):

- Chapter 5 – Geology and Hydrology: NCC;
- Chapter 6 – Hydrology: NRW;
- Chapter 7 – Ecology: NCC and NRW;
- Chapter 8 – Landscape and Visual Resources: NCC;
- Chapter 9 – Historic Environment: NCC;
- Chapter 10 – Traffic and Transport: Local Highway Authority;
- Chapter 11 – Noise and Vibration: NCC;
- Chapter 12 – Air Quality: NRW;
- Chapter 13 – Climate Change: NCC; and
- Chapter 14 – Population and Health: NCC.

Local Planning Authority

4.62 The project lies within the administrative area of NCC. The EIA process has been informed by regular pre-application meetings discuss key aspects of the project as follows:

- Simec Uskmouth Power Station Ltd. meetings with NRW on 16 April 2018;
- Simec Uskmouth Power Station Ltd. meeting with NCC on 11 September 2018;
- Simec Uskmouth Power Station Ltd. meetings with NRW on 18 October 2018;
- Simec Uskmouth Power Station Ltd. meetings with NRW on 28 March 2019;
- A pre-application meeting held at Simec Uskmouth Power Station Ltd. on 9 May 2019;
- Simec Uskmouth Power Station Ltd. meetings with NRW on 15 May 2019;
- Simec Uskmouth Power Station Ltd. meetings with NRW on 29 May 2019;
- Simec Uskmouth Power Station Ltd. meeting with NCC on 25 September 2019;
- Simec Uskmouth Power Station Ltd. meetings with NRW on 24 October 2019; and
- Simec Uskmouth Power Station Ltd. meeting with NCC on 19 December 2019.

4.63 Further to the above, topic specialists have consulted the relevant experts within NCC and their consultees on their approach to the EIA through the scoping process. Further information regarding consultation with topic specific organisations is detailed within the individual topic chapters.

4.64 Meetings have been undertaken throughout the EIA and design process in order to agree methodologies and request and share information regarding existing environmental conditions. Due to the restrictions upon movement related to COVID-19 (Coronavirus) the public engagement events that were being planned by Uskmouth Power Station could not proceed, Instead Uskmouth Power Station will host additional information sources on Simec Atlantis Energy's website.

Public Consultation

4.65 The applicant has engaged with the local community within the restrictions imposed by COVID-19 in order to inform local people about the project, to explain the development and its likely effects and to take on board any concerns or issues raised. Pre-application Consultation (PAC) was conducted as follows:

Online pre-application Consultation

4.66 Uskmouth Power Station hosted pre-Application information (including a virtual tour) on the Simec Atlantis Energy website in line with the May 2020 Welsh Government revised pre-application consultation regulations. The pre-application consultation document suite was hosted at:

https://simecatlantis.com/uskmouth-power-station-planning-application/

4.67 The pre-application consultation was also discussed within the following external publications:

- South Wales Argus 29th May 2020.
- Wales Online 1st June 2020.

4.68 Following feedback from Nash Community Council (the local community council) and given the inability to hold a physical public consultation event, Uskmouth Conversion Project team organised a 'live' Online Local Residents Consultation Event, this involved the Uskmouth Conversion Project team delivering a presentation with live audio and video followed by a Q&A session during which local residents had the opportunity to send text questions to the team via web chat, the Uskmouth Conversion Project team provided verbal answers. This action exceeds the minimum requirements for PAC.

4.69 The online presentation was held on Thursday 25th June 2020 from 13.00 to 14.30 and was publicised by postal invites delivered to 76 dwellings in the village of Nash and surrounding area on 23rd June 2020

Specialist Consultees Consultation

4.70 Developers are also required to undertake pre-application consultation with "specialist consultees". The following were consulted on 29th May 2020:

- Natural Resources Wales;
- Cadw;
- Dwr Cymru Welsh Water;
- Newport City Council as the Highways Authority.

4.71 Responses from Cadw and DWCC were received by the deadline of 29th June 2020. Uskmouth Conversion Project has been in contact with NRW Development, who provided their response on 29th July. NCC Local Highways Authority has not provided a PAC response to date. Several attempts were made to contact Local Highways Authority but were unsuccessful in obtaining a consultation response.

Pre-Application Consultation Report (PAC Report)

4.72 A pre-application consultation report (PAC Report) is provided in the full planning application detailing how comments received have been taken into account by the design team in the preparation of the full planning application and, where relevant, in the EIA process.

References

Committee on Climate Change (2016) UK Climate Change Risk Assessment 2017.

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Highways Agency, Transport Scotland, Welsh Assembly Government and the Department for Regional Development Northern Ireland (2008) Assessment and Management of Environmental Effects. Design Manual for Roads and Bridges, Volume 11, Section 2, Part 5. HA 205/08.

Institute of Environmental Management and Assessment (2004) Guidelines for Environmental Impact Assessment.

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Institute of Environmental Management and Assessment (2015a) Environmental Impact Assessment Guide to Shaping Quality Development.

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Ministry for Housing, Communities and Local Government (2019a) Planning Practice Guidance. Available at: http://planningguidance.planningportal.gov.uk

Ministry of Housing, Communities and Local Government (2019b) National Planning Policy Framework.

Welsh Office (1999) Circular 11/99 Environmental Impact Assessment

Welsh Government (2017) Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017

Welsh Government (2018) Planning Policy Wales Edition 10

5 GEOLOGY, HYDROGEOLOGY AND GROUND CONDITIONS

Introduction

5.1 This chapter of the Environmental Statement (ES) assesses the likely environmental effects of the Uskmouth Conversion Project with respect to controlled waters and contaminated land. This chapter describes: the methods used to assess the effects; the baseline conditions existing at the site and its vicinity; the mitigation measures adopted as part of the Uskmouth Conversion Project; specific mitigation measures required to prevent, reduce or offset any significant adverse effects; and the likely residual environmental effects after implementation of these measures.

Assessment Methodology

5.2 The methodology used in this chapter follows the General Approach described in Chapter 4 of this ES, and in addition, considers the following specific Planning Policy Context and Guidance.

Planning Policy Context

5.3 The principal legislation regarding the protection of specific water resources, water quality standards, land contamination and policy relevant to the Uskmouth Conversion Project is set out in the following primary European legislation:

- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (Water Framework Directive (WFD)).
- Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration (daughter to 2000/60/EC) (Groundwater Daughter Directive).
- Directive 2013/39/EU of the European Parliament and of the Council of 12 August 2013, amending Directives 2000/60/EC and 2008/105/EC as regards priority substances in the field of water policy.
- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and wildlife and fauna (the Habitats Directive).

5.4 The following European Directives are implemented through Acts and Regulations in the United Kingdom by the UK Parliament and, for specific devolved competencies, by the Welsh Government:

- Environmental Protection Act 1990: Part IIA (2012).
- Environment Act (1995).
- Contaminated Land (Wales) Regulations (2006) and Amendment (2012).
- Groundwater (England and Wales) Regulations (2009).
- Water Resources Act (1991).
- Water Act (2014).
- Groundwater Regulations (1998), which transpose the EC Groundwater Directive 80/68/EC into UK law.
- Water Environment (Water Framework Directive) (England and Wales) Regulations (2003), which transpose the Water Framework Directive 2000/60/EC into UK law.

- Waste Framework Directive (2008) as transposed via The Waste (England and Wales) Regulations 2011.
- Environmental Permitting (England and Wales) Regulations (2010).
- Hazardous Waste (England and Wales) (Amendment) Regulations (2016).

5.5 In Wales, Part IIA of the Environmental Protection Act (EPA), as introduced by Section 57 of the Environment Act 1995, came into effect in September 2001 with the implementation of the Contaminated Land Regulations 2000 (now superseded by the Contaminated Land (Wales) Regulations 2006 and Amendment 2012). Under Part IIA of the EPA, sites are identified as 'contaminated land' if they are causing, or if there is a significant possibility of causing, significant harm to human health or significant pollution of controlled waters. 'Controlled Waters' are defined as including both surface waters and groundwater within an aquifer (Water Resources Act (1991)).

5.6 Planning Policy Wales (PPW10) sets out the Welsh Government's national policies on different aspects of land use planning (Welsh Government, 2018). PPW10 provides general guidance and information with regards to development planning throughout Wales. This document provides extensive information on the planning objectives for Wales and puts particular emphasis on recognising the special characteristics of places through implementation of green infrastructures and their integration with development.

5.7 The Local Development Plan (LDP) for Newport was adopted on 27 January 2015 (Newport City Council, 2015). The LDP sets out objectives to be achieved and establishes Spatial and Strategic Policies. The Local Planning Policies concerning Controlled Waters and Ground Conditions include:

- SP1 Sustainability: Development proposals will be required to make positive contribution to sustainable development by concentrating development in sustainable locations on brownfield land within the settlement boundary.
- SP4 Water Resources: Development proposals should minimise water consumption, protect water quality during and after construction and result in no net increase in surface water run-off through the sustainable management of water resources.
- SP13 Planning Obligations: Development proposals will be required to help deliver more sustainable communities by providing or making contributions to local and regional infrastructure in proportion to its scale and the sustainability of its location.

5.8 The LDP General Policies guide all development proposals and relevant to Controlled Waters and Ground Conditions require consideration of Climate Change, Natural Environment and Environmental Protection and Public Health.

Relevant Guidance

5.9 The following guidance has been referred to in the context of best practice for the management of Controlled Waters and Ground Conditions:

- Guidance for Pollution Prevention (GPPs) and Pollution Prevention Guidelines (PPG) issued by Natural Resources Wales (NRW).
- Welsh Local Government Association (WLGA) and Environment Agency (2012) Development of Land Affected by Contamination: A Guide for Developers.
- Defra and Environment Agency (2004) Model Procedures for the Management of Land Contamination – Contaminated Land Report 11.
- CIRIA (1996) Construction Industry Research and Information Association R132: A Guide for Safe Working on Contaminated Sites.
- CIRIA (2001) Contaminated land risk assessment: A guide to good practice (C552).

- CIRIA (2007) Assessing risks posed by hazardous ground gases to buildings (C665).
- CIRIA (2014) Asbestos in soil and Made Ground: A guide to understanding and managing risks (C733).
- CL:AIRE (2011) The Definition of Waste: Development Industry Code of Practice v2.

Study Area

5.10 The area forming the basis of the assessment undertaken is defined by the redline site boundary for the Uskmouth Power Station. SIMEC Atlantis Energy Limited ("Atlantis") are the developer of the Uskmouth Conversion Project. The Uskmouth Power Station located near Newport in South Wales is owned by SIMEC Uskmouth Power Limited a wholly owned subsidiary of Atlantis.

5.11 The area included in this assessment comprises the site, relevant water bodies, water features and land which could be potentially be affected by the Uskmouth Conversion Project.

Baseline Methodology

5.12 The assessment has been undertaken in accordance with International Standards ISO 21365:2019 and is considered suitable to meet the initial requirements of planning as outlined within the National Planning Policy Framework (NPPF). The assessment also reflects the requirements of the guidance within Model Procedures for the Management of Contaminated Land (CLR11).

5.13 Information from the baseline conditions relevant to the assessment were obtained primarily from the following sources:

- A review of environmental records from local, regional, and national agencies. The information is derived from Envirocheck Reports provided by Landmark Information Group, Ref. 228896479_1_1. Please note the terms and conditions attached to the supply of data from Landmark.
- An assessment of potential sources of contamination on and surrounding the site, from a review of historical maps and aerial photographs dated from 1883; information also sourced from Landmark.
- A review of the site geology using published maps, borehole records and other relevant information.
- Permit Variation Supporting Information (RPS, 2019) including previous site monitoring and information associated with Site Protection and Monitoring Programme reports, Site Condition Report and Industrial Emission Directive Baseline Report.

Consultation

5.14 Table 5.1 sets out points raised by Newport City Council and other statutory Consultees in the EIA Scoping Opinion report. Responses have been provided against each comment to demonstrate how the issue has been addressed in the assessment.

Table 5.1: Consultation Responses Relevant to this Chapter

Date	Consultee and Issues Raised	How / Where Addressed
13 February 2020	Newport City Council EIA Scoping Opinion: We reiterate the use of the following documents to inform the ES:	
	i. Follow the risk management framework provided in CLR11, Model Procedures for the Management of Land Contamination, when dealing with land affected by contamination.	National Policies and specific guidance documents related to the management of land contamination have been used to assess the risks

ii. Refer to the Environment Agency's 'Guiding Principles for Land Contamination' for the type of information that we require in order to assess risks to controlled waters from the site. The Local Authority can advise on risk to other receptors, such as human health. iii. Refer to the Environment Agency's (2018) 'Approach to Groundwater Protection' Pollution Prevention	posed to controlled waters, including surface waters and groundwater, and human health.
1.1.18 We advise at this stage that any measures being proposed from the assessment to avoid and minimise significant environmental effects during construction, such as pollution control measures, should have regard to the relevant Pollution Prevention Guidelines available at www.netregs.org.uk	PPGs and GPPs are considered in this assessment and included within the Construction Environmental Management Plan (CEMP).
1.1.19 Pollution prevention measures and pollution incident response plans for when the site is operational should also be included (or referred to) in the ES, particularly regarding the delivery and storage of chemicals and fuels. Again, we advise referring to www.netregs.org.uk	The site currently operates under Environmental Permitting Regulations and storage of chemicals and fuel is managed as part of its activities.
1.1.20 Given the proposed storage and use of a large quantity of fuel once the site is operational, consideration should be given to the containment of firewater and whether this could be contained on site/within existing drainage, to prevent release to the environment through surface water lines.	Drainage network currently takes into account storage fuel, previously using coal, at the same location as the proposed waste derived fuel pellets. Firewater and drainage are considered in the assessment of potential effects to the Environment.

Assessment Criteria and Assignment of Significance

5.15 Identification of sensitive receptors has been carried out through desk study and consultation with stakeholders.

5.16 In compliance with the IEMA Quality Mark the sensitivity of the baseline and magnitude of the impact is clearly defined. A qualitative assessment of receptor sensitivity/value described in Table 5.2 and magnitude of impact described in Table 5.3 is based on professional judgement and guidelines for IEA.

5.17 The sensitivity or value of a receptor is dependent on its importance (at a local, national or European scale), its rarity and its potential for substitution.

5.18 The magnitude of a predicted impact is dependent on its size (scale/extent), duration, timing (e.g. seasonality) and frequency (permanent, seasonal etc.).

Receptor Sensitivity/Value

Table 5.2: Example Definitions of Sensitivity or Value

Sensitivity	Typical Descriptors
Very High	Very high importance and rarity, international scale and very limited potential for substitution. **Surface water:** - European Community (EC) Designated Salmonid/Cyprinid fishery. - WFD Class 'High'. - Site protected/designated under EC or UK wildlife legislation (Special Area of Conservation (SAC), Special Protection Area (SPA), Sites of Special Scientific Interest (SSSI), Water Protection Zone (WPZ), Ramsar Site, salmonid water/species protected by EC legislation).

	Groundwater: - Principal aquifer providing a regionally important resource or supporting site protected under EC and UK Habitat legislation. - Groundwater Source Protection Zone (SPZ1). **Geology (solid geology):** - Very rare and of very high international, national and regional geological/geomorphological importance with no potential for replacement (e.g. designated sites of national importance including SSSI, active quarries and mining activities of national importance). **Soils (superficial geology/topsoil and subsoils):** - Soils of very high importance and rarity, international scale and very limited potential for substitution.
High	High importance and rarity, national scale, and limited potential for substitution. **Surface water:** - WFD Class 'Good'. - Major Cyprinid Fishery. - Species protected under EU or UK habitat legislation. **Groundwater:** - Principal aquifer providing locally important resource or supporting river ecosystem. - SPZ 2. **Geology (solid geology):** Of medium national and high regional geological/geomorphological importance with limited potential for replacement (e.g. currently non-designated Geological Conservation Review (GCR) site, regionally important site, active quarries and mining activities of regional or local importance). **Soils (superficial geology/topsoil and subsoils):** Soils of high importance and rarity, national scale and limited potential for substitution.
Medium	High or medium importance and rarity, regional scale, limited potential for substitution. **Surface water:** - WFD Class 'Moderate'. **Groundwater:** - Aquifer providing water for agricultural or industrial use with limited connection to surface water. - SPZ 3. **Geology (solid geology):** - Of low regional and high local geological/geomorphological importance with some potential for replacement (e.g. allocated Regionally Important Geological and Geomorphological Sites (RIGS) or recommended RIGS). **Soils (superficial geology/topsoil and subsoils):** - Soils of medium importance and rarity, regional scale, limited potential for substitution.
Low	Low or medium importance and rarity, local scale. **Surface water:** - WFD Class 'Poor'. **Groundwater:** - Unproductive strata. **Geology (solid geology):** - Of local geological/geomorphological importance with potential for replacement (e.g. non-designated exposure/former quarries and mining activities). **Soils (superficial geology/topsoil and subsoils):** - Soils of low importance and rarity, local scale.
Negligible	Very low importance and rarity, local scale. **Surface water:** - Non-WFD surface water. **Groundwater:** - Aquiclude. **Geology (solid geology):** - Of little local geological/geomorphological interest. **Soils (superficial geology/topsoil and subsoils):** - Soils of very low importance and rarity, local scale.

Magnitude of Impact

Table 5.3: Example Definitions of Magnitude

Sensitivity	Typical Descriptors
High	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements (Adverse). **Surface water:** - Failure of both soluble and sediment-bound pollutants to comply with Environmental Quality Standards (EQS) values. - Increased frequency and magnitude of pollution from a spillage. - Loss or extensive change to a fishery. - Loss or extensive change to a designated Nature Conservation Site. **Groundwater:** - Loss of or extensive change to an aquifer. - Increased frequency and magnitude of pollution from spillages. - Loss of, or extensive change to, groundwater supported designated wetland. **Geology (solid geology):** - The Proposed Development is very damaging to the geological environment/soils resource of the area. May result in loss or damage to areas designated as being of regional or national geological interest. Loss of resource and/or quality and integrity of resource. Severe damage to key characteristics, features or elements. Impacts cannot be mitigated for (e.g. destruction of a designated site (SSSI or RIGS)). **Soils (superficial geology/topsoil and subsoils):** - Loss of soils resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements.
	Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality (Beneficial). **Surface water:** - Improvement of WFD status. - Removal of existing polluting discharge or removing the likelihood of polluting discharges occurring to a watercourse. **Groundwater:** - Removal of existing polluting discharge to an aquifer and removing the likelihood of polluting discharges occurring. - Recharge of an aquifer. **Geology (solid geology and soils):** - The Proposed Development is very beneficial to the geological/hydrogeological environment/soils resource of the area. There are very few proposals likely to merit this score, but it may be that the proposals result in the exposure of geological formations that may become of significant regional and or national interest.
Medium	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements (Adverse). **Surface water:** - Failure of either soluble or sediment-bound pollutants to comply with EQS values. - Increased frequency or magnitude of pollution from spillages. - Partial loss in productivity of a fishery. **Groundwater:** - Partial loss or change to an aquifer. - Increased frequency or magnitude of pollution from spillages. - Partial loss of the integrity of groundwater supported designated wetlands. **Geology (solid geology):** - The Proposed Development may adversely affect the geological/hydrogeological conditions/soils resource existing at the site but would not result in the loss of, or damage to, areas designated as being of regional or national geological interest. Loss of resource, but not adversely affecting the integrity. Partial loss of/damage to key characteristics, features or elements. Some mitigation may be possible but would not prevent scarring of the geological environment, as some features of interest would be lost or partly destroyed. **Soils (superficial geology/topsoil and subsoils):**

	- Loss of soils resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, feature or elements.
	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (Beneficial). **Surface water:** - Improvement of WFD status. - Reduction in existing spillage risk by 50% or more (when existing spillage risk >1% annually). **Groundwater:** - Removal of existing polluting discharge to an aquifer or removing the likelihood of polluting discharges occurring. **Geology (solid geology and soils):** - There is moderate benefit to the geological/hydrogeological environment/soils resource of the area as a result of the Proposed Development. There are very few proposals likely to merit this score, but it may be that the project results in the exposure of geological formations that may become of significant interest or a brownfield contaminated site that is or is likely to be determined as Contaminated Land would be remediated by the Proposed Development.
Low	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements (Adverse). **Surface water:** - Frequency or magnitude of pollution from spillages resulting in intermittent failure of either soluble or sediment-bound pollutants with EQS values. **Groundwater:** - Potential low risk of pollution to groundwater from routine runoff. - Minor effects on groundwater supported wetlands. **Geology (solid geology):** - The proposals would not affect areas with regional or national geological interest/soils resource but may result in the loss of or damage to areas of local geological/soils resource interest. Cannot be completely mitigated for but opportunities exist for the replacement of lost or damaged areas which may be of similar local geological/soils interest. **Soils (superficial geology/topsoils and subsoils):** - Some measurable change in soil attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring (Beneficial). **Surface water:** - Improvement of some determinands used in WFD status assessment. - Calculated reduction in existing spillage risk by 50% or more (when existing spillage risk is <1% annually). **Groundwater:** - Calculated reduction in existing spillage risk by 50% or more to an aquifer (when existing spillage risk is <1% annually) **Geology (solid geology and soils):** - Minor benefit to the geological/hydrogeological environment/soils resource. The proposals may result in the exposure of geological formations that may become of significant local interest.
Negligible	Very minor loss or detrimental alteration/positive addition to one or more characteristics, features or elements (Adverse). **Surface water:** - No risk identified. - Risk of pollution from accidental spillages <0.5%. **Groundwater:** - No measurable impact upon an aquifer. **Geology (solid geology):** - The proposals would not affect areas with regional or national geological interest/soils resource but may result in the loss of or damage to areas of local geological/soils resource interest. Cannot be completely mitigated for but opportunities exist for the replacement of lost or damaged areas which may be of similar local geological/soils interest. **Soils (superficial geology/topsoils and subsoils):**

	- Some measurable change in soil attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
	Very minor benefit or detrimental alteration/positive addition to one or more characteristics, features or elements (Beneficial). **Surface water:** - No risk identified. - Risk of pollution from accidental spillages <0.5%. **Groundwater:** - No measurable impact upon an aquifer. **Geology (solid geology and soils):** - The proposals would be of minor benefit or positive addition to local areas of geological interest/soils resource, by potentially providing greater exposure and or protection.
No change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.

5.19 The consequence of an impact (expressed as 'significance of effect'), is determined by considering the magnitude of the impact and the importance, or sensitivity, of the receptor or resource.

Significance of Effects

5.20 The assessment of significance has been based on the matrix presented in Table 5.4.

Table 5.4: Assessment Matrix (Complex)

Sensitivity	Magnitude of Impact				
	No Change	Negligible	Low	Medium	High
Negligible	No change	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	No change	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	No change	Negligible or Minor	Minor	Moderate	Moderate or Major
High	No change	Minor	Minor or Moderate	Moderate or Major	Major or Substantial
Very high	No change	Minor	Moderate or Major	Major or Substantial	Substantial

5.21 Where the matrix offers more than one significance option, professional judgement has been used to decide which option is most appropriate.

5.22 Only effects of moderate and above are considered significant in terms of the EIA Regulations and have been considered for further mitigation or monitoring.

Limitations of the Assessment

5.23 The current assessment is mainly supported by the Preliminary Risk Assessment (PRA) report and limitations of the information in this report are also carried on to this assessment. Although no site-specific intrusive site investigation information is available, further site investigation is likely to address specific design constraints which would deal with any uncertainty remaining at this stage.

5.24 A CEMP which would set out the environmental measures that would be adopted during the construction phase of the Scheme will need to be prepared. The CEMP would include the monitoring and contamination management requirements identified within the Remediation Strategy Report for the site.

5.25 Despite these limitations, the information currently available on the water environment and ground conditions is considered sufficient to inform the environmental assessment.

Baseline Environment

Current Baseline Conditions

5.26 The Uskmouth Conversion Project site is currently occupied by Uskmouth Power Station. The site lays on the eastern bank of the River Usk, topographically between 8.2 m and 9.2 m Above Ordnance Datum (AOD). Based on occupation, the site is divided into its northern and a southern parts.

5.27 The northern part of the site relates to the Power Station Upgrade which currently comprises the existing turbine house, boiler house and Flue Gas Desulphurisation plant. Near the boiler house and turbine house are other identified structures that may be regarded as potential contamination sources, including a substation, lime and fly ash silos, fuel oil tanks and the carpenters' workshop.

5.28 The southern part of the site relates to the Proposed Development which currently comprises much of the existing coal stockyard together with the biomass storage shed, ash treatment facility, hoppers and coal conveyors linking the storage area with the boiler house. Railway sidings cross the central part of the development site. In the southern part of the development site is an oil store.

5.29 Ground conditions in the area of the Proposed Development mainly comprise hardstanding with some areas covered by buildings. Below the Made Ground providing the sub-base of the hardstanding and buildings, the geology is composed of the following sequence:

- Tidal Flat Deposits (TFD) – unconsolidated mud or sand sediments typically comprising soft silty clay with disconnected layers of sand, gravel or peat. TFD act as aquitard, i.e. preventing groundwater flow.
- Glaciofluvial Deposits (GFD) – Sand and gravel, locally with lenses of silt/clay.
- Mercia Mudstone Group (MMG) – Generally reddish-brown, less commonly green-grey, mudstones and subordinate siltstones weathering to a clay/silt material.

5.30 MMG bedrock is designated as a Secondary B Aquifer of low vulnerability, typically comprising lower permeability layers that may store and yield limited amounts of groundwater due to localised fissures, thin permeable layers and weathering. Fracture flow is the prime means of groundwater flow through this stratum and is likely to be in continuity with the overlying lower potentially water bearing GFD. The MMG forms part of the groundwater body name "Usk Devonian Old Red Sandstone" (Water body ID GB40902G201700) and covers the entire eastern bank of the River Usk.

5.31 No designated sites (statutory or non-statutory), nor rock faces associated with historical quarries, are located within the site. No conjectured fault lines are identified within the Study Area based on published 1:10,000 scale mapping.

5.32 Previous site investigations (ERM, 2006 & 2008) analysed Made Ground and underlying geological formation. The conclusions drawn from the analysis indicate the available soil quality dataset is generally characterised by low levels of organic and inorganic contamination in soils. Soil quality is largely characterised by the absence of Volatile Organic Compounds (VOCs) and Semivolatile Organic Compounds (SVOCs), with exceptions for Total Petroleum Hydrocarbons (TPH), recorded in their less mobile carbon bands. The concentrations of the contaminants identified in soil are lower than those recorded in the overlying Made Ground. No hot spots indicative of gross soil contamination has been identified by ERM during the investigation and no requirement for site remediation was identified on the basis of observed soil quality.

5.33 Groundwater found in the GFD is classed as a Secondary A aquifer, comprising 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.

5.34 Groundwater levels in the Made Ground showed a north-south gradient with water level observed at 1.5 mbgl in the northern part of the Proposed Development and 2.7 mbgl toward the south. The indicative groundwater gradient and elevation within Made Ground should be taken with care due to the wide tidal range from the River Usk and likely influence on groundwater level within the Made Ground.

5.35 Groundwater levels in the GFD were last measured in 2015 (Enzygo, 2015) and range from 5.8 mbgl in the southern part of the Proposed Development decreasing to 7.1 mbgl toward the north.

5.36 Made Ground groundwater quality was found to be generally good with minor exceedance of EQS for chromium, nickel and zinc. TPH concentrations were also recorded near the oil store, typically in heavy less mobile carbon ranges. No exceedance above the EQS has been encountered in the deeper borehole monitoring of the GFD in 2015.

5.37 In accordance with the conclusions of historical reporting, the baseline dataset provided no evidence for a significant impact on shallow and deep groundwater quality by leachate generated from the shallow Made Ground.

5.38 The site ground water drainage comprises of several drains to the south of the Proposed Development discharging to an attenuation pond to the east of the Proposed Development. Most of the site is covered by hardstanding and/or specifically designed impermeable surface ensuring protection against infiltration of potential contaminants. The site drainage includes a sump, oil interceptor, sediment traps and retention/attenuation ponds. The permitted activities already include control and mitigation measures in case of accidental pollution.

5.39 The River Usk defines the western and northern boundaries of the site. The River Usk is classed as a transitional waterbody described under the WFD (Waterbody ID GB530905415404) as mixed and extensive intertidal with “heavily modified” status. The River Usk has a tidal range of over 11 m during spring tides due to its downstream connection with the Severn estuary, Severn Lower (Waterbody ID GB530905415401).

5.40 The River Usk is designated a SAC and a biological SSSI.

5.41 There are no SPZs for groundwater abstraction within the site or in its vicinity.

5.42 Current on-site sources of contamination include the oil store, railway sidings, coal stockyard and former landfill area.

5.43 Asbestos Carrying Materials (ACMs) identified in the boiler basement and associated pipework were removed from the site in 2007. Asbestos is known to be present in the Made Ground and the site should be classified as red in accordance with the Site Investigation Steering Group guidelines.

5.44 The entire Proposed Development area could also be affected by TFD generating gas, i.e. methane or carbon dioxide from organic content. Based on information available, a preliminary Conceptual Site Model has been developed and is presented in the Preliminary Risk Assessment report.

5.45 A summary of the receptor sensitivities is given in Table 5.5.

Table 5.5: Site receptors sensitivity

Name	Description	Designation	Sensitivity
River Usk	Surface waterbody	SAC and a SSSI	Very High
Drainage system	Surface waterbody	Non-WFD surface water.	Negligible
Attenuation Pond	Surface waterbody	Non-WFD surface water.	Negligible
Groundwater (Made Ground)	Aquifer providing water for agricultural or industrial use	No designation	Medium

	with limited connection to surface water		
Groundwater (GFD/MMG)	Aquifer providing water for agricultural or industrial use with limited connection to surface water	Secondary A / B	Medium
Human Health	Workers on site during construction and operation	N/A	Very High
Buildings	Current buildings on site	No designation	High
Soils and Geology	Ground on and below site	little local geological / geomorphological interest. Soils of very low importance and rarity, local scale	Low

Future Baseline Conditions

5.46 Consideration has been given to the potential for changes in the baseline conditions in the medium to long term as a result of climate change. The Climate Change Risk Assessment in Wales (Welsh Government and Defra, 2012) has been reviewed, together with other climate change prediction tools. With respect to controlled waters and soils, the Climate Change Risk Assessment for Wales identifies the following considerations.

- Reduction in soil moisture and lower river flows, and an increase in the frequency and magnitude of droughts.
- Changes in soil organic carbon, although the ways in which it might be affected are not adequately understood at present.
- Increase in soil erosion in drier summers.
- Wetter soils and increased waterlogging in winters with higher levels of precipitation.

5.47 It is not considered likely there would be significant changes in geological conditions.

5.48 These factors have been considered, where practicable, in the assessment of effects.

Mitigation Measures Adopted as Part of the Project

5.49 General adoption and compliance with Pollution Prevention Guidelines and Guidance for Pollution Prevention measures are expected during construction, limiting eventual potentially contaminated surface water run-off effects on controlled waters.

5.50 A CEMP including specific building related piling risk assessment and deep excavations phasing, including the management of groundwater seepage, would also be required.

Assessment of Construction Effects

5.51 In order to assess the potential environmental effects on controlled waters, the geology and soils as a result of construction, it is first necessary to identify the list of activities that are considered part of the construction phase of Uskmouth Conversion Project. Construction activities are described in Table 5.6.

Table 5.6: Construction Effects

Construction activities	Potential Effects
Power Station Upgrade	
Refurbishment of two combustion units	Internal modification with no expected effects on Controlled Water soils or geology
Proposed Development	

Construction of main fuel storage silos (4 × 10,000 tonnes)	Potential effect from previously contaminated land on controlled water (excavation and piling)
Construction of new conveyor systems and refurbishment of part of the current conveyor system	Potential effect from previously contaminated land on controlled water (excavation and piling) Potential effect from intersecting saturated ground
Construction of fuel de-dusting building	Potential effect from previously contaminated land on controlled water (excavation and piling)
Construction of two day-silos for fuel back-up and one silo for storage of lime	Potential effect from previously contaminated land on controlled water (excavation and piling)
Improvement of rail fuel unloading facilities (refurbishment and extension of the existing rail unloading hopper)	Potential effect from previously contaminated land on controlled water (excavation and piling) Potential effect from intersecting saturated ground
Construction of vessels and infrastructures for the delivery and storage of flue gas treatment reagents and residues	Potential effect from previously contaminated land on controlled water (excavation and piling)
Conversion of the facility to accommodate new reagents used	Potential effect from previously contaminated land on controlled water (excavation and piling)

5.52 The biomass fuel reserve would be stored in the existing biomass storage building on site. In the event the fuel pellets are co-fired with biomass, the biomass would be added to the fuel pellets prior to pulverisation in the mills using the existing biomass delivery system. Therefore, no construction activities will be required for this aspect of the Uskmouth Conversion Project.

5.53 Construction of buildings and improvements to facilities would typically be undertaken and , based on current site use, would involve limited earth movement, but include excavations and piling to establish appropriate foundation.

5.54 Effects of excavations and piling are assessed for each receptor in Table 5.7.

Table 5.7: Assessment of Construction Effects

Construction activities	Potential Effects	Magnitude of Impact	Receptor	Sensitivity of receptor	Significance of Effects
Excavation	**Controlled Waters** Earth movement from excavation may disturb soil contaminants and generate leachate, suspended solids) directly impacting adjacent surface waters (drains, ponds, river Usk).	Low	River Usk	Very High	Minor adverse
			Drainage System	Negligible	Minor adverse
			Attenuation Pond	Negligible	Negligible
			Groundwater (Made Ground)	Medium	Minor adverse
			Groundwater (GFD/MMG)	Medium	Minor adverse
	Controlled Waters Stockpile of materials may generate contaminated high suspended solids (drains, ponds, river Usk).	Low	River Usk	Very High	Minor adverse
			Drainage System	Negligible	Minor adverse
			Attenuation Pond	Negligible	Negligible
			Groundwater (Made Ground)	Medium	Minor adverse
			Groundwater (GFD/MMG)	Medium	Minor adverse
	Controlled Waters Elevated sediment loads from dewatering activities to Controlled waters (drains, ponds, river Usk).	Low	River Usk	Very High	Minor adverse
			Drainage System	Negligible	Minor adverse
			Attenuation Pond	Negligible	Negligible
			Groundwater (Made Ground)	Medium	Minor adverse
			Groundwater (GFD/MMG)	Medium	Minor adverse
	Controlled Waters	Medium	River Usk	Very High	Minor adverse

	Excavation may intercept groundwater restricting natural groundwater flow or introduce contaminants. Groundwater infiltration management may require discharge to drainage or controlled waters (River Usk).		Drainage System	Negligible	Minor adverse
			Attenuation Pond	Negligible	Negligible
			Groundwater (Made Ground)	Medium	Minor adverse
			Groundwater (GFD/MMG)	Medium	Minor adverse
	Soil and Geology Inhalation of toxic gases/explosion of flammable gases from pathways created from piling – possible loss of life.	Medium	Human health	Very High	Moderate
			Buildings	High	N/A
			Soil and Geology	Low	N/A
	Soil and Geology Deep excavation instability from faces and groundwater seepage.	High	Human health	Very High	Negligible
			Buildings	High	Major
			Soil and Geology	Low	Negligible
	Soil and Geology Adverse health effects from exposure to contaminated soils.	Medium	Human health	Very High	Moderate
			Buildings	High	N/A
			Soil and Geology	Low	N/A
Piling	**Controlled Waters** Contamination of GFD or MMG aquifer units through creation of new pathways from piling.	Medium	River Usk	Very High	Negligible
			Drainage System	Negligible	Minor adverse
			Attenuation Pond	Negligible	Negligible
			Groundwater (Made Ground)	Medium	Minor adverse
			Groundwater (GFD/MMG)	Medium	Minor adverse
	Soil and Geology Driving of contamination into underlying geology.	Low	Human health	Very High	N/A
			Buildings	High	Negligible
			Soil and Geology	Low	Negligible

5.55 The construction effects are all considered temporary and local to the site.

Further Mitigation

5.56 A ground investigation and drainage survey will be required to determine any evidence of hydrocarbons in Made Ground in proximity to the oil store. Potentially contaminated leachate and suspended solids will be mitigated by the creation of a development platform with assumed clean imported material. A foundation works risk assessment will be required to assess the potential impact of piled foundations and of deep excavation for the groundwater within the GFD and MMG aquifer units.

5.57 Dust suppression and application of good working practices during construction will mitigate risks posed to neighbouring site users.

5.58 Due to the potential presence of asbestos on site, the significance of the effects associated with construction work has been assigned Moderate adverse, but further mitigation associated with additional ground investigation would reduce the risk to Minor adverse. Deep excavations have the potential to intercept groundwater below the GFD and have a Major adverse effect on surrounding buildings, but the implementation of mitigation measures detailing the excavation works and how stability and groundwater management is managed reduce the risk to Minor adverse. The

magnitude of the potential adverse effects will be adequately mitigated by the implementation of a CEMP reducing the significance of the effects to minor adverse. The CEMP is to be secured through planning condition.

Future Monitoring

5.59 The Proposed Development is a regulated permitted site subject to compliance monitoring related to its Environmental Permit and to the Industrial Emissions Directive.

Accidents and/or Disasters

5.60 Construction activities present a risk of accidents and/or disaster including spillage of chemicals (principally oil) and stability of excavation. The production of a CEMP incorporating spillage mitigation measures and appropriate phased construction for the excavation, including groundwater management measures, will sufficiently mitigate risk to life, current on-site infrastructures and the environment.

Assessment of Operational Effects

5.61 In order to assess the potential environmental effects on controlled waters, geology and soils resulting from operations of the Uskmouth Conversion Project on site, it is necessary to identify activities that are considered part of the operations. Operational activities are described in Table 5.8.

Table 5.8: Operational Effects

Operational activities	Potential Effects
Combustion of waste derived fuel pellets	Air stack emission of contaminants depositing to soil Air stack emission of contaminants depositing to surface water Air stack emission of contaminants depositing to soil and leaching to groundwater
Storage of oil	Potential effect from spill or leakage on soil and controlled waters
Storage of waste derived fuel pellets	Generation of leachate to Controlled waters (surface water, groundwater and River Usk)
Storage of chemicals required for operations (urea, ammonium sulphate)	Potential effect from spill or leakage on soil and controlled waters
Storage of fly ash and bottom ash	Generation of leachate to Controlled waters (surface water, groundwater and River Usk)
Discharge of water to cooling tower pond	Infiltration of contaminants from pond blowdown to unsaturated zone in Made Ground and saturated zone in Made Ground
Discharge of water from demineralisation plant to drain and storm water sump	Infiltration of contaminants to unsaturated zone in Made Ground and saturated zone in Made Ground

5.62 The operational activities of the Uskmouth Conversion Project do not differ significantly from the current electricity generation activities permitted on site. Storage of chemicals within the facility already takes place under permitted activities and no significant change to current operations are expected. Main changes relate to the nature of the feedstock, its transport and storage, and the nature of the waste generated.

5.63 Relevant potential operational effects of the Uskmouth Conversion Project are assessed for each receptor in Table 5.9.

Table 5.9: Assessment of Operational Activities

Operational activities	Potential Effects	Magnitude of Impact	Receptor	Sensitivity of receptor	Significance of Effects
Feedstock / Chemicals	**Controlled Waters** Direct feedstock storage spillage or leaching to Controlled Waters.	Negligible	River Usk	Very High	Minor
			Drainage System	Negligible	Negligible
			Attenuation Pond	Negligible	Negligible
			Groundwater (Made Ground)	Medium	Minor
			Groundwater (GFD/MMG)	Medium	Negligible
	Controlled Waters Contribution to discharge to Controlled Waters.	Negligible	River Usk	Very High	Minor
			Drainage System	Negligible	Negligible
			Attenuation Pond	Negligible	Negligible
			Groundwater (Made Ground)	Medium	Minor
			Groundwater (GFD/MMG)	Medium	Negligible
	Soil and Geology Feedstock spillage affecting surrounding soils.	Negligible	Human health	Very High	Minor
			Buildings	High	N/A
			Soil and Geology	Low	Negligible
Waste (fly ash and bottom ash)	**Controlled Waters** Direct waste storage spillage to controlled waters.	Negligible	River Usk	Very High	Minor
			Drainage System	Negligible	Negligible
			Attenuation Pond	Negligible	Negligible
			Groundwater (Made Ground)	Medium	Minor
			Groundwater (GFD/MMG)	Medium	Negligible
	Controlled Waters Waste leaching to Controlled Waters.	Negligible	River Usk	Very High	Minor
			Drainage System	Negligible	Negligible
			Attenuation Pond	Negligible	Negligible
			Groundwater (Made Ground)	Medium	Minor
			Groundwater (GFD/MMG)	Medium	Negligible
	Soil and Geology Waste spillage affecting surrounding soils.	Negligible	Human health	Very High	Minor
			Buildings	High	N/A
			Soil and Geology	Low	Negligible

5.64 The operational effects are all considered temporary and local to the site.

Further Mitigation

5.65 The site is a permitted facility under Environmental Permitting Regulations and all potential operational risk are adequately managed and/or mitigated if required by the current permit. Further details on spillage prevention measures are enclosed in the Permit Variation and include spillage management plan protection measures incorporated in the design of the facilities storage maintenance programme.

5.66 The site is mainly composed of impermeable surface and drainage is contained on site before discharging to an attenuation pond. No direct discharge is made to the River Usk. Most of the storage silos (raw materials, ancillary materials or waste) are located at sufficient distance to

prevent any discharge or contamination to the River Usk. The TFD provides an impermeable stratum below ground providing an additional level of protection to deeper groundwater resources.

Future Monitoring

5.67 The operational Uskmouth Conversion Project is a regulated permitted activity and would be subject to compliance monitoring related to its Environmental Permit and Industrial Emissions Directive.

Accidents/Disasters

5.68 The Environmental Permit currently held by the Uskmouth Power Station contains an Accident Management Plan that contains Fire Prevention and Management Plan, a procedure for the recording and follow-up of accidents, incidents and non-conformance. Design is subject to Hazard and Operability (HAZOP)/Hazard Identification (HAZID) reducing further risk of accidents and disasters.

Potential Changes to the Assessment as a Result of Climate Change

5.69 Consideration has been given to the potential for changes to the assessment in the medium to long term as a result of climate change. The Climate Change Risk Assessment in Wales (Welsh Government and Defra, 2012) has been reviewed, together with other climate change prediction tools.

5.70 It is not considered likely there would be significant changes to the operation as a result of the effects of Climate Change.

Assessment of Cumulative Effects

5.71 No other proposed developments in the vicinity of the site are likely to have any impact on geology, hydrogeology or ground conditions and therefore no cumulative effect from another development is likely to have a significant effect on specific receptors.

Inter-relationships

5.72 This chapter assesses the significance of effects on geology, hydrogeology and ground conditions. Other potential impacts on the water environment are considered within Chapter 6: Hydrology, Drainage and Flood Risk, Chapter 7: Ecology and Nature Conservation and Chapter 12: Air Quality.

Summary of Effects

5.1.1 The construction and operation of the Uskmouth Conversion Project would have the potential for Minor adverse effects on human health, buildings or controlled waters.

5.73 Without the implementation of additional mitigation measures, the most salient risks consist in:

- the construction works of deep excavations associated with the conveyor system within the railway unloading facility and transfer towers; and
- exposure to asbestos from construction workers.

5.74 The summary of the effects is presented in Table 5.10.

References

European Parliament (2000) Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (Water Framework Directive).

European Parliament (2006) Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration (daughter to 2000/60/EC) (Groundwater Daughter Directive).

European Parliament (2013) Directive 2013/39/EU of the European Parliament and of the Council of 12 August 2013, amending Directives 2000/60/EC and 2008/105/EC as regards priority substances in the field of water policy.

European Parliament (1992) Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and wildlife and fauna (the Habitats Directive).

UK Parliament (1990) Environmental Protection Act 1990: Part IIA (2012).

UK Parliament (1995) Environment Act (1995).

UK Parliament (2006) Contaminated Land (Wales) Regulations (2006) and Amendment (2012).

UK Parliament (2009) Groundwater (England and Wales) Regulations (2009).

UK Parliament (1991) Water Resources Act (1991).

UK Parliament (2014) Water Act (2014).

UK Parliament (1998) Groundwater Regulations (1998), which transpose the EC Groundwater Directive 80/68/EC into UK law.

UK Parliament (2003) Water Environment (Water Framework Directive) (England and Wales) Regulations (2003), which transpose the Water Framework Directive 2000/60/EC into UK law.

UK Parliament (2008) Waste Framework Directive (2008) as transposed via The Waste (England and Wales) Regulations 2011.

UK Parliament (2010) Environmental Permitting (England and Wales) Regulations (2010).

UK Parliament (2016) Hazardous Waste (England and Wales) (Amendment) Regulations (2016).

Guidance for Pollution Prevention (GPPs) and Pollution Prevention Guidelines (PPG) issued by Natural Resources Wales (NRW).

Welsh Local Government Association (WLGA) and Environment Agency (2012) Development of Land Affected by Contamination: A Guide for Developers.

Defra and Environment Agency (2004) Model Procedures for the Management of Land Contamination – Contaminated Land Report 11. Environment Agency September 2004. ISBN: 1844322955

CIRIA (1996) Construction Industry Research and Information Association R132: A Guide for Safe Working on Contaminated Sites.

CIRIA (2001) Contaminated land risk assessment: A guide to good practice (C552).

CIRIA (2007) Assessing risks posed by hazardous ground gases to buildings (C665).

CIRIA (2014) Asbestos in soil and Made Ground: A guide to understanding and managing risks (C733).

CL:AIRE (2011) The Definition of Waste: Development Industry Code of Practice v2.

Planning Policy Wales (PPW10).

Local Development Plan (LDP) for Newport was adopted on 27th January 2015 (Newport City Council, 2015).

Table 5.10: Summary of Likely Environmental Effects on Geology, Hydrogeology and Ground Conditions

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact	Significance of effect	Significant / Not significant	Notes
Construction phase							
Groundwater within GFD/MMG	Medium	Excavation works at the railway unloading facility intercepting ground water Excavation works at the transfer towers	Short term	Medium	Minor adverse	Not significant	Reduced significance of effect through implementation of CEMP
Buildings on site	Medium	Excavation works at the railway unloading facility intercepting ground water Excavation works at the transfer towers	Short term	Medium	Minor adverse	Not significant	Reduced significance of effect through implementation of CEMP
Human Health	High	Soil contamination (asbestos) discovered during construction	Short term	Minor	Minor adverse	Not significant	Reduced significance of effect through implementation of CEMP/ PPG
Operational phase							
Controlled Waters (River Usk/groundwater within GFD/MMG)	Very High to High	Discharge of contaminated water	Medium term	Medium	Minor adverse	Not significant	Discharge assessment has been undertaken through H1 assessment as part of Permit Variation

6 HYDROLOGY AND FLOOD RISK

Introduction

6.1 This chapter of the Environmental Statement (ES) presents the findings of the Environmental Impact Assessment (EIA) work undertaken in relation to the potential effects of the Uskmouth Conversion Project on hydrology, drainage and flood risk throughout the construction and operation of the Uskmouth Conversion Project.

6.2 This chapter summarises hydrology, drainage and flood risk relevant legislation, policy, guidance and standards, the consultation undertaken to support and inform the assessment, the assessment methodology and the baseline conditions both at and in the vicinity of the Uskmouth Conversion Project. It then considers the mitigation measures required to prevent, reduce or offset effects.

6.3 Potential impacts regarding geology and ground conditions are assessed in Chapter 5: Geology, Hydrogeology and Ground Conditions.

Assessment Methodology

6.4 The main legislative, policy and guidance for assessing and managing risks to the surface water environment, human health, including controlled waters and flood risk, are:

Legislation

6.5 The main legislative drivers are:

- Coast Protection Act 1949;
- Environment Act 1995;
- Environmental Damage and Liability (Prevention and Remediation) Regulations 2015;
- The Environmental Protection (Duty of Care) (Amendment) (Wales) Regulations 2003;
- Floods and Water Management Act 2010;
- Land Drainage Act 1991;
- Well-being of Future Generations (Wales) Act 2015;
- The Environmental Permitting (England and Wales) Regulations 2010 (as amended 2016);
- The Groundwater (Water Framework Directive) (Wales) Direction 2016; and
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017.

Flood and Water Management Act 2010

6.6 The Flood and Water Management Act 2010 implements the recommendations from Sir Michel Pitt's Review of the floods in 2007 and places a series of responsibilities on councils. The main aim of the Act is to improve flood risk management.

6.7 The Act designates councils as Lead Local Flood Authorities (LLFAs) with a 'lead' role in managing flood risk from surface water, groundwater and ordinary watercourses across their jurisdictional area. This requires working closely with partners involved in flood and water management, especially Natural Resources Wales (NRW).

National Planning Policy (Wales)

Planning Policy Wales (Edition 10)

6.8 Section 6.6 of Planning Policy Wales Edition 10 (PPW10) relates to 'Water and Flood Risk' and outlines the Welsh Government's objectives in terms of addressing flood risk.

6.9 PPW10 states that all development on land within the flood plain of a watercourse, drained via a culvert, or on low lying land adjacent to tidal water is at some risk of flooding and whilst flood risk can be reduced using mitigation measures it can never be completely eliminated.

6.10 Paragraph 6.6.22 states climate change is likely to increase the risk of flooding as a result of sea-level rises, increased storminess and more intense rainfall. Flooding as a hazard involves the consideration of the potential consequences of flooding, as well as the likelihood of an event occurring. Planning authorities should adopt a precautionary approach of positive avoidance of development in areas of flooding from the sea or rivers. Surface water flooding will affect choice of location and the layout and design of schemes and these factors should be considered at an early stage in formulating development proposals.

6.11 Local planning authorities should take a strategic approach to flood risk and consider the catchment in its entirety. They should ensure that new development is not exposed unnecessarily to flooding and should consider flood risk in terms of the potential cumulative impact in the locality on a catchment wide basis (river catchment and coastal cell), recognising that this may require working across administrative boundaries. Development proposals should seek to reduce, and certainly not increase, flood risk arising either from river and/or coastal flooding or from additional run-off from development in any location.

Technical Advice Note 14: Coastal Planning (March 1998)

6.12 Technical Advice Note 14 (TAN 14) paragraph 6 states that local planning authorities need to be aware of coastal issues. For the purposes of planning along open stretches of coast, the geographical extent of influence of physical processes affecting the coastline can be defined with some certainty by sediment cells or sub cells. In estuaries, the upstream extent of the tidal reach is an important boundary.

6.13 Paragraph 7 states that physical processes and ground conditions at the coast may be essential for creating and maintaining conservation and recreation sites and features. Interference with these processes may have consequences for the overall balance of the physical system. Whilst it is mandatory for the developer to demonstrate that the proposed site can be developed satisfactorily, having regard to those matters, local planning authorities still need to consider these potential effects when making planning decisions.

Technical Advice Note 15: Development and Flood Risk (July 2004)

6.14 TAN 15 provides technical guidance which supplements the policy set out in PPW10 in relation to development and flooding. It advises on development and flood risk as this relates to sustainability principles and provides a framework within which risks arising from both river and coastal flooding, and from additional run-off from development in any location, can be assessed.

Local Planning Policy

6.15 The Newport Local Development Plan 2011-2026 was adopted by Newport City Council (NCC) in January 2015. The Local Development Plan (LDP) contains the following policy in relation to flood risk:

Policy SP3 Flood Risk

6.16 Policy SP3 states:

"Newport's coastal and riverside location necessitates that development be directed away from areas where flood risk is identified as a constraint and ensure that the risk of flooding is not increased elsewhere. Development will only be permitted in flood risk areas in accordance with national guidance. Where appropriate a detailed technical assessment will be required to ensure that the development is designed to cope with the threat and consequences of flooding over its lifetime. Sustainable solutions to manage flood risk should be prioritised."

Policy GP1 General Development Principles – Climate Change

6.17 Policy GP1 states:

"Development proposals should be designed to withstand the predicted changes in the local climate change to reduce the risk of flooding on site and elsewhere by demonstrating where appropriate, that the risks and consequences of flooding can be acceptably managed, including avoiding the use of non-permeable hard surfaces."

Policy CE9 Coastal Zone

6.18 Policy CE9 states:

"*Development will not be permitted in the coastal area or adjoining the tidal river unless:*

i. In the undeveloped coastal area such development is required to be on the coast to meet an exceptional need which cannot reasonably be accommodated elsewhere;

ii. the area is not itself at risk nor will the proposed development exacerbate risks from erosion, flooding or land instability.

Development which requires a coastal location should be sited within the developed coastal zone."

Relevant Guidance and Standards

- Welsh Goverment (2018) Statutory standards for sustainable drainage systems (SuDS) – designing, constructing, operating and maintaining surface water drainage systems;
- CIRIA Report C532. Control of Water Pollution from Construction Sites;
- CIRIA Report C741. Environmental Good Practice on Site; and
- CIRIA Report C753 (2015). The SuDS Manual.

Study Area

6.19 A 500 m buffer around the site redline boundary has been selected for data collection purposes to allow for variance in final location and alignments and to identify any existing assets or infrastructure that might affect or be affected by the Uskmouth Conversion Project. A 500 m buffer is considered appropriate for data collection considering the nature of the Uskmouth Conversion Project and the likely zone of influence on hydrological receptors. Given the landscape surrounding the Uskmouth Conversion Project and ongoing anthropogenic activities, it is be difficult to ascertain the exact source of any impacts on water quality beyond the 500 m buffer.

Baseline Methodology

6.20 The hydrology, drainage and flood risk information for the study area was gathered through a detailed desktop review of publicly available sources of literature from NRW, British Geological Survey (BGS) and NCC, as summarised in Table 6.1.

Table 6.1: Summary of Information Sources Consulted during the Preparation of the Report

Source	Data	Information consulted/ provided
Ordnance Survey	Online and OS Explorer Mapping 1:25,000 Sheet 152: Newport & Pontypool.	Area information, rivers and other watercourses, general site environs, built environment and catchment Information.
British Geological Survey	BGS (online) Geology of Britain Viewer.	Site and area geology.
NRW	NRW data holdings, customer service and engagement team.	Current flood risk, local flood defences, flood levels, supplementary geology and groundwater information.
Local Planning Authority (LPA), NCC	Newport Local Development Plan (January 2015).	Flood Zoning. Local Development Framework.
Water Utility Company	Private Water Utilities.	Water and sewerage assets linking to Welsh Water.
Welsh Government	PPW10. TAN 14. TAN 15.	Flood zoning for the Proposed Development as used by the NRW.

Consultation

6.21 A formal scoping exercise was undertaken, and a scoping report submitted in January 2020. NCC's Scoping Opinion was provided 13/02/2020.

6.22 A summary of all consultation with stakeholders or consultees (such as local planning authority) is presented in Table 6.2.

Table 6.2: Consultation Responses Relevant to this Chapter

Date	Consultee and Issues Raised	How/ Where Addressed
29 July 2019	NRW environmental data request.	Incorporated into the baseline environment section of this chapter**Error! Reference source not found.**.
January 2020	NRW confirmation on hydrological/tidal model update availability.	Update not available. No action required.
13 February 2020 Scoping Opinion	NRW – We agree with the proposed scope of the Flood Consequences Assessment (FCA) set out in section 6. The proposals indicate land use will remain broadly consistent with the current power station with new storage silos located in areas previously used for fuel storage or of minimal size elsewhere which would not result in an increase in flood risk elsewhere (2.37-2.41). The FCA should assess the flood risk to the development and set out any mitigation measures and emergency plans which are required.	A supporting FCA is presented in Appendix 6.1. Design-in mitigation measures and on site management procedure are outline in Table 6.14 and Table 6.15.
	NRW – We recommend that the applicant seeks confirmation from the determining authority regarding the proposed 40 year lifetime of development in terms of assessing flooding consequences. If agreed, climate change scenarios could be considered over this period.	Assessment life has been increased following discussions with the LPA to 75 years.

	The applicant states that the scheme will be assessed for flooding over a 40 year period. The proposal is not being promoted as a fixed term scheme and the Council would not treat it as such. Any permanent permission would need to be based on 75 year lifetime for flood purposes. The implication of doing otherwise is that the scheme would need to have a fixed life and site restoration conditions and potentially a legal agreement to secure its removal.	Assessment life has been increased following discussions with the LPA to 75 years.
July 2020 Pre-application consultation response by Dwr Cymru Welsh Water (DCWW)	DCWW's PAC response was to request that a drainage proposal be submitted. The following comments were also provided: • Foul flows only from the proposed development can be accommodated within the public sewerage system; • No highway or land drainage run-off will be permitted to discharge directly or indirectly into the public sewerage system; • The development requires approval of Sustainable Drainage Systems (SuDS) features and recommends that the developer engage in consultation with the Local Authority, as the determining SuDS Approval Body (SAB), in relation to their proposals for SuDS features; • A water supply can be made available to service the proposed development; • There may be a need to apply to DCWW for any connection to the public sewer under Section 106 of the Water industry Act 1991; • Some public sewers and lateral drains may not be recorded on DCWW's maps of public sewers because they were originally privately owned and were transferred into public ownership by nature of the Water Industry Regulations 2011. The presence of such assets may affect the proposal. You may contact DWCC to establish the location and status of any apparatus in and around the site. Under the Water Industry Act 1991 DWCC has rights of access to its apparatus at all times. DWCC provided copies of extract plans of water and sewer apparatus in the area.	An outline drainage strategy at Appendix 6.2 of the ES has been provided. SUP will ensure that any drainage layout or strategy submitted takes DWCC comments into account. SUP acknowledges that it is required to explore and exhaust all surface water drainage options in accordance with the drainage hierarchy, which states that discharge to a combined sewer shall only be made as a last resort. SUP will engage with the SAB in relation to the proposals for SuDS features. SUP does not anticipate the need for a new connection to the water supply of the public sewer as a result of the proposed operational development. SUP will contact DCWW to establish the location and status of any apparatus in and around our site prior to the commencement of development.

Assessment Criteria and Assignment of Significance

6.23 The baseline characterisation set out above enables the identification of the nature of potential impacts. The assessment considers the potential impacts to environmental receptors and the pathways by which the receptors may be affected. The following terms have hydrological meaning:

- Source: increase in low permeable surfacing, potential surface water contaminant sources, ground/channel disturbance;
- Pathway: the mechanism by which the source may affect a receptor i.e. run-off; and
- Receptor: identified features that may be affected, based on the sensitivity of the Proposed Development.

6.24 This includes consideration of the probability of harm occurring, considering potential sources of flooding and pollution, including changes in surface water run-off/quality characteristics and receptors that may be affected by changes to baseline conditions.

6.25 The potential impacts likely to occur due to the Proposed Development have been determined by considering the sensitivity of hydrological and flood risk key attributes that may be affected and the magnitude of predicted impacts.

Receptor Sensitivity/Value

6.26 The sensitivity or value of a hydrological receptor or attribute is largely determined by its quality, rarity and scale. The determination of value or sensitivity considers the scale at which the attribute is important. This can be defined as being local level (the Uskmouth Conversion Project site), district level (Newport), county level (Monmouthshire), regional level (South Wales), national level (Wales) or international level (Europe).

6.27 For the purpose of this ES, changes to 'flood risk' is defined as the permanent removal of, or increase in, low permeability surfacing leading to an alteration in pre-development surface water run-off rates or a derogation of floodplain storage. 'Temporary changes' to flood risk is the temporary removal or alteration in permeable surfacing leading to a temporary increase in surface water run-off or derogation of floodplain storage (for example during construction).

6.28 The definitions set out in Table 6.3 below have been followed in the consideration of sensitivity for this project. This table considers guidance provided in Table 3.2 (Volume 11, Section 2, Part 4 LA104) of the Design Manual for Roads and Bridges (DMRB) (Highways Agency et al., 2019).

Table 6.3: Definition of Terms relating to the Sensitivity of Hydrological Receptors

Sensitivity	Typical Descriptors
Very High	Receptor is high value or critical importance to local, regional or national economy. Receptor is highly vulnerable to impacts that may arise from the project and recoverability is long term or not possible. Surface water: Water Framework Directive (WFD) Current Overall Status of High. Flood risk: Land within Flood Zone 3 or Zone C2, or with more than one hundred residential properties protected from flooding by flood defence infrastructure or by natural floodplain storage.
High	Receptor is of moderate value with reasonable contribution to local, regional or national economy. Receptor is generally vulnerable to impacts that may arise from the project and recoverability is slow and/or costly. Surface water: WFD Current Overall Status of Good. Flood risk: Land within Flood Zone 3/2 or Zone C/C1 or between one and one hundred residential properties or industrial premises protected from flooding by flood defence infrastructure or by natural floodplain storage.
Medium	Receptor is of minor value with small levels of contribution to local, regional or national economy. Receptor is somewhat vulnerable to impacts that may arise from the project and has moderate to high levels of recoverability.

	Surface water: WFD Current Overall Status of Moderate. Flood risk: Flood plain within Flood Zone 2/1 or Zone B or has limited constraints and a low probability of flooding of residential and industrial properties.
Low	Receptor is of low value with little contribution to local, regional or national economy. Receptor is not generally vulnerable to impacts that may arise from the project and/or has high recoverability. Surface water: WFD Current Overall Status of Poor. Flood risk: Flood plain within Flood Zone 2/1 or Zone A or has limited constraints and a very low probability of flooding of residential and industrial properties.
Negligible	Receptor is of negligible value with no contribution to local, regional or national economy. Receptor is not vulnerable to impacts that may arise from the project and/or has high recoverability. Surface water: WFD Current Overall Status of Bad. Flood risk: Area outside flood plain (Flood Zone 1/ Zone A) or flood plain with very low probability of flooding industrial properties.

Magnitude of Impact

6.29 The magnitude of any predicted impact is dependent on its size, duration, timing (e.g. seasonality) and frequency (permanent, seasonal etc.). A qualitative appraisal of the likely magnitude of the predicted impact is provided within this assessment and considers the mitigation measures adopted as part of the Proposed Development to control such impacts. The magnitude of the predicted impact has been described using the criteria outlined in Table 6.4. This table considers guidance provided in Table 3.4, (Volume 11, Section 2, Part 4 LA104) of DMRB (Highways Agency et al., 2019).

Table 6.4: Definition of Terms relating to the Magnitude of an Impact upon Hydrology

Sensitivity	Typical Descriptors
High	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements (Adverse). Impact is of extended temporal or physical extent and of long-term duration (i.e., greater than 10 years duration).
	Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality (Beneficial). Impact is of extended temporal or physical extent and of long-term duration (i.e., greater than 10 years duration).
Medium	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements (Adverse). Impact is of moderate temporal or physical extent and of medium-term duration (i.e., less than 10 years).
	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (Beneficial). Impact is of moderate temporal or physical extent and of medium-term duration (i.e., less than 10 years).
Low	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements (Adverse). Impact is of limited temporal or physical extent and of short-term duration (i.e., less than two years).
	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring (Beneficial). Impact is of limited temporal or physical extent and of short-term duration (i.e., less than two years).
Negligible	Very minor loss or detrimental alteration to one or more characteristics, features or elements (Adverse). Physical extent of impact is negligible duration (i.e., less than one year).

	Very minor benefit to or positive addition of one or more characteristics, features or elements (Beneficial). Physical extent of impact is negligible duration (i.e., less than one year).
No change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Significance of Effects

6.30 The significance of predicted effects has been determined using publicly available environmental data and considers the sensitivity of the receptor and the magnitude of each impact. Table 6.5 below is used to inform the evaluation of the significance of effects. The table is based on guidance provided within the DMRB (Highways Agency et al, 2019). The significance of the effect upon hydrology, drainage and flood risk is determined by correlating the magnitude of the impact and sensitivity of the receptor. The method employed for this assessment is presented in Table 6.5 and the final assessment for each effect is based upon professional judgement.

Table 6.5: Matrix used for the Assessment of the Significance of Effect

Sensitivity	Magnitude of Impact				
	No Change	Negligible	Low	Medium	High
Negligible	No change	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	No change	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	No change	Negligible or Minor	Minor	Moderate	Moderate or Major
High	No change	Minor	Minor or Moderate	Moderate or Major	Major or Substantial
Very high	No change	Minor	Moderate or Major	Major or Substantial	Substantial

6.31 For consistency between disciplines the overall significance of an effect is expressed as Negligible, Minor, Moderate, Major or Substantial based on the definitions below:

- Substantial: Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of local importance may also enter this category.
- Major: These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process.
- Moderate: These beneficial or adverse effects may be important, but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse effect on a particular resource or receptor.
- Minor: These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project.
- Negligible: No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

6.32 For the purpose of this assessment any effect that is moderate, major or substantial is considered to be significant. Any effect that is minor or below is not significant.

Limitations of the Assessment

6.33 The assessment is primarily based on publicly available data obtained from NRW, NCC and commercial data supply companies, as well as additional information gathered during a site visit and information supplied from the Proposed Development's operators and stakeholders.

6.34 The assessment is limited by a lack of:

- flow data for watercourses and drainage channels; and
- water quality data for specific ordinary watercourses in close proximity to the Proposed Development.

6.35 Notwithstanding the above, a reasonably high level of certainty has been applied to the baseline and assessment presented in this chapter. Where available, catchment data regarding water quality has been used to inform the assessment, with a hydrological site walkover undertaken within the study area and wider area. The information gathered via publicly available sources and supplied via consultees when completing the assessment is considered to have a sufficiently high level of certainty in order to establish the baseline with no data limitations that would affect the conclusions of this assessment. Therefore, there are not considered to be any data limitations that would affect the conclusions of this assessment.

Baseline Environment

6.36 The baseline datasets have been collated to inform the assessment of the potential environmental effects of the Proposed Development. Current baseline conditions were ascertained through a desk-based assessment utilising publicly available data including OS mapping, NRW data, utility plans, a site walkover, topographical survey and a limited drainage survey. This provided an insight into surface water features and the existing land use of the hydrological features within the immediate vicinity of the Proposed Development.

Current Baseline

6.37 The Uskmouth Conversion Project lies at the mouth of the River Usk in the south east of Newport, Wales within the wider curtilage of Uskmouth Power Station.

6.38 A topographical survey indicates that the site boundary slopes from north to south, with levels within the Uskmouth Power Station recorded as approximately 8.6 mAOD. Elevations within the coal stock area to the south are recorded as approximately 7.4 mAOD.

6.39 The closest designated main river is the tidally dominated River Usk which lies immediately to the north and west. The Newport Velocity Depth Mapping – Update identifies the main flood risk posed to the Proposed Development originating from the tidally dominated River Usk and Severn Estuary.

6.40 A site survey was undertaken by RPS in December 2019 which identified that surface water run-off from the coal stocking area is flows under gravity to a perimeter drain which encircles the southern boundary of the coal stockyard.

6.41 Responsibility for ordinary watercourses which discharge into the River Usk fall under the jurisdiction of NCC as the LLFA under the Flood and Water Management Act 2010 and Land Drainage Act 1991. The Marine Management Organisation (MMO) is responsible for marine licensing in English inshore and offshore waters. 'English waters' is the area of sea within the limits of territorial waters (12 nautical miles) adjacent to the English coastline (the 'inshore' area). This also includes any area of sea beyond the territorial limit (the 'offshore' area), that is within the exclusive economic zone (EEZ) and the UK sector of the continental shelf (up to 200 nautical miles). This excludes the waters of any devolved administration. The LLFA is required to exercise

general supervision over all matters relating to water level management within its administrative area.

6.42 Further descriptions of the key hydrological and flood risk characteristics within the study area are set out below.

Hydrological Setting

6.43 Potential sources of flooding for the Uskmouth Conversion Project have been assessed and are set out in detail within the FCA (Appendix 6.1) and summarised below.

Fluvial and Tidal Flooding

6.44 The NRW Flood Risk Map uses four categories to describe the risk of flooding. These categories are set out in Table 6.6.

Table 6.6: NRW Flood Zone Definitions

Flood Zone	Flood Zone Definition
Very Low	This land is assessed as having less than 1 in 1000 (0.1%) of flooding in any year.
Low	This land is assessed as having between 1 in 1000 (0.1%) and 1 in 100 (1%) chance of flooding in any year.
Medium	This land is assessed as having between 1 in 100 (1%) and 1 in 30 (3.3%) chance of flooding in any year.
High	This land is assessed as having a chance of flooding greater than 1 in 30 (3.3%) in any year.

6.45 NRW notes that the tidally dominated River Usk is the main source of flooding within the study area, therefore the risk of flooding is determined to be tidal.

6.46 The NRW Flood Risk Map indicates that the majority of the site boundary area is at 'medium' risk of flooding (Flood Zone 2). A small section of the former coal stockyard is at 'low' risk of flooding (Flood Zone 1). Some areas benefit from local flood defence infrastructure.

6.47 The Uskmouth Conversion Project area is defined as Zone C1 by the Welsh Government in the Development Advice Maps (DAMs) that accompany TAN 15 meaning that it is at flood risk from events equal to or greater than 0.1% flood risk, but served by significant infrastructure, including flood defences (Appendix 6.1: FCA).

6.48 As discussed in the FCA (Appendix 6.1) modelled tidal levels have been extracted from the Newport Velocity Depth Mapping (2016), the data has been used to generate tidal flood levels including future climate change.

6.49 A comparison between topographical survey data against model point data extracted from the Newport Velocity Depth Mapping (2016) study for the 1 in 200 year 2090 defended event scenario indicates that the existing power station assets may be impacted by tidal flooding to a depth of 0.92 m. The ash treatment facility, biomass storage shed, store and associated infrastructure may be impacted by flooding to a depth of 0.27 m. The southern area of the site boundary associated with the silos and conveyors is at risk of flooding to a depth of 1.41 m during the defended 1 in 200 year 2090 event.

6.50 The Uskmouth Conversion Project site boundary is defined as 'highly vulnerable' and suitable for the present Flood Zones including climate change, subject to the application of a justification test. A justification test has been undertaken and there are no other reasonably available alternative sites suitable for a development of this type.

Flood Defence Details

6.51 NRW Flood Mapping identifies that the majority of the Uskmouth Conversion Project site is not protected by flood defences.

Groundwater Flooding

6.52 Full details of the ground conditions of the site boundary area can be found in Chapter 5: Geology, Hydrogeology and Ground Conditions. The underlying superficial deposits are Tidal Flat Deposits (Clay and Silt) and Glaciofluvial Deposits underlain by bedrock of the Mercia Mudstone Group.

6.53 Recorded water strikes on the BGS borehole logs ST38SW/39-41 were at depths of 15.45 mbgl and 15.85 mbgl, at the interface between the base of the Tidal Flat Deposits and the Glaciofluvial Deposits.

Surface Water Flood Risk

6.54 Surface water flood mapping produced by NRW indicates that the majority of the site boundary area is at 'very low' risk with a chance of flooding each year of less than 1 in 1,000 (0.1%). Localised areas within the boundary are defined as being at 'low' risk between 1 in 1,000 (0.1%) and 1 in 100 (1%) chance of flooding each year.

6.55 As the site boundary area is largely already surfaced by low permeable hardstanding and/or compacted coal, the change in permeability as a result of the Proposed Development has been identified as negligible and not significant.

6.56 The main risk of flooding is associated with surface water ponding in localised low-lying areas of the site boundary area.

Flooding from Infrastructure/Sewer Failure

6.57 No potential sources of flooding from artificial drainage systems, sewers, ponds or reservoirs have been identified.

Historical Flood Events

6.58 NRW publicly available online historical flood mapping available at http://lle.gov.wales/map#m=-2.96257,51.55198,14&b=europa&l=136; indicates that there are no records of flooding within the study area.

Surface Water Resources

Surface Water and Drainage Strategy

6.59 The Uskmouth Conversion Project site is currently drained via a combination of traditional below ground drainage networks and open drainage ditches before discharging to the River Usk approximately 0.5 km to the west of the site.

6.60 Drainage improvement works were undertaken c.2006-2009 to the south east of the site which include provisions for storage of fuel ash including a new surface water drainage system, an attenuation pond and other infrastructure improvements. RPS drawing 019784-RPS-SI-ZZ-DR-D-0300 included in Appendix A of the Outline Drainage Strategy Report (Appendix 6.2) depicts the site boundary area in its existing state.

6.61 As part of the 2006-2009 works, an internal perimeter drainage ditch was installed around the coal/fuel ash area to intercept surface water run-off containing suspended sediments and allow these to settle out before the run-off was discharged to the attenuation pond via a concrete catch pit structure.

6.62 The coal stockyard drainage ditch flows west to east around the southern section of the site before discharging into the attenuation pond via a lamella plate clarifier and hydrobrake limited to 30 l/s as per a previously consented SuDS scheme c.2006-2009. Water is then directed to a drainage channel via an outfall on the south west corner of the pond from where flows head south and then west along the perimeter of the coal storage area parallel to the coal run-off drainage ditch. Water then finally discharges into the estuary via a headwall on the Usk coastline.

Surface Water Abstraction

6.63 The abstraction licence records taken from Envirocheck data records indicate that there is one historical licence within 500 m of the Uskmouth Conversion Project operated by Aes East Usk Limited (licence number 20/56/11/0022) detailed below. Aes East Usk Limited is not listed on Companies House but was a previous owner of the Uskmouth Power Station installation. This water abstraction licence was previously operated in connection with the Uskmouth Power Station installation but is not currently utilised.

Table 6.7: Surface Water Abstraction Licence within a 500 m Search Area of the Project

Name of Holder	Licence number	Grid Reference	Distance from site (m)	Maximum daily volume (m^3)
Aes East Usk Limited	20/56/11/0022	332330, 183830	0	1,832,000 abstract tidal water from the River Usk for the purpose of non-evaporative cooling

Groundwater Water Abstraction

6.64 The Envirocheck Report (2018) confirms that there is no groundwater abstraction within the study area.

Discharge Consents

6.65 Discharges of liquid effluent or wastewater into surface waters are regulated by the NRW using discharge consents and environmental permits. The Envirocheck Report (2019) indicates that there are 13 active discharge or non-revoked consents within the 500 m study area of the Uskmouth Conversion Project (Table 6.8).

Table 6.8: Surface Water Discharge Consents within a 500 m search area of the Project

Name of Holder	Permit Number	Grid Reference	Distance from Site (m)	Effluent Type	Effective Date
Dwr Cymru Cyfyngedig	Ab0067101	333450, 184110	23	Sewage discharges	1 January 2010
Dwr Cymru Cyfyngedig	Ab0067102	333450, 184110	23	Sewage discharges	31 December 2000
Severn Power Limited	An0260501	332464, 183876	3	Sewage discharges	17 November 2014
Uskmouth Power Station	An0285201	332700, 184000	46	Sewage discharges	7 October 1998
Associated British Ports	An0033364	332130, 184200	399	Not supplied	3 February 1993
Saica Pack UK Ltd	An0267401	332050, 184150	403	Trade and other matter discharges	17 October 1996

Associated British Ports	An0033331	332010, 184180	452	Not Supplied	3 February 1993
Associated British Ports	An0033366	331920, 184080	430	Not Supplied	3 February 1993
Paul Baldock	Ab0041901	331900, 184120	474	Sewage discharges	27 June 2000
Associated British Ports	An0033333	331830, 184020	436	Not Supplied	3 February 1993
Associated British Ports	An0033332	331970, 184120	436	Not Supplied	3 February 1993
Associated British Ports	An0033365	331980, 184140	444	Not Supplied	3 February 1993
Associated British Ports	An0033334	331710, 183930	470	Not Supplied	3 February 1993

6.66 Although the volume and parameters of the discharges are regulated (via the discharge consents and permits), the quality of the receiving surface water may potentially be affected.

Pollution Incidents to Controlled Waters

6.67 Pollution incident mapping has been used to identify if the quality of watercourses within the hydrology, drainage and flood risk study area have been affected by pollution.

6.68 A review of Envirocheck data identified 3 pollution incidents in the hydrology, drainage and flood risk study area. Incidents were reported as category 3 (minor impact) with 1 recorded as a category 2 (significant) incident dated 1991 c.380 m south east of the Proposed Development associated with the release of sewage. This is defined by NRW, under the common incident classification scheme, as a substantiated incident with no impact to water quality.

Surface Water Quality

6.69 The overall WFD status for watercourses within the study area have been extracted from the Usk Management Catchment Summary (2016) and summarised in Table 6.9. The objective dates are explained as follows:

- 2015: status matches the predicted future status or potential. The main environmental objective is to prevent deterioration in status between 2015 and 2021.
- 2021: there is confidence that as a result of the programme of measures, the water body will improve from its 2015 status to achieve the predicted future status by 2021. The environmental objective is for water bodies and elements to make an improvement from the reported 2015 status to achieve the predicted future status by 2021.
- 2027: the deadline for achieving the status or potential has been extended to 2027. For a 2027 date, there is currently not enough confidence that the improvement in status can be achieved by an earlier date.

Table 6.9: WFD Water Quality Data

Name of Catchment	Overall Status 2015	Objective 2015-2021
River Usk	Moderate	Good

6.70 In summary, the records show that the watercourse within the hydrology, drainage and flood risk study area have a WFD status of 'Moderate'. However, all waterbodies have objectives to improve, with most aiming to achieve 'Good' status by 2021.

6.71 A full description of the WFD classification process and associated definitions are available at: https://naturalresources.wales/evidence-and-data/research-and-reports/water-reports/river-basin-management-plans/river-basin-management-plans-published/?lang=en.

Sensitive Receptors

6.72 The sensitive receptors listed in Table 6.10 have the potential to be affected by the Uskmouth Conversion Project. The assessment in this chapter has considered the potential effects upon these sensitive receptors.

Table 6.10: Potentially Affected Sensitive Receptors

Receptor	Importance/Sensitivity/Vulnerability to Change
River Usk	High (Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC))
Severn Estuary	High (SSSI, SAC, Special Protection Area (SPA))

Future Baseline Conditions

6.73 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 requires that *"an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge"* is included within the ES.

6.74 In the event that the Uskmouth Conversion Project does not progress, an assessment of the future baseline conditions has been carried out and is described within this section.

6.75 The main change to the hydrology, drainage and flood risk future baseline is associated with the potential effects of climate change, which may impact on future peak river flow rates and rainfall intensity. A summary of potential climate change allowances as outlined by the Welsh Government is presented below. Further details of climate change allowances can be found in Adapting to Climate Change: Guidance for Flood and Coastal Erosion Risk Management Authorities in Wales (December 2017).

Climate Change

6.76 The Met Office UK Carbon Projections dataset provides probabilistic projections of change in climatic parameters over time for 25 km grid squares across the UK. Projected changes during low, medium and high future global greenhouse gas emissions scenarios have been reviewed for the period from 2070 up to 2115, encompassing the construction and operational phases of the Proposed Development.

6.77 UKCP09 is was updated (to CP18) in November 2018 (Met Office, 2018). However, due to the delay in updating modelling with new climate data, UKCP09 remains the most widely used dataset for NRW models and remains an appropriate tool for flood adaptation planning (Met Office, 2017). For the assessment of this site, climate change allowances have been extracted from the Welsh Government (December 2017) Adapting to Climate Change: Guidance for Flood and Coastal Erosion Risk Management Authorities in Wales. These have not been updated with new findings as since the publication of UKCP18 as no modelling information is available based on this data set. Instead a precautionary approach to the exiting data was adopted.

6.78 PPW10 sets out how the planning system should help minimise vulnerability and provide resilience to the impacts of climate change. This includes demonstrating how flood risk will be managed in the present day and, over a development's lifetime, taking climate change into account. Guidance

requires that FCAs take into account, where appropriate, increases in rainfall intensity, peak river flows and sea level rise.

6.79 The range of allowances (see Table 6.11) is based on percentiles. The 50th percentile is the point at which half of the possible scenarios for peak rainfall intensity fall below it and half fall above it. The central estimate is based on the 50th percentile and the upper estimate is based on the 90th percentile.

Applies across all of Wales	Total potential change anticipated for 2020s (2015-2039)	Total potential change anticipated for 2050s (2040-2069)	Total potential change anticipated for 2080s (2070-2115)
Upper Estimate	10%	20%	40%
Central Estimate	5%	10%	20%

6.80 Guidance is also provided on increases in river flows as a consequence of climate change. The guidance provides central, upper central and higher central climate allowance bands which should be utilised within the assessment of flood risk, including the flood risk vulnerability classification, for sites in Flood Zones 2, 3a and 3b (at flood risk) (see Table 6.12).

6.81 Table 6.12 identifies the range of increase per time period for peak rainfall intensity. Assessment should assess both the central and upper estimates to understand the range of impact.

Table 6.11: Change to Extreme Rainfall Intensity Compared to a 1961-90 Baseline

Applies across all of Wales	Total potential change anticipated for 2020s (2015-2039)	Total potential change anticipated for 2050s (2040-2069)	Total potential change anticipated for 2080s (2070-2115)
Upper Estimate	10%	20%	40%
Central Estimate	5%	10%	20%

6.82 Guidance is also provided on increases in river flows as a consequence of climate change. The guidance provides central, upper central and higher central climate allowance bands which should be utilised within the assessment of flood risk, including the flood risk vulnerability classification, for sites in Flood Zones 2, 3a and 3b (at flood risk) (see Table 6.12).

Table 6.12: Peak River Flow Allowances by River Basin District

Wales (Severn)	Total potential change anticipated by the 2020s	Total potential change anticipated by the 2050s	Total potential change anticipated by the 2080s)
Upper Estimate	25%	40%	70%
Central Estimate	15%	20%	25%

6.83 Table 6.13 outlines the anticipated annual sea level rise associated with climate change per defined time period. NRW expect sea level rise to increase the rate of coastal erosion.

Table 6.13: Sea Level Rise

Wales	2009 to 2025	2026 to 2055	2056 to 2085	2086 to 2115	Cumulative rise 1990 to 2115 / metres (m)
Annual Change (mm/yr)	3.5 (59.5 mm)	8.0 (240 mm)	11.5 (345 mm)	14.5 (449.5 mm)	1.094 m

6.84 NRW climate change guidance has been derived from national scale research. There may be cases where local evidence supports the use of other local climate change allowances. With specific reference to changes in extreme rainfall LIT 5707 notes that UKCP09 provides useful information on change to rainfall across the UK.

6.85 RPS has added 40% to all attenuation/run-off calculations for the Proposed Development to account for climate change.

Mitigation Measures Adopted as Part of the Project

6.86 Potential impacts to the hydrological environment would be avoided where practicable through a number of standard construction mitigation measures as outlined in Table 6.14 and Table 6.15.

6.87 As part of the development process and in line with industry standard guidelines, a number of mitigation measures would be incorporated, where practicable, to reduce the potential for impacts on water resources, hydrology, drainage and flood risk. These mitigation measures are considered to be standard industry practice for this type of development and would include, but are not limited to, the production of and adherence to a Surface Water Management Strategy and a Flood Management Plan, the anticipated content of which is summarised below.

Surface Water and Flood Risk Management

6.88 Temporary drainage mitigation techniques including run-off interceptor channels could be installed during construction to link to the permanent drainage network, this would ensure discharges from construction activities are controlled in quality and volume. The permanent drainage network includes a run-off drainage ditch around the southern section of the construction area that discharges into an attenuation pond via a lamella plate clarifier and hydrobrake limited to 30 l/s as per a previously consented SuDS scheme c.2006-2009. Water then enters the southern boundary drainage ditch via an outfall and continues parallel to the run-off drainage ditch, before finally discharging into the Usk estuary.

6.89 Construction material and/or spoil within construction compounds are positioned where possible away from drainage systems or surface watercourses and no hazardous substances would be stored in close proximity of the drainage network.

6.90 Section 6 of the FCA (Appendix 6.1) describes the principles of the Outline Surface Water Drainage Strategy for the Uskmouth Conversion Project site. The detailed drainage strategy is anticipated to be the subject of a planning condition and would be prepared by the contractor before being agreed with NRW and the LLFA. The strategy would incorporate the use of appropriate SuDS techniques, interceptors and separators as required, treating surface water run-off generated from the site, prior to discharging into the local surface water network at an agreed rate.

6.91 Any area at risk of spillage, such as vehicle maintenance areas and hazardous substance stores (including fuel, oils and chemicals) would be bunded and carefully sited to minimise the risk of hazardous substances entering the drainage system, the River Usk or the Severn Estuary. Additionally, the bunded areas would have impermeable bases to limit the potential for migration of contaminants into groundwater following any potential leakage/spillage event.

6.92 Table 6.14 presents a list of general industry guideline and best practice measures to be incorporated into the construction phase of the Uskmouth Conversion Project. These measures would be included within a Construction Environmental Management Plan (CEMP) to be drafted prior to commencement.

Table 6.14: Construction Mitigation Measures

Mitigation Measure	Justification

Construction	
Surface Water Management Strategy This would form part of the Outline Drainage Strategy Report (Appendix 6.2). The Uskmouth Conversion Project would result in the construction of low permeable surfacing, potentially altering the surface water run-off and flow regime. A surface water management plan is required to ensure the existing run-off rates to the surrounding water environment are maintained at predevelopment rates. The surface water management strategy is based on the worst-case attenuation volumes. The strategy would ensure that the mean annual run-off rate is restricted, in accordance with national and local NCC policy requirements. Measures to mitigate against water pollution would also be incorporated into the final detailed drainage design and include, where appropriate and feasible, measures set out below to ensure that any increase in surface water run-off would be handled on-site and a run-off rate to the surrounding water environment (River Usk) is maintained at an agreed rate. It would highlight potential contaminants and suspended sediment that could originate from the Proposed Development which may affect the receiving watercourse and set out appropriate monitoring to be carried out during the construction phase and continue throughout the lifetime of the development, as necessary.	To address NRW and LLFA surface water run-off requirements.
Best Practice Measures Construction work would be undertaken in general accordance with the following best practice guidance: • NRW (February 2018) Works and maintenance in or near water GGP5 • NRW (July 2017) Safe storage and disposal of used oils GGP8 • NRW (April 2017) Vehicle washing and cleaning GPP13 • NRW (undated) Dewatering underground ducts and chambers GPP20 • NRW (July 2017) Pollution Incident Response Plans GPP21 • NRW (July 2018) Safe storage of Drums and Intermediate Bulk Containers (IBCs) GPP 26 • NRW guidance for discharges to surface water and groundwater: environmental permits (https://naturalresources.wales/permits-and-permissions/water-discharges-and-septic-tanks/discharges-to-surface-water-and-groundwater/guidance/?lang=en) • NRW (January 2017) Above ground oil storage tanks GPP2 • NRW guidance for work on a river, flood defence or sea defence (https://naturalresources.wales/permits-and-permissions/flood-risk-activities/guidance/?lang=en) Pollution Prevention Guidance, which have been withdrawn. However, still provide useful best practice guidance: • Pollution Prevention Guidance Note 6: Pollution Prevention Guidelines – Working at Construction and Demolition Sites (EA, 2012) • Pollution Prevention Guidance Note 5: Working in, near or liable to affect watercourses (EA, 2007) CIRIA Guidance Documents: • Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors CIRIA (C532) (CIRIA, 2001) • CIRIA – SuDS Manual (CIRIA, 2015a) • CIRIA (C741) Environmental good practice on site guide (CIRIA, 2015b) • CIRIA (C648) Control of water pollution from linear construction projects (CIRIA, 2001) Additional on-site management strategies: • Prevent surface water being affected during earthwork operations. No discharge to surface watercourses would occur without permission from the NRW (SuDS Manual) • Wheel washers and dust suppression measures to be used as appropriate to prevent the migration of pollutants (SuDS Manual)	To accord with guidance and best practice for constructional works.

- Regular cleaning of roads of any construction waste and dirt to be carried out (SuDS Manual)
- A construction method statement to be submitted for approval by the regulator (SuDS Manual)
- Defra, October 2005. Flood Risk Assessment Guidance for New Development, Phase 2 FD2320/TR2 (Defra, 2005). Management Plan

6.93 Table 6.15 presents a list of measures to be incorporated into the operational phase of the Uskmouth Conversion Project.

Table 6.15: Operational Mitigation Measures

Mitigation Measures	Justification
Operation	
Surface Water Drainage Strategy The strategy would incorporate the use of appropriate SuDS techniques, interceptors and separators as required, treating surface water run-off generated from the site, prior to discharging into the local surface water network at an agreed rate.	To reduce the risk of surface water flooding and manage flows from increased areas of low permeable surfacing.
Flood Evacuation Plan This plan would be applicable throughout the lifetime of the Uskmouth Conversion Project covering procedures to ensure the safety of on-site users. Plan to developed in accordance with NRW guidance on Evacuation plans.	To reduce the risk of harm to on-site users.
Drainage Maintenance Plan This plan would be applicable throughout the lifetime of the Uskmouth Conversion Project covering drainage within the site and any connections to the surface water, or foul sewer and trade waste networks.	To reduce the risk of surface water pollution and to maintain the drainage network in order that flood risk does not increase temporarily.
Flood Management Plan This plan would be applicable throughout the lifetime of the Uskmouth Conversion Project and should include flood-warning measures.	To ensure the safety of on-site users and reduce the risk of surface water pollution and to maintain the drainage network in order that flood risk does not increase temporarily.
Emergency Spillage Management Plan This plan would be applicable throughout the lifetime of the Uskmouth Conversion Project and should include emergency measures in the event that spillages should occur.	To reduce the risk of surface water pollution and to maintain the drainage network in order that flood risk does not increase temporarily.
Water Quality Monitoring Strategy Ongoing water quality monitoring should be undertaken throughout the lifetime of the Uskmouth Conversion Project.	To reduce the risk of surface water pollution and to maintain the drainage network in order that flood risk does not increase temporarily.

Assessment of Construction Effects

6.94 The identified potential environmental impacts arising from the construction of the Uskmouth Conversion Project are listed below:

- the impact of construction on temporary flood risk;
- the impact of construction on water resources; and
- the impact of construction on the on-site drainage network.

6.95 A description of the significance of impacts upon hydrology, drainage and flood risk receptors caused by each identified impact is given below.

Impact of Construction on Temporary Flood Risk

6.96 The Uskmouth Conversion Project site is at 'medium' to 'high' risk of tidal flooding from the tidally dominant River Usk.

6.97 The site is predominantly surfaced with low permeability hardstanding. This is unlikely to alter during the construction phase. Therefore, flood risk to the surrounding area is also unlikely to alter during the construction phase.

Sensitivity of Receptor

6.98 The land adjoining the site consists of industrial related uses (Liberty Steel). Site workers associated with the Uskmouth Conversion Project and that of adjoining sites are sensitive receptors. These receptors are considered to be of medium recoverability and high value. The sensitivity of the receptor is therefore, considered to be **high**.

Magnitude of Impact

6.99 As construction of the Uskmouth Conversion Project is not anticipated to significantly change the extent of impermeable areas within the site boundary, the run-off rates and characteristics associated with construction are expected to be similar to existing run-off rates. Accordingly, impacts on flood risk during the construction phase are not predicted to affect the adjoining receptors.

6.100 Furthermore, construction methodologies would ensure that off-site surface water flows during construction are not increased. Mitigation measures would be adopted as part of the project to manage surface water flows during the construction phase of the Uskmouth Conversion Project; this may include construction of additional drainage network to discharge surface water falling upon the construction site.

6.101 A flood management plan and flood evacuation plan would be implemented during construction and future operation of the Uskmouth Conversion Project to ensure the safety of site users.

6.102 Any impact is predicted to be of locally spatial extent, short term duration, intermittent and high reversibility. The magnitude is therefore, considered to be **low**.

Significance of Effect

6.103 The overall significance of the effect on flood risk taking into account the mitigation measures adopted as part of the project set out in Table 6.14 is assessed as **minor beneficial**, following the use of construction drainage techniques.

The Impact of Construction on Water Resources

6.104 During construction of the Uskmouth Conversion Project, there is a potential risk of accumulation of standing water on site and accidental discharges of untreated run-off to watercourses whilst development and the permanent surface water drainage system is being constructed. The River Usk and Severn Estuary are the nearest watercourses and are also SSSIs.

6.105 There are a number of potential water pollutants which could arise during construction which may potentially affect the water quality of receiving watercourses. These are outlined below:

- fine particulate materials (e.g. silts and clays);
- cement;
- oil, fuel and chemicals (from plant machinery and processes); and
- other wastes such as wood, plastics, sewage and rubble.

6.106 These pollutants may be present as a result of normal site activities, incorrect storage of oils and chemicals and/or accidental spillage. The significance of the incident would be dependent on the nature of the pollutant, the quantity, the mitigation measures adopted and their timing and effectiveness, also the sensitivity of the receiving watercourse.

Sensitivity of Receptor

6.107 In this case, the receptors are the River Usk and Severn Estuary which, due to their ecological designations, are considered highly vulnerable and high value. The sensitivity of the receptor is therefore, considered to be **high**.

Magnitude of Impact

6.108 Activities associated with machinery during construction could lead to an increase in turbid run-off and spillages/leaks of fuel, oil etc. that could affect nearby watercourses.

6.109 However, the Uskmouth Conversion Project construction process would include mitigation measures adopted as part of the project to intercept run-off and ensure that discharges from the construction site are controlled in quality and volume. In addition, water quality monitoring could be carried out throughout the construction phase to ensure no discharge of pollutants or increase in suspended sediment occurs. The impact is predicted to be of local spatial extent, short term duration, intermittent and high reversibility. The magnitude is therefore, considered to be **low**.

Significance of Effect

6.110 Taking into consideration the integration of construction mitigation measures in Table 6.14 adopted as part of the project, the significance of effect in relation to run-off from construction sites and spillages, would be **minor adverse**, which is not significant.

The Impact of Construction on the On-site Drainage Network

Sensitivity of Receptor

6.111 Some disruption to the existing drainage regime is possible during construction activities associated with the Uskmouth Conversion Project. For example, blockage of a drainage flow path/pipe has the potential to lead to backing up of the system and surcharging of the drainage infrastructure. The potential effect to on-site drains is considered of moderate vulnerability, moderate to high recoverability and minor value. The sensitivity of the receptor is, therefore, considered to be **medium**.

Magnitude of Impact

6.112 Construction of the Uskmouth Conversion Project has the potential to remove or disrupt the on-site drainage network, in turn increasing the flood risk to the Uskmouth Conversion Project and surrounding receptors.

6.113 Current maintenance of the existing site drainage system includes annual casting and silt removal from site drainage ditches, and inspection and silt removal from the Lamella plate clarifiers. It is predicted that the impact would affect the receptor directly.

6.114 The implementation of Uskmouth Conversion Project construction mitigation measures adopted as part of the project would limit the disruption to the on-site drainage network and/or include temporary construction drainage, if necessary. In this case, the impact is predicted to have a negligible impact on surrounding receptors, be of short-term duration, intermittent and reversible. The magnitude is therefore, considered to be **no change**.

Significance of Effect

6.115 The significance of effect on the on-site drainage networks when the construction mitigation measures adopted as part of the project in Table 6.14 are incorporated, is considered to be **no change**.

Further Mitigation

6.116 The assessment has demonstrated that the Uskmouth Conversion Project would not cause any exceedances of the hydrology, drainage and flood risk objectives and that the overall effect would be 'not significant'. It is therefore not considered necessary to propose further mitigation measures for this development beyond those outlined above.

Future Monitoring

6.117 Ongoing water quality monitoring should be undertaken throughout the lifetime of the Uskmouth Conversion Project. This would apply to the drainage ditches within and surrounding the Uskmouth Conversion Project site boundary and accord with testing requirements as specified in the Environmental Permit and in line with the Outline Drainage Strategy (Appendix 6.2). Currently, water discharge from site are monitored on the three water discharge points on site – W1a, W1b and W2. Water flow at the discharge points is checked daily and water samples taken when there is a flow exiting the discharge flap. Water samples are sent to an independent lab for analysis on a weekly basis when flow is discharging from site. This regime of sampling and monitoring would carry on during the Uskmouth Conversion Project and any additional samples would be taken and analysed as required.

Accidents and/or Disasters

6.118 Potential direct effects on hydrology, drainage and flood risk (from a catastrophic failure of fuel and oil storage) are limited as the Uskmouth Conversion Project incorporates a range of water treatment techniques, interceptor channels, settlement pits and separators to mitigate any such event. As a result, any direct and/or indirect water quality effects associated with the Uskmouth Conversion Project are unlikely.

6.119 On the above basis, in the event of an accident/disaster, the Uskmouth Conversion Project includes a number of features and measures to contain, treat and manage pollution risk. Overall, the risk to population health and water quality is not considered significant.

Assessment of Operational Effects

6.120 The potential environmental effects arising from the operation of the Uskmouth Conversion Project are listed below:

- the impact of operation on flood risk;
- the impact of operation on water resources; and
- the impact of operation on the on-site drainage network.

6.121 A description of the significance of impacts upon hydrology, drainage and flood risk receptors caused by each identified impact is given below.

Impact of Operation on Flood Risk

6.122 NRW flood model outputs extracted from the Newport Velocity Depth Mapping Update (November 2016) identifies that the site is at flood risk during a defended 1 in 200 year event for 2090, with flood depths ranging from 0.92 m within the existing power station assets to 0.27 m within the ash treatment facility, biomass storage shed, store lorry loading area and associated infrastructure.

The southern area of the site associated with the Proposed Development, including silos and conveyors is at risk of flooding to a depth of 1.41 m during the defended 1 in 200 year 2090 event as the land associated with the silos is significantly lower.

6.123 The new storage silos, associated hardstanding and internal access road spurs would add a small amount of additional impermeable surface relative to the existing power station site. The existing Uskmouth Power Station drainage system is considered to have adequate capacity to manage run-off from the additional impermeable surface area created as a result of the Uskmouth Conversion Project.

Sensitivity of Receptor

6.124 Site users/staff are considered sensitive receptors and considered to be of high value. The sensitivity of the receptor is therefore, considered to be high.

6.125 The land adjoining the Uskmouth Power Station site consists of industrial related uses (Liberty Steel). Site workers associated with the Uskmouth Conversion Project and that of adjoining sites are considered to be sensitive receptors. These receptors are considered to be of medium recoverability and high value. The sensitivity of the receptor is therefore, considered to be **high**.

Magnitude of Impact

6.126 Following the implementation of appropriate management techniques and plans, including but not limited to a Flood Evacuation Plan, Site Management Flood Protocol and registration to NRW's flood warning system, flood risk can be appropriately managed.

6.127 Uncontrolled surface water flows generated during site operation and maintenance could lead to an increase in flood risk. The impact is predicted to be of local spatial extent affecting the site and local receptors, short to medium term duration and intermittent occurrence. However, the Uskmouth Conversion Project would incorporate appropriate drainage solutions as part of the detailed design, with any temporary disruption to on-site drainage being restored due to mitigation measures adopted as part of the project, set out in Table 6.15.

6.128 The Uskmouth Conversion Project would retain the existing surface water drainage regime, whereby surface water flows are conveyed by an internal drainage network passing through a lamella plate clarifier prior to discharging into the River Usk/Severn Estuary. An Outline Drainage Strategy is provided in Appendix 6.2. A detailed drainage design is anticipated to be required by an appropriately worded planning condition.

6.129 The site has been subject to an FCA (Appendix 6.1) and in completing this document it has been confirmed with NRW and the LLFA that because the Uskmouth Conversion Project would retain the existing drainage regime principles of directing flows into the tidally dominant River Usk/Severn Estuary there is no requirement to reduce existing run-off rates.

6.130 Therefore, the impact of the Uskmouth Conversion Project, subject to mitigation measures set out in Table 6.15, is predicted to be of local spatial extent, short term duration, intermittent and highly reversible. With the operational measures proposed, it is predicted that the impact would not affect surrounding local receptors directly. The impact of the Uskmouth Conversion Project is therefore considered **negligible**.

Significance of Effect

6.131 The overall significance of the effect on flood risk taking into account the mitigation measures set out in Table 6.15 is assessed as **minor beneficial**.

The Impact of Operation on Water Resources

6.132 During the operation of the Uskmouth Conversion Project, there are likely to be a number of potential pollutants present which may give rise to water quality effects on the surrounding surface watercourses if allowed to infiltrate them. These include:

- hine particulate materials (e.g. silts and clays);
- hydrocarbons;
- oils, fuels and chemicals (from plant machinery and processes); and
- process waste water.

Sensitivity of Receptor

6.133 In this case the receptor is the River Usk and Severn Estuary the sensitivity of which is considered **high**.

Magnitude of Impact

6.134 Pollution arising from accidental spillages on site such as road traffic accidents could result in a range of impacts on watercourses from negligible to high. Activities associated with machinery during the operation could lead to an increase in turbid run-off and spillages/leaks of fuel, oil etc. that could affect nearby watercourses. Based on the locality of the River Usk and Severn Estuary, the magnitude of impact has been assessed as high.

6.135 The provision of operational mitigation measures, including on-site drainage networks, as outlined in Table 6.15 would reduce the potential impact to **low**.

Significance of Effect

6.136 The provision of permanent operational measures as outlined in Table 6.15 would reduce the range of potential effects, should they occur, to **minor adverse**, which is not significant.

The Impact of Operation on the On-site Drainage Network

Sensitivity of Receptor

6.137 During operation there is a potential for disruption to the existing drainage regime. A blockage or silting up of a drainage flow path/pipe run has the potential to lead to backing up of the system and surcharging of the drainage infrastructure. The effect to on-site drains is considered of moderate vulnerability, moderate to high recoverability and minor value. The sensitivity of the receptor is, therefore, considered to be **medium**.

Magnitude of Impact

6.138 The potential blockage of on-site drainage would increase flood risk to the site and the surrounding receptors. However, operational mitigation and on-site management measures would limit disruption to on-site drainage.

6.139 In this case the impact is predicted to have a negligible impact on surrounding receptors, be of short-term duration, intermittent and reversible. The magnitude is therefore, considered to be **no change**.

Significance of Effect

6.140 The significance of effect on the on-site drainage networks with the implementation of operational mitigation measures adopted as part of the project in Table 6.15 is considered to be **no change**.

Further Mitigation

6.141 The assessment has demonstrated that the Uskmouth Conversion Project would not cause any exceedances of the hydrology, drainage and flood risk objectives and that the overall effect would be 'not significant'. It is, therefore, not considered necessary to propose further mitigation measures for this development.

Future Monitoring

6.142 Ongoing water quality monitoring should be undertaken throughout the lifetime of the Uskmouth Conversion Project. This would apply to the drainage ditches within and surrounding the Uskmouth Conversion Project site boundary and accord with testing requirements as specified in the existing site Environmental Permit and in line with the Outline Drainage Strategy (Appendix 6.2).

Accidents/Disasters

6.143 Potential direct effects on hydrology, drainage and flood risk (from a catastrophic failure of fuel and oil storage) are limited as the Uskmouth Conversion Project incorporates a range of water treatment techniques, interceptor channels, settlement pits and separators to mitigate any such event. As a result, any direct and/or indirect water quality effects associated with the Uskmouth Conversion Project are unlikely.

6.144 On the above basis, in the event of an accident/disaster, the Uskmouth Conversion Project includes a number of features and measures to contain, treat and manage pollution risk. Overall, the risk to population health and water quality is not considered significant.

Potential Changes to the Assessment as a Result of Climate Change

6.145 The assessment has demonstrated that the Uskmouth Conversion Project would not cause any exceedances of the hydrology, drainage and flood risk objectives including an appropriate allowance for climate change (40%) as detailed in the Welsh Government (December 2017) Adapting to Climate Change: Guidance for Flood and Coastal Erosion Risk Management Authorities in Wales.

Assessment of Cumulative Effects

6.146 This section considers the inter-project cumulative effects of the Uskmouth Conversion Project on water resources and hydrology in conjunction with other projects / developments.

6.147 The potential cumulative impacts with other major developments have been identified outlining likely significant effects (if any) and assessing against the baseline position, including the built and operational development. In assessing cumulative impacts, other major developments identified through consultation with the local planning authorities and other relevant authorities on the basis of those that are:

- Under construction;
- Permitted application(s), but not yet implemented;
- Submitted application(s) not yet determined;
- Projects on the Planning Inspectorate's Programme of Projects;
- Identified in the relevant Development Plan (and emerging Development Plans – with appropriate weight being given as they move closer to adoption) recognising that much information on any relevant proposals will be limited; and

- Identified in other plans and programmes (as appropriate) which set the framework for future development consents/approvals, where such development is reasonably likely to come forward.

6.148 A review has been undertaken to highlight any approved and proposed developments within a 1 km search area from the project.

6.149 A 1 km search area is deemed appropriate for data collection considering the nature of the Uskmouth Conversion Project and likely zone of influence on hydrological receptors. Given the landscape surrounding the Uskmouth Conversion Project, current and ongoing activities, and natural baseline fluctuations it is difficult to ascertain the exact source of any impacts on flood risk and/or water quality beyond 1 km.

6.150 The review of approved and proposed developments established that there are four cumulative developments within the defined search area outlined below:

- Llanwern – Solar DNS planning permission reference: DNS/3213968;
- LDP Allocation EM1 ii) East of Queensway Meadows, south of Glan Llyn – 27 hectares for B1, B2 and B8 uses;
- LDP Allocation EM1 iv) Solutia – 43 hectares for B1, B2, B8 and leisure use; and
- LDP Allocation H1 (23) Traston Lane.

6.151 For each of the proposed developments and scenarios presented it is assumed, where relevant, in accordance with PPW10 and TAN15, any new development is required to attenuate surface water run-off, where practicable, to the greenfield run-off rate and provide appropriate management techniques to treat potentially contaminated run-off prior to discharge into the local drainage network. In addition, discharges from developments are monitored by NRW and LLFA/SuDS Approval Body (SAB) for water quality.

6.152 Any works undertaken within 8 m of a watercourse and/or flood defence would require a Flood Risk Activities Permit (FRAP) or consent from either NRW, LLFA or MMO depending on whether the waterbody is designated a Main River, Ordinary watercourse or tidal body. For the FRAP, consent or licence to be provided the developer is required to demonstrate that the risk of flooding during the lifetime of the development could be mitigated to a level acceptable to NRW, LLFA/SAB and/or MMO. Consequently, the cumulative impacts on water resources & hydrology are predicted to be not significant.

6.153 Therefore, it has been determined that no significant cumulative effects on hydrology, drainage and flood risk receptors are likely.

Inter-relationships

6.154 The assessment includes consideration of all potential impacts on hydrology, flood risk features character and water quality. Therefore, no additional interrelated effects are considered likely to occur beyond those identified in the specific assessment.

Summary of Effects

6.155 The hydrology, drainage and flood risk study area is shown on NRW flood maps as being located within Flood Zone 1, 2 and 3 with a varying probability of flooding from low to high.

6.156 The hydrology, drainage and flood risk study area includes a number of catchments associated with unnamed ordinary watercourses and NRW designated main rivers (River Usk and the Severn Estuary). Some of these rivers are associated with designated ecological habitats or are designated for their own ecological/environmental importance.

6.157 Although Uskmouth Conversion Project construction phase has the potential to cause a temporary degradation of water quality to main and ordinary watercourses through increase in soil erosion and accidental release of sediment, appropriate mitigation measures have been identified within this chapter to minimise potential impacts. The effect with mitigation is considered to be of no more than minor adverse significance.

6.158 The new storage silos, associated hardstanding and internal access road spurs would add a small amount of additional impermeable surface relative to the existing power station site. The existing Uskmouth Power Station drainage system is considered to have adequate capacity to manage run-off from the additional impermeable surface area created as a result of the Uskmouth Conversion Project.

6.159 Appropriate operational management measures would be incorporated in order to mitigate against any increase in run-off, including an outline drainage strategy. The effects during the operational phase in relation to flood risk are therefore considered to be of negligible significance.

6.160 The operation of the Uskmouth Conversion Project requires routine maintenance of key infrastructure elements, and may involve the use of chemicals, oils and greases and therefore, there is the potential for spillages to occur which may affect the water quality of ordinary watercourses. Operational practices would involve management plans including spill procedures, clean up and remediation of contaminated water run-off and water quality monitoring (if required) in order to mitigate against any decrease in water quality status. The potential effects of operation and maintenance are therefore considered to be of minor adverse significance.

6.161 An FCA has been prepared which identifies that the Uskmouth Conversion Project is considered being at varying degrees of risk of tidal flooding. Flood management procedures and a Flood Evacuation Plan would be incorporated into the development management plan to ensure that on site materials are appropriately stored and that site-users are safety evacuated from site in a timely manner. The potential impacts on site-users and the local environment is therefore considered to be of minor adverse significance. The Uskmouth Conversion Project is at low risk of surface water flooding and at no risk of flooding from reservoir failure. The Uskmouth Conversion Project is defined as 'highly vulnerable' and suitable for the present Flood Zones including climate change, subject to the application of a justification test. A justification test has been undertaken and there are no other reasonably available sites suitable for a development of this type.

6.162 The FCA demonstrates that appropriate mitigation measures would reduce the adverse impacts caused by the Uskmouth Conversion Project and an appropriate drainage strategy would be incorporated into the design to attenuate any increase in surface water run-off, therefore, increase in flood risk. The FCA and Outline Drainage Strategy therefore demonstrate that the project meets the requirements of PPW10 and TAN15.

6.163 Cumulative impacts from developments screened into the assessment have been assessed. It is assumed that each development would be constructed in line with the requirements of PPW10 and TAN15, requiring that new developments attenuate surface water run-off where practicable to the greenfield run-off rate via a surface water management plan and/or drainage scheme. The impacts are predicted to result in effects of negligible or minor adverse significance.

6.164 A summary of the findings of the hydrology, drainage and flood risk assessment are presented in Table 6.16.

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Welsh Government, 2016. Planning Policy Wales- Chapter 13: Minimising and Managing Environmental Risks and Pollution.

Welsh Government Spatial Data Infrastructure, 2001. The Registered Landscapes of Outstanding and of Special Interest in Wales GIS Polygon Dataset.

Welsh Government (2018) Statutory standards for sustainable drainage systems – designing, constructing, operating and maintaining surface water drainage systems

Table 6.16: Summary of Likely Environmental Effects on Hydrology, Drainage and Flood Risk

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact	Significance of effect	Significant / Not significant	Notes
Construction phase							
Impact of construction on temporary flood risk	High	Risk to site users and infrastructure	Short term	Low	Minor Beneficial	Not Significant	Includes mitigation measures adopted as part of the project.
Impact of construction on surface water resources	High	Pollution of local watercourses	Short Term	Low	Minor Adverse	Not Significant	Includes mitigation measures adopted as part of the project.
Impact of construction on on-site drainage network	Medium	Risk to site users and infrastructure	Short term	No Change	No Change	Not Significant	Includes mitigation measures adopted as part of the project.
Operational phase							
Impact of operation on flood risk	High	Alteration to surface water flow regimes	Short term	Negligible	Minor Beneficial	Not Significant	Includes mitigation measures adopted as part of the project.
Impact of operation on water resources	High	Pollution of local watercourses	Short term	Low	Minor Adverse	Not Significant	Includes mitigation measures adopted as part of the project.
Impact of operation on the on-site drainage network	Medium	Risk to site users and infrastructure	Short term	No Change	No Change	Not Significant	Includes mitigation measures adopted as part of the project.

7 ECOLOGY

Introduction

7.1 This chapter is concerned with the impacts of the construction and operation of the Uskmouth Conversion Project upon terrestrial ecology.

7.2 The Uskmouth Conversion Project relates to the conversion of the existing coal fired power plant at Uskmouth Power Station to operate as a plant which would generate electricity through the combustion waste derived fuel pellets, through the construction of fuel storage and material handling infrastructure external to the existing power station building (i.e. the Proposed Development) and works required for fuel combustion equipment conversion and plant life extension to be conducted inside the existing power station buildings (i.e. the Power Station Upgrade).

Assessment Methodology

Planning Policy Context

7.3 The following national and local planning policy documents and guidance are relevant to the Uskmouth Conversion Project and are described briefly in the sections below with reference to the particular sections applicable to nature conservation and biodiversity:

- Planning Policy Wales Edition 10 (PPW10);
- Technical Advice Note (TAN) 5;
- Local Planning Policy; and
- Biodiveristy Frameworks, Action Plans and Management Plans.

Planning Policy Wales

7.4 PPW10 (Welsh Government, 2018) provides a national policy framework for Wales. Chapter 6 of PPW10 covers 'Distinctive and Natural Places'. The following objectives are listed in paragraph 6.4.3 of PPW10, all of which are relevant:

'Support the conservation of biodiversity, in particular the conservation of wildlife and habitats;

Ensure action in Wales contributes to meeting international responsibilities and obligations for biodiversity and habitats;

Ensure statutorily and non-statutorily designated sites are properly protected and managed;

Safeguard protected and priority species and existing biodiversity assets from impacts which directly affect their nature conservation interests and compromise the resilience of ecological networks and the components which underpin them, such as water and soil, including peat; and

Secure enhancement of and improvements to ecosystem resilience by improving diversity, condition, extent and connectivity of ecological networks.'

7.5 The Biodiversity and Resilience of Ecosystems Duty (Section 6 Duty) contained within the PPW10 (paragraph 6.4.5) states:

'Planning authorities must seek to maintain and enhance biodiversity in the exercise of their functions. This means development should not cause any significant loss of habitats or

populations of species, locally or nationally and must provide a net benefit for biodiversity. In doing so planning authorities must also take account of and promote the resilience of ecosystems, in particular the following aspects: diversity between and within ecosystems; the connections between and within ecosystems; the scale of ecosystems; the condition of ecosystems including their structure and functioning; and the adaptability of ecosystems.'

Technical Advice Note 5: Nature Conservation and Planning

7.6 Technical Advice Note (TAN) 5 (Welsh Assembly Government, 2009) provides advice about how the land use planning system should contribute to protecting and enhancing biodiversity and geological conservation. The TAN provides advice for local planning authorities on:

- the key principles of positive planning for nature conservation;
- nature conservation and Local Development Plans;
- nature conservation in development management procedures;
- development affecting protected internationally and nationally designated sites and habitats; and
- development affecting protected and priority habitats and species.

Local Planning Policy

7.7 The application site is located within the administrative area of Newport City Council. The ecological assessment reported in this chapter has had regard to the following local policy documents.

7.8 Relevant local planning policies from the Newport Local Development Plan 2011-2026 (Newport City Council, 2015a) have been considered in the assessment.

7.9 Newport City Council has also published the River Usk Strategy (Newport City Council, 2009), and Wildlife and Development Supplementary Planning Guidance (SPG) (Newport City Council, 2015b), the relevant recommendations of which have been taken into account.

7.10 The key planning policies relevant to ecology and nature conservation are set out below.

Newport Local Development Plan 2011-2026

7.11 Objective 6 of the Newport Local Development Plan, which relates to the Conservation of the Natural Environment is:

'To protect and enhance the quality of the natural environment, including landscape, protected habitats and species of principal importance for biodiversity in Wales (regardless of greenfield or brownfield status) and the protection of controlled waters.'

7.12 The key policies relevant to ecology and nature conservation are:

- GP5 General Development Principals – Natural Environment;
- SP4 Water Resources;
- SP9 Conservation of the Natural, Historic and Built Environment;
- CE8 Locally Designated Nature Conservation and Geological Sites; and
- CE9 Coastal Zone.

7.13 Under GP5, the Uskmouth Conversion Project should:

- be designed and managed to protect and encourage biodiversity and ecological connectivity;

- demonstrate how they avoid, or mitigate and compensate negative impacts to biodiversity, ensuring that there are no significant adverse effects on areas of nature conservation interest (international, european, national, welsh), Section 42 and local protected habitats and species, and features of importance for ecology; and
- include scheme should enhances the site and the wider context including green infrastructure and biodiversity networks.

River Usk Strategy (2009)

7.14 Newport City Council's River Usk Strategy (Newport City Council, 2009) includes a section on Ecological Interests and Opportunities (Section 6). Paragraph 6.18 of the strategy states that:

"Development proposals linked to the River Usk or adjoining land will be assessed against UDP Policy SP7 – Conservation of the Natural Environment. Only proposals that conserve and, where appropriate, enhances the nature conservations interests will be granted permission".

7.15 The table contained within Section 6 of the Strategy sets out the main ecological features associated with the River Usk and presents examples of potential impacts as well as potential impact avoidance and/or enhancement measures for biodiversity.

7.16 The key recommendations of this section of the strategy are:

'To continue to work closely with the Environment Agency and Countryside Council for Wales to ensure that future proposals or plans do not adversely affect the nature conservation features of the River Usk.

To comply with the Conservation (Natural Habitats &c) Regulations 1994 and carry out Habitats Regulations Assessments to ensure that development does not have a detrimental impact upon the Special Area of Conservation or the special features for which it was designated.'

Wildlife and Development Supplementary Planning Guidance (2015)

7.17 Newport City Council's Wildlife and Development SPG (2015) provides specific direction on how biodiversity should be conserved and enhanced throughout the development control process, whilst drawing on national planning policy, and the policies contained in the Development Plan. Biodiversity must be actively considered by all proposed developments.

Biodiversity Action Plans and Management Plans

7.18 The following Biodiversity Action Plans are relevant to the ecological assessment of the Uskmouth Conversion Project:

- UK Post-2010 Biodiversity Framework (Joint Nature Conservation Committee (JNCC), 2012).
- Newport Local Biodiversity Action Plan (Newport Biodiversity Partnership, 2014).

7.19 The UK Post-2010 Biodiversity Framework supersedes the UK Biodiversity Action Plan. In 2007, the UK Biodiversity Partnership published an updated list of priority UK species and habitats covering terrestrial, freshwater and marine biodiversity to focus conservation action for rarer species and habitats in the UK. The UK priority list contains 1,150 species and 65 habitats. The UK list has been used as a reference to draw up the species and habitats of principal importance in Wales under Section 7 of the Environment (Wales) Act 2016.

7.20 The Newport Biodiversity Action Plan (Newport Biodiversity Partnership, 2014) contain Action Plans for some of the habitats and species recorded within the study area). These have been taken into account in this assessment.

Action Plan for Pollinators in Wales

7.21 The Action Plan for Pollinators in Wales (Welsh Government, 2013) recognises that:

'Pollinators are an essential component of our environment. Honeybees and wild pollinators including bumblebees, solitary bees, parasitic wasps, hoverflies, butterflies and moths and some beetles are important pollinators in Wales, for crops such as fruit and oil seed rape, clovers and other nitrogen fixing plants that are important to improving the productivity of pasture systems for livestock grazing, and wild flowers.'

7.22 It recognises the value of pollination as a contribution to the UK crop market and that bee and pollinator health and declining populations have been increasingly highlighted as a cause for concern in the UK and globally. The Welsh Government has thus worked with industry and stakeholders to look in more detail at the evidence and issues around pollinators and their conservation in Wales. The plan describes the current situation in Wales and identifies areas where action is needed. It details the Welsh Government's Vision for Pollinators in Wales and puts that into the context of the Welsh Government's priorities and policies. It also lays out an Agenda for Action comprising the outcomes and areas for action that have been identified and how the Welsh Government will work towards them.

Relevant Legislation and Guidance

7.23 The following relevant UK legislation has been considered within this assessment:

- The Conservation of Habitats and Species Regulations 2017;
- The Environment (Wales) Act 2016;
- The Countryside and Rights of Way Act 2000;
- Wildlife and Countryside Act 1981 (as amended);
- The Natural Environment and Rural Communities (NERC) Act 2006;
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003;
- The Well-being of Future Generations Act (Wales) 2015; and
- The Protection of Badgers Act 1992.

7.24 EC Directive 2009/147/EC on the Conservation of Wild Birds (the Birds Directive) and 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the Habitats Directive) are also relevant. These are implemented in the UK principally through the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017.

7.25 All wild birds, their nests and eggs are protected under Part 1, Section 1 of the Act. Birds listed in Schedule 1 of the Act are subject to special protection. Wild animals listed in Schedule 5 are protected under Section 9. Plants listed in Schedule 8 are protected under Section 13 of the Act.

7.26 The Birds Directive provides a framework for the conservation and management of, and human interactions with, all wild birds in Europe. Birds listed in Annex 1 are afforded special protection.

7.27 The main aim of the Habitats Directive is to promote the maintenance of biodiversity by requiring Member States to take measures to maintain or restore natural habitats and wild species listed in the Annexes to the Directive at a favourable conservation status, introducing robust protection for those habitats and species of European importance. Member States are required to take requisite measures to establish a system of strict protection for the animal species listed in Annex IV (a) and plant species in Annex IV (b).

7.28 The provisions of the Habitats Directive are transposed into UK law by the Conservation of Habitats and Species Regulations 2017. Where species protected by the regulations would be

affected by development, a licence may be granted subject to tests set out in section 55 of the Regulations. These are that:

1) the licence must be necessary for reasons of preserving public health or public safety or other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment;

2) there is no satisfactory alternative; and

3) the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.

7.29 The Well-being of Future Generations (Wales) Act 2015 includes a number of well-being goals (Part 2 Section 4), the second of which is 'A resilient Wales' described as:

'A nation which maintains and enhances a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change (for example climate change).'

7.30 Part 2 Section 3 of the Act places a well-being duty on public bodies (which include the Welsh Ministers) requiring that:

'(1) Each public body must carry out sustainable development.

(2) The action a public body takes in carrying out sustainable development must include—

(a) setting and publishing objectives ("well-being objectives") that are designed to maximise its contribution to achieving each of the well-being goals, and

(b) taking all reasonable steps (in exercising its functions) to meet those objectives.……'

7.31 The Environment (Wales) Act 2016 includes measures to provide an integrated natural resource management process to deliver the sustainable management of natural resources. That means the collective actions (including non-action) required for managing the maintenance, enhancement and use of natural resources in a way, or at a rate, which enables people and communities to provide for their social, economic and environmental well-being in Wales.

7.32 The Act requires public bodies to co-operate, share information, jointly plan for and report on the management of natural resources, of which climate resilience and climate mitigation are key strands.

7.33 Section 6 of the Act sets out a biodiversity and resilience of ecosystems duty and replaces Section 40 of the Natural Environment and Rural Communities Act 2006. This applies to a range of public authorities such as the Welsh Ministers, local planning authorities and public bodies. This ensures that biodiversity is an integral part of the decisions that public authorities take in Wales. It also links biodiversity with the long term health of ecosystems and aligns to the framework for sustainable natural resource management in the Act. The Act requires all public authorities in Wales to report on the actions they are taking to improve biodiversity and promote ecosystem resilience.

7.34 In regard to promoting the resilience of ecosystems, the Welsh Government must in particular have regard to the United Nations Environmental Programme Convention on Biological Diversity 1992.

7.35 Section 7 of the Act replaces Section 42 of the Natural Environment and Rural Communities Act 2006 and requires the Welsh Government to prepare and publish a list of the living organisms and types of habitat which in their opinion are of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales, and to take measures to maintain and enhance these species and habitats. Hereafter these are referred to as 'Section 7 Species' or 'Section 7 Habitats'.

Study Area

7.36 The study area for terrestrial ecology extends to 2 km from the site redline boundary for statutory and non-statutory designated sites and species records.

7.37 The study area for the baseline surveys are defined in the individual ecology species survey reports appended to this Environmental Statement (ES).

7.38 The extent of the Uskmouth Conversion Project to which this assessment applies, is shown on the figures which accompany Chapter 7 of the ES.

7.39 The survey area comprised the main power station buildings and curtilages, coal stockyard and an operational reservoir (Lamby's Lake). The application site is bounded to the south by the boundary ditch, beyond which lies the Newport Wetlands Site of Special Scientific Interest (SSSI). An interceptor ditch separates the operational areas of the coal stockyard from the boundary ditch.

Baseline Methodology

7.40 The following ecological baseline studies were undertaken to inform this assessment:

- Preliminary Ecological Appraisal (Appendix 7.1)
- Bat Survey Report – Roost Surveys and Activity (Appendix 7.2)
- Great crested newt survey (Appendix 7.3)
- Water vole and otter survey (Appendix 7.4)
- Breeding bird survey (Appendix 7.5)
- Coastal bird survey (Appendix 7.6)
- Badger survey (Appendix 7.7)
- Reptile presence/absence survey (Appendix 7.8)
- Dormouse survey (Appendix 7.9)
- Invertebrate survey (Appendix 7.10)

7.41 The survey methodologies employed are described in the relevant survey reports (with reference to the applicable published guidance) included in the appendices to this chapter.

Consultation

7.42 A summary of the consultations in relation to ecology and nature conservation is given in Table 7.1, with relevant information on Ecology provided by local authority as a pre-application response.

Table 7.1: Consultation Responses Relevant to this Chapter

Date	Consultee and Issues Raised	How/Where Addressed
17 June 2019	Sali Palmer Monmouthshire County Council ecologist on behalf of Newport City Council pre-application ecology comments.	
	• Sensitivity of site location and proximity of internationally important populations and assemblages of fauna species.	Recognised in baseline survey reports (Appendices 7.1 to 7.10) and shadow Habitat Regulations Assessment shadow HRA (Appendix 7.11).
	• Need for an Ecological Impact Assessment (EcIA), Preliminary Ecological Appraisal (PEA), Bat Roost Appraisal and other targeted species surveys.	PEA covered the entire power station and scoped which protected species would need to be undertaken for development in the eastern half of the power station. These were subsequently

		completed in spring, summer and autumn 2019 and are presented as standalone appendices.
	• Robust implementation of avoidance, mitigation, compensation hierarchy.	Discussions with the design team to avoid impacts where practical Inclusion of mitigation and compensation (as detailed in the ES chapter) were the potential for impacts could not be removed.
	• Need for long term habitat management to be considered.	Future management of habitats for biodiversity is referenced in the Additional Mitigation/Monitoring section of this chapter (paragraphs 7.321 to 7.369).
	• Need for Habitat Regulations Assessment covering estuarine habitats, birds, fish and otter.	A shadow Habitat Regulations Assessment (HRA) report has been prepared for the Uskmouth Conversion Project and is presented in Appendix 7.11.
	• Requirement for ecological enhancements to provide biodiversity net gain, in line with Planning Policy Wales (ed 10) and local planning policy GP5, and the Environment (Wales) Act 2016. Enhancements to be shown on a plan.	An Ecological Enhancement Plan (Figure 7.4) has been prepared for the habitat creation in part of the currently operational coal stockyard.
13 February 2020	Natural Resources Wales Scoping Opinion and requirements for the ecology section of the ES.	
	• Air quality impacts on ecologically designated sites.	The modelling of air quality has informed this assessment in the ES and HRA.
	• Protected species status, assessment of significant impacts, mitigation.	Details of survey results are provided in appendices and summarised in the main text with the assessment of effects.
	• Future management and monitoring.	Commitments are made in relation to an ongoing management with biodiversity objectives and a monitoring strategy for habitats, species status and management outcomes.
	• Need for biodiversity net benefits from the development.	The creation and enhancement of habitats around the Uskmouth Conversion Project are summarised in the Additional Mitigation/Monitoring section of this chapter (paragraphs 7.321 to 7.369).
	Newport City Council Scoping Opinion.	
	• The impact of additional lighting should be assessed in terms of ecology and the character and appearance of the site.	Commitments to retaining the existing dark corridor flight lines have been made as part of the Uskmouth Conversion Project.
July 2020 NRW's pre-application response	• Requested further information to demonstrate the proposal is unlikely to result in a detrimental impact to the maintenance of favourable conservation status of the population of otters (a European protected species) and to allow the competent	Uskmouth Conversion Project is preparing further information, including a Lighting Strategy, to be submitted during the determination of the planning application to enable a Habitats Regulation Assessment (HRA) to be undertaken.

	authority to carry out an assessment under Regulation 63 of the Conservation of Habitats and Species Regulations 2017, including the provision of a Lighting Strategy during the determination of the application; and • Requested further information to demonstrate there are no unacceptable effects on water vole (a nationally fully protected species).	Uskmouth Conversion Project is preparing further information to be submitted during the determination of the planning application to enable a HRA to be undertaken.

Assessment Criteria and Assignment of Significance

7.43 The assessment of ecological effects from the Uskmouth Conversion Project focusses on 'important ecological features' (IEFs). These are species and habitats that are valued in some way and could be affected by a Uskmouth Conversion Project. Other IEFs may occur on or in the vicinity of the site of a proposed development but do not need to be considered because there is no potential for them to be affected significantly.

7.44 Each IEF is ascribed a value, and the magnitude of the impact/s on the IEF is quantified. The interaction of IEF sensitivity and impact magnitude informs the overall significance of the impact.

Receptor Sensitivity/Value

The evaluation of IEFs for the purposes of this assessment has been based on the criteria set out in Table 7.2.

Table 7.2: Definitions of Ecological Receptor Value

Value	Typical Descriptors
Very High	International Importance. Sites of European or greater than UK or Welsh significance (Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar Site). Resident, or regularly occurring, populations of species which may be considered at an International or European level where: • the loss of these populations would adversely affect the conservation status or distribution of the species at this geographic scale; or • the population forms a critical part of a wider population at this scale; or • the species is at a critical phase of its life cycle at this scale.
High	Sites of UK or National (Welsh) Importance (SSSI & National Nature Reserves (NNR)). Priority habitats in UK BAP and NERC Act (2006). Ancient woodland. Resident, or regularly occurring, populations of species which may be considered at an International, European, UK or National level where: • the loss of these populations would adversely affect the conservation status or distribution of the species at this scale; or • the population forms a critical part of a wider population at this scale; or • the species is at a critical phase of its life cycle at this scale.
Medium	Sites of Regional (South East Wales) or County Importance (e.g. Sites of Nature Conservation Importance – SINCs). Priority habitats in Regional BAP. Resident, or regularly occurring, populations of species which may be considered at an International, European, UK or National level and key/priority species listed within Local BAPs where:

	• the loss of these populations would adversely affect the conservation status or distribution of the species at this scale; or • the population forms a critical part of a wider population; or • the species is at a critical phase of its life cycle.
Low	District Importance. Designated sites including Local Nature Reserves (LNRs) designated in the local context. Areas of habitat; or populations/communities of species considered to appreciably enrich the habitat resource within the local context (such as veteran trees), including features of value for migration, dispersal or genetic exchange.
Negligible	No higher than Parish or very local importance.

7.45 In assigning a value to a site, habitat or species population or assemblage, its distribution and status (including a consideration of trends based on available historical records) are considered. Rarity is considered because of its relationship with threat and vulnerability, and the need to conserve representative areas of habitats and genetic diversity of species populations, although rarity in itself is not necessarily an indicator of value. A species that is rare and declining is assigned a higher value than one that is rare but known to be stable.

7.46 The valuation of sites also takes full account of existing value systems such as SSSIs and Local Wildlife Site designations. Judgement is required for the valuation of sites of less than county importance.

7.47 The valuation of habitats takes into account published selection criteria. These include size (extent), diversity, naturalness, rarity, fragility, typicalness, recorded history, position in an ecological or geographical unit, current condition and potential importance.

7.48 Criteria for the valuation of habitats and plant communities include Annex III of the Habitats Directive, guidelines for the selection of biological SSSIs and criteria used by local planning authorities and the Wildlife Trusts for the selection of local sites. Legal protection status is also a consideration for habitats where these are features of statutory designated sites.

7.49 Species populations are valued on the basis of their size, recognised status (such as recognised through published lists of species of conservation concern and designation of BAP status) and legal protection status. For example, bird populations exceeding 1% of published information on biogeographic populations are considered to be of international importance, those exceeding 1% of published data for national populations are considered to be of national importance, etc.

7.50 In assigning importance to species populations, it is important to consider the status of the species in terms of any legal protection to which it is subject. However, it is also important to consider other factors such as its distribution, rarity, population trends, and the size of the population which would be affected. Thus, for example, whilst the great crested newt *Triturus cristatus* is protected under the Habitats Directive, and therefore conservation of the species is of significance at the international level, this does not mean that every population of great crested newt is internationally important and thus of very high value. It is important to consider the particular population in its context. Thus, in assigning values to species the geographic scale at which they are important has been considered. The assessments of value rely on the professional opinion and judgement of experienced ecologists.

7.51 Due regard has been paid to the legal protection afforded to such species in the development of mitigation measures to be implemented during construction and operation of the Uskmouth Conversion Project. For European protected species there is a requirement that a scheme should not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range, i.e. to maintain favourable conservation status, a scheme should not affect the long term availability of sufficient habitat required by the population, the long term viability of the population, or the long term natural range of the species.

7.52 Assessing feature values requires consideration of both existing and future predicted baseline conditions, and therefore, the description and valuation of ecological features takes account of any likely changes, including for example, trends in the population size or distribution of species, likely changes to the extent of habitats and the effects of other proposed developments or land use changes.

Magnitude of Impact

7.53 The likely impacts of the Uskmouth Conversion Project have been assessed in terms of the:

- type of impact (i.e. whether the Uskmouth Conversion Project would result in a beneficial or adverse impact on the identified IEFs);
- size or intensity of the impact measured in relevant terms (e.g. numbers of individuals lost or gained, area of habitat lost or created);
- extent or spatial scope of the impact;
- likely duration of the impact;
- reversibility of the impact – whether the effect is naturally reversible or reversible through mitigation action; and
- timing and frequency of the impact, in relation to ecological changes.

7.54 Table 7.3 indicates how the magnitude of impacts has been described within this assessment, taking into account guidance provided in CIEEM (2018).

Table 7.3: Definitions of Magnitude

Sensitivity	Typical Descriptors
High	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements (Adverse).
	Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality (Beneficial).
Medium	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements (Adverse).
	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (Beneficial).
Low	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements (Adverse).
	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring (Beneficial).
Negligible	Very minor loss or detrimental alteration to one or more characteristics, features or elements (Adverse).
	Very minor benefit to or positive addition of one or more characteristics, features or elements (Beneficial).
No change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.

7.55 Conservation status is described by the CIEEM (2018) guidance as follows:

'Habitats – conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area.'

'Species – conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area.'

7.56 The assessment of whether the favourable conservation status of an IEF is likely to be compromised has been made using professional judgement based on an analysis of the predicted impact of the Uskmouth Conversion Project with reference to specific parameters outlined in Table 7.2 and Table 7.3. For designated sites that are affected by the Uskmouth Conversion Project, the focus has been on the impacts on the integrity of the site, i.e. the ability of the site to continue to maintain conditions which would allow the key species and habitats for which it was designated to flourish. In assessing impacts on these sites, the focus has been on impacts on the key species and those habitats and features of value to them.

7.57 In assessing the magnitude of impacts, consideration has been given to the fragility or stability of the habitats and the sensitivity of the species potentially affected by the Uskmouth Conversion Project. Fragile habitats are those which are readily damaged by human activity. Fragility is to some degree the inverse of stability, which can be defined as the ability of an ecosystem to maintain some form of equilibrium in the presence of perturbations. Fragility and stability can be expressed in terms of the degree of change in species abundance and composition following disturbance. Sensitive species are those that are highly susceptible to disturbance. This may be direct disturbance as result of human activity, noise etc., or disturbance as a result of habitat change where a species is particularly associated with a specific habitat and would be lost for the area if that habitat is removed.

7.58 Where likely adverse impacts have been identified, mitigation methods have been incorporated into the Uskmouth Conversion Project, where practicable.

Significance of Effects

7.59 The significance of the effects on the identified IEFs has been assessed taking into account the value of the sites, habitats and species that would be affected and the predicted magnitude of impact. The nature of the effects has been classified as adverse, beneficial or neutral.

7.60 Following the general approach described in the Assessment Methodology for this ES, levels of significance have been defined as follows.

- Substantial: Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of local importance may also enter this category.
- Major: These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process.
- Moderate: These beneficial or adverse effects may be important but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse effect on a particular resource or receptor.
- Minor: These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process but are important in enhancing the subsequent design of the project.
- Negligible: No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

7.61 Effects that are of such low significance that they are not considered material, are assessed as 'negligible'. Effects of 'moderate' or greater significance are considered to be significant in terms of the EIA Regulations.

7.62 Beneficial effects, where present, are described within the text and should also be considered within the decision-making process.

7.63 The assessment has been undertaken on the basis of the guidance referred to above. Table 7.4 provides a guide to assessment based on this approach.

Table 7.4: Assessment of Significance Matrix

Sensitivity	Magnitude of Impact				
	No Change	Negligible	Low	Medium	High
Negligible	No change	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	No change	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	No change	Negligible or Minor	Minor	Moderate	Moderate or Major
High	No change	Minor	Minor or Moderate	Moderate or Major	Major or Substantial
Very high	No change	Minor	Moderate or Major	Major or Substantial	Substantial

Timescale of Effects

7.64 For the purposes of the assessment the following timeframes are referred to in relation to the duration of effects and/or the time required for mitigation measures to become effective:

- Short term: one to three years;
- Medium term: four to nine years; and
- Long term: greater than nine years.

Limitations of the Assessment

7.65 Minor constraints were incurred during the bat emergence and activity surveys, the dormouse survey, reptile survey, breeding bird survey and badger survey, as detailed in the protected species reports (Appendices 7.1 to 7.10).

7.66 The wintering bird survey was conducted from December until April but excluding the autumn early winter period. The surveys in mid-winter and late winter showed consistency in the areas used, species present and numbers. In this context, the survey data is considered to have accurately classified the wintering bird assemblage and this has not been a constraint on the assessment.

7.67 These constraints did not significantly affect the survey coverage or the validity of survey findings.

7.68 Dense tall ruderal vegetation on the steep banks along the boundary ditch restricted access to the channel and prevented access to several areas. These are shown on the water vole and otter survey plan in Appendix 7.4. However, the grassland and scattered scrub on the power station side of the boundary ditch lacks cover for otter holts or couches. A precautionary approach has been taken for otters in the assessment and consequently this is not a constraint on the assessment.

7.69 The restricted access on the boundary ditch bank meant that a comprehensive survey for water vole along the throughout the boundary ditch channel was not possible. Dense tall herb vegetation overhanging the ditch on the far bank completely obscured visibility of the ground and identification of presence absence of burrows. Access to the boundary ditch to the west of the application site was not possible due to the continuous bramble thicket and scrub growing alongside and over the channel.

7.70 With low levels of water vole activity recorded in the accessible section of the boundary ditch, the impact assessment has assumed potential presence of water vole in all sections of the boundary

ditch where the habitat is suitable. Areas heavily shaded by low growing scrub and bramble have been classified as sub-optimal habitat of lower value for water vole. Nevertheless, a precautionary approach has been taken for otters in the assessment and consequently this is not a constraint on the assessment.

7.71 Full access to the margins of open water habitat was not possible. However, the survey was designed to give sufficient surveyor access to the boundary ditch and waterbodies to have confidence in the absence result.

7.72 The information obtained from the baseline surveys and precautionary assumptions are considered sufficient to fully inform a robust evaluation and assessment of impacts on ecological features of interest.

Baseline Environment

Statutory Designated Sites

7.73 Information on statutory designated sites, including SACs, SPAs, SSSIs and NNRs were obtained through the desk studies included as part of the Preliminary Ecological Appraisal (Appendix 7.1) and is summarised in this section. International, national and county designated sites are shown on Figure 7.1 (Designated Sites Plan).

River Usk SAC and River Usk (Lower Usk) SSSI

7.74 The River Usk/Afon Wysg SAC extends from the Black Mountains in the west of the Brecon Beacons National Park and flows east and then south to enter the Severn Estuary at Newport. The primary reason for the designation of the SAC is the presence of a range of fish species (including sea lamprey *Petromyzon marinus*, brook lamprey *Lampetra planeri*, river lamprey *Lampetra fluviatilis*, twaite shad *Alosa fallax*, Atlantic salmon *Salmo salar* and bullhead *Cottus gobio*) and European otter. The citation for the SAC also notes the presence of watercourse habitat (watercourses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation) and allis shad *Alosa alosa* as qualifying features, although not the primary reason for designation.

7.75 The River Usk is also designated at the national level as a SSSI. The relevant part of the river through Newport forms part of the River Usk (Lower Usk) SSSI, which extends from Abergavenny to the confluence with the River Ebbw at Newport where it enters the Severn Estuary. The SSSI citation notes that the river is one of the largest in Wales and that the Lower Usk represents an example of a large lowland river not subject to significant modification. Upstream of Abergavenny the River Usk (Upper Usk) SSSI extends along the course of the river to Glasfynydd Forest on the northern edge of Fforest Fawr in Powys.

7.76 The special features of the SSSI are as follows.

- Running water supporting Ranunculion vegetation;
- Otter;
- Fish species; and
- A group of rare craneflies.

7.77 The SSSI citation indicates that in addition to the fish and otter populations, the invertebrate fauna is characteristic of a large lowland river, with rare crane flies of particular interest. Scarce higher plant communities at the river's tidal reaches are also of special interest. Although not a special feature of the site, there is a good range of breeding birds associated with the riverine habitats. The SSSI designation includes some areas of adjacent habitat, such as woodland, marshy grassland, stands of tall herb, swamp and fen vegetation, saltmarsh and coastal grassland.

7.78 The River Usk SAC is of very high (international) ecological value and the River Usk (Lower Usk) SSSI is of high (national) ecological value.

Severn Estuary SAC, SPA, Ramsar Site and SSSI

7.79 The Severn Estuary/Môr Hafren is designated as a European Marine Site, incorporating SAC, SPA and Ramsar site designations. The European Marine Site includes the following features:

- Estuary;
- Subtidal sandbanks;
- Intertidal mud and sand;
- Atlantic salt meadow/saltmarshes;
- Reefs;
- Migratory fish (river *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus*, twaite shad *Alosa fallax*, salmon *Salmo salar*, eel *Anguilla anguilla*, sea trout *Salmo trutta trutta* and allis shad *Alosa alosa*) and an assemblage of other fish species;
- Internationally important populations of migratory and wintering bird species;
- Internationally important populations of waterfowl;
- Rocky shores; and
- Freshwater grazing marsh/neutral grassland.

7.80 The River Severn is also designated at the national level as a SSSI. The citation sets out the estuarine fauna, which includes invertebrate populations of considerable interest in addition to the internationally important populations of wintering waterfowl and migratory fish. In addition, the estuary fringes include areas of saltmarsh supporting a range of saltmarsh types.

7.81 The Severn Estuary SAC, SPA and Ramsar Site are of very high (international) ecological value, the Severn Estuary SSSI is of high (national) ecological value.

Newport Wetlands SSSI and NNR

7.82 Newport Wetlands is designated as a SSSI and National Nature Reserve, adjoined to the south by the Severn Estuary and to the north and east by the Gwent Levels – Nash and Goldcliff SSSI. The Newport Wetlands is a site of importance for its bird populations and the habitats associated with them. The special features are:

- Reens and ditches;
- Reedbeds;
- Higher plants;
- Over-wintering birds;
- Breeding birds; and
- Insects and other invertebrates (aquatic).

7.83 The site supports nationally important numbers of shoveler *Anas clypeata* and black-tailed godwit *Limosa limosa*, together with other overwintering species. During summer, the wet grassland, saline lagoons and reedbeds support a variety of breeding birds, including populations of avocet *Recurvirostra avosetta*, redshank *Tringa totanus*, lapwing *Vanellus vanellus*, water rail *Rallus aquaticus*, Cetti's warbler *Cettia cetti* and bearded tit *Panurus biarmicus*. The habitats also support a diverse assemblage of aquatic invertebrates and aquatic plants.

7.84 The Newport Wetlands Reserve is a partnership managed by Natural Resources Wales (NRW), the Royal Society for the Protection of Birds (RSPB) and Newport City Council and is located within the western part of the Newport Wetlands SSSI.

7.85 The Newport Wetlands SSSI, NNR and RSPB reserve is of high (national) ecological value.

Non-statutory Designated Sites

7.86 Non-statutory designated sites are shown on Figure 7.1, and details of these sites are provided in the Preliminary Ecological Appraisal Report (Appendix 7.1) and summarised below.

7.87 Julian's Gout Land SINC is located within the wider Uskmouth Power Station landholding, 200 m east of the application site boundary. The Alpha Steel Site SINC and the Solutia SINC are located 540 m and 1,320 m east of the application site boundary, respectively. Descriptions of the designated sites are provided below.

Julian's Gout Land SINC

7.88 This site is designated as an area of maritime-influenced semi-improved neutral grassland, with willow carr, large populations of marsh helleborine *Epipactis palustris*, marsh orchids *Dactylorhiza spp.* and narrow leaved bird's-foot-trefoil *Lotus glaber*. The SINC is of medium (county) ecological value.

Alpha Steel Site SINC

7.89 The former industrial land within the Gwent Levels comprises of scrub and other habitats which support a range of species including scarce moth species, an assemblage of birds including Cetti's warbler, and plants including orchids. The SINC is of medium (county) ecological value.

Solutia Site SINC, WTR

7.90 The Solutia Site SINC is also a Gwent Wildlife Trust Reserve (WTR) and comprises of reed, swamp and marsh, with wet grassland areas. Breeding bird species include Cetti's warbler and reed bunting. The SINC is of medium (county) ecological value.

Habitat Surveys – Phase 1 Habitat Survey

Terrestrial Habitats

7.91 The results of the Phase 1 Habitat Survey are shown on Figure 7.2 and described in full in the Preliminary Ecological Appraisal Report (Appendix 7.1).

Coal Fired Power Station

Hardstanding and Buildings

7.92 The northern section of the application site largely comprises the coal fired power station, associated buildings and hardstanding.

7.93 The coal fired power station comprises of several sections of varying height between approximately two and 14 storeys. Most of the building is brick built and flat roofed, with rows of single glazed windows and glazed wall on the northern elevation. The southern section is constructed of steel with corrugated steel cladding and adjoins the concrete chimney stack.

7.94 Smaller ancillary buildings include the rail unloading facility, bunker hall, emulsifier/fire pump house and the garage of emulsifier building. Conveyer belts connect the power station building to a collection of small buildings at the edge of the coal stockyard (transfer tower, crusher building,

and biomass shed). The on-site buildings and hardstanding are of negligible (site) ecological value.

Amenity Grassland

7.95 A small area of amenity grassland adjoins the emulsifier building with a second area of amenity grassland located to the south of the hardstanding. These areas are frequently mown and support a limited assemblage of common grass and herbaceous plant species. The species-poor amenity grassland is a very common habitat in urban areas which would be easily replaceable and has negligible (site) ecological value.

Central Landscaped Area

Regenerated (Neutral) Grassland

7.96 A central area of the application site is grassland, dissected by currently disused railway lines between the coal fired power station and coal stockyard. Species composition includes common grasses such as Yorkshire fog *Holcus lanatus* and common bent *Agrostis capillaris*, and forbs such as red clover *Trifolium pratense* and bird's-foot trefoil *Lotus corniculatus*. Narrow leaved bird's-foot trefoil *Lotus tenuis* is occasional / locally frequent. The grassland is very likely to have established on ground that has historically been subject to disturbance from site activities and is subject to amenity grassland management and rabbit grazing but has a more patchy sward. Butterfly bush *Buddleija davidii* is starting to colonise the western part of this area of grassland within the application site. The grassland is of negligible (site) ecological value.

7.97 There are several semi-mature and mature trees planted within the regenerated grassland area including, aspen *Populus tremula*, alder *Alnus glutinosa*, white willow *Salix alba*, sycamore *Acer pseudoplatanus*, whitebeam *Sorbus* sp., holm oak *Quercus ilex* and non-native pine *Pinus* sp. The trees have negligible (site) ecological value.

Coal Stockyard

Bare Ground and Ephemeral/Short Perennial

7.98 The coal stockyard covers the majority of the southern section of the application site, comprising of extensive bare ground with some remaining stockpiles of coal, with ephemeral/perennial vegetation colonising the southern and eastern margins alongside the interceptor ditch.

7.99 Most of the coal remains unvegetated, but colonisation was noted on substrate where the stored materials have remained undisturbed for an extended period of time.

7.100 The ephemeral/short perennial vegetation around the boundary is typically 5 m wide but is up to 20 m wider on the southern boundary. The species composition includes fat hen *Chenopodium album,* red goosefoot *Oxybasis rubra*, narrow-leaved bird's-foot trefoil, scentless mayweed *Tripleurospermum inodorum* and creeping bent *Agrostis stolonifera*. The vegetation cover is as high as 75% closest to the interceptor ditch with gradation into the unvegetated bare ground which is the dominant habitat across the stockyard. The habitat has negligible (site) ecological value.

Open Water – Interceptor Ditch

7.101 The coal stockyard is bounded by a steeply banked wet ditch which intercepts run off from the storage area and consequently contains large amounts of coal fines. The ditch typically holds small areas of shallow standing water and supports a few localised stands of common reed *Phragmites australis* and bulrush *Typha latifolia*. Natural colonisation of the perimeter includes locally abundant narrow-leaved bird's-foot trefoil. This habitat has negligible (site) ecological value.

Neutral Grassland

7.102 Between the interceptor ditch and boundary ditch is an 8 m wide linear embankment of made ground supporting a neutral grassland of variable structure, which includes open herb-rich areas containing species such as narrow-leaved bird's-foot trefoil, yellow-wort *Blackstonia perfoliata*, pyramidal orchid *Anacamptis pyramidalis* and common centaury *Centaurium erythraea*. Patches of false oat-grass *Arrhenatherum elatius*, Yorkshire fog, and hemp agrimony *Eupatorium cannabinum* are also present. The grassland is periodically cut and is an operational access track around the southern and eastern perimeters of the coal stockyard. This habitat has negligible (local) ecological value.

Reservoir/Lamby's Lake

Open Water and Marginal Vegetation

7.103 Lamby's Lake is a man-made waterbody (reservoir) in the south-eastern area of the application site. A narrow fringe of marginal vegetation exists around steep sided banks on the perimeter of the waterbody. Both common reed and bulrush are frequent with great willowherb *Epilobium hirsutum*, hemlock water-dropwort *Oenanthe crocata*.

7.104 The marginal/tall ruderal vegetation grades into neutral grassland with false oat-grass, common knapweed *Centaurea nigra*, hemp agrimony and perforate St. John's-wort *Hypericum perforatum* with occasional pyramidal orchid, southern marsh-orchid *Dactylorhiza praetermissa*, and narrow-leaved everlasting pea *Lathyrus sylvestris*. This habitat has low (local) ecological value with connectivity to the SSSI ditch network.

Boundary Ditch (west of main access road)

Open Water and Tall Herb

7.105 A deep ditch channel forms the southern boundary of the application site between the Proposed Development and the adjoining SSSI. The boundary ditch is steeply banked and has a variable water depth with shallower sections supporting stands of common reed and bulrush. The habitat has negligible (site) ecological value.

7.106 The banks support tall herb vegetation and are being colonised by immature trees, scrub including silver birch *Betula pendula*, and willow *Salix* sp., and the non-native species; butterfly bush and sea buckthorn *Hippophae rhamnoides*.

7.107 The section of ditch closest to the main access road (south of Lamby's lake) supports dense mature scrub on its banks with willow and hawthorn *Crataegus monogyna*, butterfly bush and bramble *Rubus fruticosus* all represented.

7.108 Ditches are a key feature of the Gwent Levels SSSI which form a connected network of high importance for biodiversity and nature conservation. The southern boundary bank is located within the Newport Wetland SSSI. In this context the boundary ditch habitat is classified as having low (local) ecological value.

Protected Species and other Species of Conservation Interest

Bats (Roosting)

7.109 The full results of the bat roost surveys are presented in Appendix 7.2. Surveys in 2019 confirmed the absence of bat roosts in buildings and trees within the application site.

7.110 All buildings within the application site were inspected for bat roosting potential in June 2019. The garage of the emulsifier building (Building 14) had low/moderate potential value and the transfer tower (Building 7) also had low potential value. Follow up emergence surveys found no evidence

of roosting bats. All the other buildings and built structures within the application site had negligible value for roosting bats.

7.111 Three individual mature trees (all willows) located in the regenerated grassland in the centre of the site were found to have moderate bat roosting potential supported by aerial inspections although there were no signs of bat activity (droppings etc.) when the trees were climbed in late summer 2019.

7.112 An elevated section of road referred to as the 'flyover bridge' lies 20 m to the east of the application site boundary. In summer 2019, eight separate cavity features within the structure of the bridge were being used as common pipistrelle *Pipistrellus pipistrellus* day roosts and two cavity features were being used by soprano pipistrelle *Pipistrellus pygmaeus* as day roosts.

7.113 The peak count for common pipistrelle using features in the northern half of the bridge in a single survey was 11. The peak count for common pipistrelle in the southern section was 13. No more than a single soprano pipistrelle was roosting during the surveys.

7.114 Evidence of bat roosts was also recorded in seven bat boxes located on trees in a treeline situated north-east of the flyover bridge. Three boxes were being used by individual soprano pipistrelle bats, one box was being used by a brown long-eared bat *Plecotus auritus* and three further bat boxes contained pipistrelle droppings. The closest tree mounted bat box roost is located 45 m from the application site.

7.115 In combination, the day roosts adjoining the Proposed Development are considered to have low (district) ecological value.

Bats (Commuting and Foraging)

7.116 Within the application site, the highest value feature for foraging bats is Lamby's Lake, where both pipistrelle species and *Myotis* species (Daubenton's bat) were recorded feeding over and around the waterbody over extended periods.

7.117 Pipistrelle bats and noctule *Nyctalus noctula* were consistently recorded in small numbers foraging over the regenerating grassland and around the mature trees. Serotine *Eptesicus serotinus* and brown long-eared bats were infrequently recorded on remote detectors positioned within the application site.

7.118 The boundary ditch is a flight line for noctules and pipistrelles with connection to off-site woodland and scrub within the wider landholding.

7.119 Outside of the application site boundary, high levels of foraging activity were recorded over the scrub habitats to the east. To the west of the application site, patches of scrub also had recorded use by foraging pipistrelle species. Noctules were additionally recorded commuting south-westwards across the River Usk and over the site.

7.120 Overall, the habitats within the application site have low (local) ecological value as a foraging resource for the local populations of bat species.

Otter

7.121 The otter *Lutra lutra* population is a qualifying feature of the River Usk SAC and is of high (national) importance.

7.122 The otter population is known to utilise the Rivers Ebbw, Rhymney and Usk also the reens of the Gwent Levels SSSI. In the wider area, the Monmouthshire-Brecon Canal is also important for local otter populations (Newport Biodiversity Partnership, 2015).

7.123 Under the precautionary principle it is assumed that otters could utilise any suitable habitat within the power station landholding and immediate surroundings.

7.124 Surveys of the wider power station confirmed the presence of an otter path on the boundary between the power station and Liberty Steel where a short section of Julian's Reen is culverted between an access track and the railway line. The watercourse is grilled at the culvert and a clear otter path leads up from Julian's Pill. A second otter path on the other side of the track/railway line leads down into dense scrub on the boundary of Julian's Reen.

7.125 Up to four individuals were recorded on the camera trap located on the bank of Julian's Pill with groups of two otters recorded on a further three occasions over an 11 day recording period. All the camera trap captures were in the period before sunrise, confirming that otters are moving from the River Usk pill into Julian's Reen moving in an easterly direction towards woodland and scrub within the Welsh Water sewage treatment works. No signs of otter activity were recorded along the two smaller drainage channels in the south-eastern part of the power station landholding.

7.126 Lamby's Lake and the section of boundary ditch adjoining the Proposed Development provide potential foraging areas for otter. There are no areas of dense cover within or adjoining the Proposed Development area and no signs of otter activity were recorded.

7.127 Under a precautionary approach, the habitats on the boundary of the application site (Lamby's Lake, boundary ditch, and grassland) have up to low (district) ecological value, but the bare ground comprising the majority of the application site has negligible (site) ecological value for otter.

Water Vole

7.128 Water vole *Arvicola amphibius* activity was recorded in a section of the boundary ditch, also outside the application site, the one section of more suitable habitat is in the south drain approximately 150 m to the east of the application site boundary. The water vole survey results are detailed in the Appendix 7.4.

7.129 The bank substrate on the margin of Lamby's Lake is constructed from crushed stone with only a shallow layer of soil and was unsuitable for establishment of burrows. The lake lies in close proximity to a heavily shaded section of boundary ditch but there is the potential for individuals to forage in bankside vegetation on the margin of lake.

7.130 The boundary ditch is culverted beneath the main access road and continues along the south-eastern boundary of the power station where the channel is heavily shaded. The section of the south drain, where water vole activity was recorded is not closely connected to the boundary ditch.

7.131 Due to ground conditions, there is uncertainty over the size of the population in the boundary ditch and under a precautionary approach the water vole population has been classified as low (district) ecological value, as a resident key/priority species.

Badgers

7.132 An intermittently used single badger *Meles meles* outlier sett entrance is located within the regenerated grassland, at the base of a tree south of the railway line. A second intermittently used sett with a single entrance is located in dense scrub, 10 m to the east of the Proposed Development on the eastern side of the main access road.

7.133 An active large main badger sett is present in the woodland block located 210 m east of the development area (Appendix 7.7). The on-site grassland provides a significant foraging area for the nearby sett and badgers were frequently observed foraging in the habitat during evening surveys. Badger is not a species of conservation concern although it is legally protected (under the Protection of Badgers Act 1992).

7.134 In Wales and England, there has been a marked increase in the badger population since the 1980s with the population in 2017 estimated to be 485,000 (Judge et al, 2017). Habitat within the application site has negligible (site) ecological value for badgers.

Breeding Birds

7.135 Within the application site the habitat of highest value for breeding birds is along the boundary ditch and at Lamby's lake. The ditch forms the southern boundary of the site with the dense scrub to the south located outside of the application site within the RSPB Newport Wetlands.

7.136 The majority of species recorded were commonly occurring residents or migrant species, many of which would nest in dense scrub outside, but adjoining, the Proposed Development boundary (Appendix 7.5). Two red list species were recorded; bullfinch *Pyrrhula pyrrhula* and whitethroat *Sylvia communis*. Two Cetti's warbler *Cettia cetti* (Schedule 1 of the WCA) territories were recorded in scrub alongside the boundary ditch with further territories in woodland and scrub to the west and east of the application site.

7.137 The buildings associated with the coal fired power station were being used by a small number of breeding birds, with a single pair of house martins *Delichon urbicum* and five pairs of swallow *Hirundo rustica* confirmed to be nesting on the eastern side of the main power station building in spring 2019. In addition, peregrine (Schedule 1 of the WCA) was confirmed to be nesting on the main power station tower.

7.138 Very little bird activity was recorded on the predominantly bare ground of the coal stockyard but a pair of oystercatcher *Haematopus ostralegus* created a nest on a coal pile close to the northern boundary.

7.139 A few wetland bird species were associated with Lamby's Lake or the adjacent section of drain; reed warbler *Acrocephalus scirpaceus*, moorhen *Gallinula chloropus*, mallard *Anas platyrhynchos* and tufted duck *Aythya fuligula*.

7.140 Tufted duck was recorded relatively frequently utilising Lamby's Lake for foraging with two families with young ducklings recorded on the lake in June confirming nesting within, or in close proximity to the site. A pair of mallard with young ducklings was also recorded on Lamby's Lake in June. An individual shoveler was recorded on one occasion but was considered non-breeding.

7.141 Canada goose *Branta canadensis* and mute swan *Cygnus olor* families were also seen on the lake but will have bred in the surrounding area with no nests found in the survey area.

7.142 The breeding bird assemblage is classified as low (local/district) ecological value.

Wintering Birds

7.143 A total of three Severn Estuary SPA qualifying species were recorded within the intertidal habitats to the west and north of the wider power station; curlew *Numenius arquata*, redshank *Tringa tetanus* and shelduck *Tadorna tadorna* during the wintering bird surveys (Appendix 7.6).

7.144 The assemblage of species (Wetland of International Importance) is also a qualifying feature of the SPA with 17 species listed. Five of these assemblage species were recorded during the survey, all of which were waterfowl species including teal *Anas crecca*, mallard *Anas platyrhynchos*, tufted duck *Aythya fuligula*, wigeon *Anas penelope* and shoveler *Anas clypeata*.

7.145 The wintering bird survey included Lamby's Lake where three of the assemblage species were recorded. Tufted duck and mallard were recorded on the lake during the core winter survey visits but in relatively small numbers (maximum counts of eight and three respectively). A single teal on one occasion in April.

7.146 All other observations of qualifying species and species included in the qualifying species assemblage were from the intertidal habitats.

7.147 Redshank were recorded on the intertidal habitats during each of the core winter survey visits with redshank roosting on the sides of Julian's Pill at high tide with counts of 88 in December, 83 in January, 50 in February, and 40 in March. Curlew (peak count of three) and shelduck (peak count

of seven) were recorded in intertidal areas in low numbers during the winter surveys utilising the estuary shoreline to forage on the exposed mudflats at low tide.

7.148 Of the species individually listed as part of the nationally-important overwintering populations under the SPA, only redshank and teal were recorded in higher than very small numbers. The maximum counts of teal were 167 at high tide and 59 at low tide. Wintering populations of wildfowl species will also utilise habitats in the Newport Wetlands reserve with waterbodies and reedbed. Mallard, shoveler, gadwall, pochard, tufted duck and shelduck will be present in the reserve throughout the winter with smaller numbers of wigeon and pintail.

7.149 The wintering bird populations directly associated with habitats in the application site are classified as negligible (site) ecological value.

7.150 The intertidal habitats immediately adjoining the wider power station site are used by a small proportion of populations of redshank, curlew and shelduck utilising the Severn estuary as a whole and are classified as of high (national) ecological value.

Reptiles

7.151 The Uskmouth power station site supports a breeding population of grass snake *Natrix helvetica* with habitat around Lamby's lake used for basking and foraging (Appendix 7.8). The numbers of individuals recorded is indicative of small population with no other reptile species recorded during the reptile survey or as ad hoc sightings. The grass snake population resident within and immediately adjoining the application site has low (local) importance.

Invertebrates

7.152 The coal stockyard and regenerating grassland supports a relatively limited assemblage of invertebrate species but the boundary ditch, neutral grassland, tall herb, interceptor ditch and ephemeral vegetation around the perimeter of this area had high value for invertebrates being associated with a habitat mosaic of more botanically rich and structurally diverse habitats and a south-facing ditch bank (Appendix 7.10). These habitats form a small proportion of the total area of high quality invertebrate habitat across the power station as a whole with extensive areas of open, sparsely vegetated flower-rich vegetation and scattered scrub growing in landforms with varied topography. This produces a complex habitat mosaic creating multiple niches and favouring a wide diversity of invertebrate species within the boundary ditch, off-site drains and seasonally waterlogged areas further increasing the species diversity.

7.153 The invertebrate assemblage associated with the application site is considered to have low (district) ecological value.

7.154 Across the wider power station site as a whole the proportion of species of conservation significance is high, and indicative of an area of regional importance.

Other Species

7.155 Protected species surveys carried out for great crested newt (Appendix 7.3) and dormouse *Muscardinus avellanarius* (Appendix 7.9) following the best practice survey methods. The surveys concluded the likely absence of both species from the power station landholding.

Future Baseline Conditions

7.156 There is the potential for changes in the baseline conditions in the medium to long term as a result of climate change. The Climate Change Risk Assessment for Wales (Welsh Government et. al., 2012) identified the following main potential threats and opportunities for the natural environment as a result of climate change:

- reduction in soil moisture and lower river flows, and an increase in the frequency and magnitude of droughts;
- changes in soil organic carbon, although the ways in which it might be affected are not adequately understood at present;
- changes in climate space and species migration patterns, which could result in significant changes to biodiversity;
- increases in pests and diseases; and
- changes to coastal and estuarine habitats and species, including a reduction in intertidal area.

7.157 The Terrestrial Biodiversity Climate Change Impacts Report Card 2012 -13 (Living With Environmental Change (LWEC) Partnership, 2013) provides qualitative assessments of likely biodiversity change that indicate a direction of travel rather than quantitative predictions. Whilst climate models project changes in temperature with reasonable confidence, the complexities of ecological responses and the interactions with other non-climate pressures mean that there is a large range of possible future outcomes. This is compounded for other climate variables, such as rainfall, where there is less certainty in future projections.

7.158 Observations and qualitative predictions for habitats of particular relevance to the application site include the following.

Grassland, Ruderal and Ephemeral/Short Perennial

7.159 Increasing temperatures have promoted earlier spring greening of grasslands and a longer growing season with the potential for this to be beneficial for plant species and associated invertebrate communities. However, decreased or less reliable summer rainfall could result in less plant biomass and changes in species composition of plant communities with a shift towards species adapted to warmer drier conditions more tolerant of periods of drought. This could have a knock-on effect on the abundance and species composition of the associated invertebrate assemblage.

7.160 While there are potential effects of climate change on the future ecological baseline, it must be recognised that ecosystems are complex and are affected by a wide range of factors. With limited data and modelling capability, it is difficult to accurately predict and quantify the potential impacts of climate change on complex ecological systems.

7.161 Broadly the low nutrient status of the existing substrate creates environmental stress and will be promoting the current level of botanical diversity in the naturally regenerating habitats, preventing more common highly competitive species from becoming dominant. Increases in environmental stress from climate change would be likely to favour assemblages of drought tolerant herbaceous species.

7.162 In largely artificial environments, such as the power station, it is likely that anthropogenic effects on biodiversity through the management and use of the land would be more significant to the future baseline conditions than the effects of climate change.

Mitigation Measures Adopted as Part of the Project

Habitat Retention

7.163 The existing power station buildings would be subject to internal modifications as part of the Power Station Upgrade. Across the application site, land take (both permanent and temporary) has been minimised. The following habitats would be retained and protected:

- Lamby's Lake and bankside vegetation;
- Interceptor ditch and a proportion of the short ephemeral/perennial vegetation;

- Southern boundary ditch and adjoining neutral grassland and scrub; and
- Mature trees and scrub.

7.164 The existing rail lines would be subject to maintenance to reinstate an operational railway line. The majority of the regenerating grassland crossed by the rail lines would be retained outside the working area and would not be disturbed by construction activities.

Habitat Protection

7.165 Construction fencing would be installed around the perimeter of the construction area, to protect adjacent retained habitats. Within the coal stockyard, this would include a 2 m stand off from the interceptor ditch to protect habitats beyond, and root protection zones around mature trees within the central area. Fencing would prevent access to contractors, machinery and vehicles and the storage of vehicles, machinery, equipment and materials in areas outside of the fence line.

7.166 Prior to the start of ecologically sensitive works, an Ecological Clerk of Works (ECoW) would deliver a toolbox talk to the site construction team, briefing them on all ecology and nature conservation requirements on site, including the mitigation measures described below. The ECoW would oversee all works potentially affecting sensitive ecological features, as described below and included in the additional mitigation section.

7.167 Water quality in the River Usk SAC and SSSI would be protected during construction through the implementation of all relevant best practice measures to prevent and deal with spills and any other discharge that could enter the terrestrial or marine aquatic systems. Measures would include designating secure areas for refuelling and storing chemicals in line with appropriate regulations and guidelines.

7.168 Surface water management measures would be implemented throughout construction. Measures would be adopted with reference to industry and regulatory pollution prevention guidelines and would protect the environment from potential construction related discharges to ensure negative effects on water quality are minimised during construction. During operation of the Uskmouth Conversion Project, the existing pollution incident prevention and control procedures would apply to the redeveloped site. All operational areas would also be subject to modern environmental controls.

Landscaping

7.169 In addition to habitat retention and protection, the landscaping scheme would include the restoration of grassland within the working area but outside the permanent built footprint and the establishment of grassland in part of the coal stockyard that is currently sparsely vegetated bare ground.

7.170 The implementation of the landscaping plan would be aligned to the construction programme as appropriate.

7.171 Areas of the coal stockyard located outside the application site would be subject to landscaping after construction.

7.172 Areas of regenerated neutral grassland areas between railway tracks that are disturbed during construction would be subject to restoration to grassland of equivalent value in the completed development. Although subject to management more typical of amenity grassland, the range of wildflower species including narrow-leaved bird's-foot trefoil confers the habitat with higher value, and this would be the objective of the restoration.

Species Protection

7.173 Marginal habitat around Lamby's Lake with the potential to be used by nesting birds and grass snakes would be protected. Dense boundary scrub, outside but adjoining the application site,

would be protected from impacts such as dust deposition, accidental damage by machinery, loud noise generating activities, and temporary lighting to maintain their potential value for use by fauna during construction and ensuring that the value of the habitat is maintained as the operational phase commences.

7.174 The boundary ditch habitats, supporting an active water vole population, would also be retained with a minimum 5 m stand off between the top of the boundary ditch bank and the working area.

Assessment of Construction Effects

Statutory Designated Sites

7.175 A full assessment of the potential impact pathways resulting from the Uskmouth Conversion Project and each of the Natura 2000 sites (Severn Estuary and River Usk) and their qualifying features is provided in the shadow HRA report (Appendix 7.11).

7.176 The potential impact pathway between the construction activities and features for which the Natura 2000 sites have been designated, relate to increased levels of noise during specific aspects of construction.

7.177 The construction phase has been divided into two main activities, with potential for impacts varying between the two. General background construction noise is predicted to have a negligible impact on the qualifying features of the Natura 2000 sites, including on mobile species such as otter, where habitats outside the designated site are important for sustaining the population. Higher levels of construction noise are associated with specific activities during construction including piling, where there is the potential for the activity of species using habitats outside the power station landholding to adapt.

7.178 The magnitude of impact on the Natura 2000 sites are negligible and the significance of the effect is negligible adverse.

7.179 During construction, the higher level noise activities would relate to piling on the southern side of the existing power station building. Negligible impacts are predicted on the intertidal habitat because of the shielding effect of the existing building, or on fauna using the Newport Wetlands because of the distance between the source of noise and waterbodies.

7.180 The effect would be negligible adverse, and not significant in terms of EIA, as only a few individuals within the large wildfowl populations using Lamby's Lake are predicted to utilise alternative habitat during construction close to this waterbody. Noise during construction would be generated from extended periods of piling in the central and southern parts of the coal stockyard. The potential effect would be dependent on the detailed specification, timing and duration of piling. Environmentally sensitive working methods that limit elevated noise and avoid the potential for a likely significant effect on wintering birds or otter would be investigated.

7.181 The Newport Wetlands SSSI adjoins the application site boundary and lies adjacent to the working area of the Proposed Development. The stand off built into the design of the construction area would create a buffer adjacent to the boundary of the SSSI and help the construction teams avoid the potential for adverse impacts on the ditch habitat or its water quality.

7.182 There is no potential for direct impacts on reens (managed channels) or reedbeds and there is separation between the higher plant and invertebrate assemblages utilising habitats in the SSSI.

7.183 Indirect impacts on wintering bird populations, breeding birds and otters using the SSSI are considered in the relevant species sections of this ES chapter.

Non-statutory Designated Sites

7.184 Julian's Gout Woodland SINC lies 200 m to the north-east of the application site, with no potential for direct impacts from construction activities. Some of the key features for which the site was

designated are in unfavourable condition including maritime-influenced semi-improved neutral grassland and the marsh helleborine *Epipactis palustris* population.

7.185 There is no hydrological connection between the Proposed Development and Julian's Gout Woodland SINC. The distance between the closest designation and construction areas means that there is a negligible likelihood of any indirect disturbance of habitats or species.

7.186 No impact pathways have been identified at other non-statutory designated sites of county value, located further from the Uskmouth Conversion Project. As a result, there would be no change to all non-statutory sites, which is not significant in terms of this EIA chapter methodology.

Habitats

Habitat Loss

7.187 The following habitats would be lost or impacted by the Proposed Development:

- Bare ground;
- Ephemeral/short perennial vegetation;
- Regenerated (neutral) grassland; and
- Amenity grassland.

Bare Ground and Ephemeral/Short Perennial Vegetation (Coal Stockyard)

7.188 The existing infrastructure in the northern part of the coal stockyard would be redeveloped and upgraded as part of the Uskmouth Conversion Project, with the modification of existing built structures and expansion of the extent of hardstanding. The Proposed Development, including the conveyor system upgrade and construction of a series of silos, would be on the coal stockyard.

7.189 The Proposed Development would be primarily located on the coal stockyard. A series of silos would be constructed on unvegetated bare ground part of which was previously used as a coal stockyard. The loss of bare ground is not significant in terms of this EIA chapter methodology.

7.190 The footprint of the Proposed Development overlaps with a small proportion of the ephemeral/short perennial vegetation on the periphery of the coal stockyard, which may be permanently lost. Larger areas of this habitat fall within the working area of the Proposed Development and would be subject to disturbance or temporary loss during construction activities. The magnitude of this impact would be medium due to the partial loss but maintenance of the integrity of the habitat as a whole.

7.191 On the precautionary basis of partial permanent loss and extensive temporary disturbance of the flower-rich regenerating ephemeral vegetation during construction, there would be negligible adverse (site/local) effect, which is not significant in terms of this EIA chapter methodology.

Regenerated (Neutral) Grassland

7.192 The regenerated grassland within the application site is subject to retention outside of the construction working areas, site storage and compounds. This grassland habitat would adjoin construction areas and have the potential to be indirectly affected by dust deposition, accidental trafficking and temporary materials storage. The magnitude of this impact is classified as low due to the minor loss of habitat but with no adverse effect on the integrity of the habitat as a whole.

7.193 Under a precautionary approach, the significance of effects would be negligible adverse and not significant in terms of this EIA chapter methodology.

Amenity Grassland

7.194 Small areas of typical species-poor amenity grassland adjoining existing buildings and hardstanding would be lost during construction activities. The magnitude of impact is medium due to the proportion of habitat loss, but the significance of effect is negligible adverse due to the low ecological value, which is not significant in terms of this EIA chapter methodology.

Interceptor Ditch

7.195 The interceptor (drainage) ditch around the coal stockyard perimeter is an integral part of the operational drainage system. This ditch would continue to have the same drainage control function during construction. The interceptor ditch, boundary ditch and Lamby's Lake are illustrated on Figure 7.2.

7.196 The scheme design aims to provide a 2 m stand off between the ditch, construction areas and any areas used for storage.

7.197 This establishes a buffer zone, preventing direct disturbance of the interceptor ditch and in turn protecting the boundary ditch on the edge of the SSSI and adjoining neutral grassland.

7.198 The ditch is part of the operational site and would receive surface water run-off from the construction area which would ultimately pass through silt traps before being discharged into Lamby's Lake. Periodic maintenance of the interceptor ditch would be required during construction to maintain its functionality and water holding capacity.

7.199 Activities during construction would have a low magnitude of impact on a man made feature of recent origin and negligible (site) ecological value and no impact on the integrity of the habitat. This would have a negligible adverse (site) effect, which is not significant in terms of this EIA chapter methodology.

Lamby's Lake

7.200 Lamby's Lake lies within the application site boundary but would be retained and protected from indirect impacts for the duration of adjacent construction. The waterbody provides a discharge point for clean water run-off from working areas.

7.201 The existing environmental protection measures would continue to be employed with silts removed from water run off before entering the aquatic habitat.

7.202 There will be no loss of habitat, but the immediate context will change with additional development in the vicinity of the waterbody. With no impact on the habitat integrity, the magnitude of impact is low. The significance of the potential effects would be a negligible adverse (site/local), which is not significant in terms of this EIA chapter methodology.

Boundary Ditch and Neutral Grassland

7.203 The ditch habitat and neutral grassland on the adjoining bund would be protected from direct disturbance throughout construction, but there is low potential of indirect disturbance given the proximity of the working area to these retained habitats.

7.204 Short term dust deposition on vegetation is possible during construction in closest proximity to the ditch, but the functioning of the interceptor ditch will channel surface water run-off from the construction areas away from the boundary ditch.

7.205 The integrity of the habitat will be protected and under a precautionary approach the magnitude would low. The potential effect would be negligible adverse (site/local), which is not significant in terms of this EIA chapter methodology.

Species

Roosting Bats

Noise

7.206 Increased noise levels associated with construction activities inside the power station buildings are expected as part of the Power Station Upgrade. In addition, temporary construction noise would be generated during the piling works for the day silos adjoining the main power station building and the primary silos, which are to be constructed in the coal stockyard as part of the Proposed Development.

7.207 Noise generated by construction activities has the potential to cause disturbance to the confirmed off-site common and soprano pipistrelle roosts located within the flyover bridge and the adjacent bat box roosts.

7.208 The three mature trees with cavity features (but no recorded use by bats) located within the application site would also be subject to periods of elevated noise during construction.

7.209 There is potential for change in the level of use of roost sites where the relatively high levels of noise are generated during the spring, summer and autumn when bats would be roosting away from hibernation sites.

7.210 The roost sites within the structure of the flyover bridge would be over 70 m from the nearest newly constructed building being constructed to the north of Lamby's Lake.

7.211 The Proposed Development would entail construction on the coal stockyard. The Power Station Upgrade construction in and around the main power station buildings. Piling would be required for the construction of the Proposed Development day silos on the southern side of main power station building, and for the primary silos on the coal stockyard.

7.212 Extended periods of elevated noise levels associated with piling would increase the potential for changes in the use of off-site roosts. The roosting locations in enclosed spaces would be further shielded from daytime construction noise. Elevated noise levels during the typical periods of roost emergence (post-sunset) or roost re-entry (pre-dawn) could also change roosting activity and use of roost sites.

Lighting

7.213 It is not anticipated that the constructions areas would require continuous external lighting during hours of darkness although localised task lighting may be required during the hours of darkness. Consequently, a lighting strategy does not form part of this planning application.

7.214 If temporary lighting required for construction were to be directed onto the flyover bridge and/or adjoining scrub it could affect the use of existing day roost sites by pipistrelle bats. Similarly, light spill onto individual mature trees within the site could also reduce their potential suitability for bats. It is not anticipated that lighting would be directed at these receptors.

7.215 In the absence of an environmentally sensitive construction lighting plan and with the potential for night-time construction lighting during at least part the main bat activity season, the use of bat roosts in the immediate vicinity of the Uskmouth Conversion Project could change during construction.

Conclusion

7.216 The potential magnitude of impacts on bats would depend on the piling method and detailed lighting design. The reduction in the use of off-site roosts in the flyover bridge would be a medium magnitude of impact based on lower numbers of bats but continued use of roost features.

7.217 The potential effects from noise and lighting together during construction could have a minor adverse significance of effect on the local common pipistrelle bat population. This effect is not significant in terms of this EIA chapter methodology.

Foraging Bats

Habitats

7.218 The habitats subject to permanent and temporary loss due to the Uskmouth Conversion Project are considered to have very low value for foraging bats based on their potential value and the findings of transect surveys in 2019. All habitats of higher value for foraging bats within and adjoining the application site being retained and protected with buffer zones.

Lighting

7.219 The existing power station site is subject to limited light spill from existing streetlights along the internal road system, lights installed at the gatehouse, on built structures in the northern part of the coal stockyard, and on the main power station buildings. Many of the habitats in the Uskmouth Conversion Project area are already subject to light spill with dark corridors largely restricted to the southern half of the coal stockyard and the perimeter boundary ditch.

7.220 The use of artificial lighting during construction could alter foraging activity at the site with the southern boundary and Lamby's Lake being the features with the highest levels of use. Increased light spill onto these areas could result in the displacement of bats into habitats further from the Proposed Development.

7.221 Increased light spill onto retained mature trees in the regenerating grassland between the railway lines could also change foraging behaviour of pipistrelle and noctule bats.

Conclusion

7.222 In the absence of mitigation, there would be potential for reduction in the suitability of bat foraging habitat due to noise and lighting. The magnitude of these indirect impacts is classified as low, with primarily daytime working and scope with detailed design to avoid night time lighting of site boundaries.

7.223 Under a precautionary approach there could be potentially minor adverse effect on the local populations of bats, which is not significant in terms of this EIA chapter methodology.

Otter

7.224 European otter can tolerate considerable levels of human disturbance. They have been recorded in cities and towns throughout the UK. In Shetland, otter have reportedly bred regularly under the islands' ferry terminals and jetties of one of Europe's largest oil terminals at Sullom Voe, (Green and Green, 1997: cited in Chanin, 2003).

7.225 Guidance published by Natural England and the Countryside Council for Wales (now NRW) (2007) and provided in the DMRB (Highways Agency 2001) suggests that a buffer zone of at least 30 m should be provided around a non-breeding holt or resting site, to minimise the risk of significant disturbance to otter.

7.226 The absence of any dense cover suitable for use by otter and the stand off bordering the working area from the boundary ditch and Lamby's Lake means that there is no overlap between areas of construction activities and otter habitat.

7.227 The likelihood of otters crossing bare ground in the coal stockyard within the construction area is very low/negligible and the construction boundary fencing is likely to be a deterrent to the movement of otter between suitable areas of habitat at the south of the site and surrounding areas. While otters are very unlikely to use habitat within the construction areas, the covering of

excavations or provision of escape means, would help prevent otters becoming trapped in the construction area.

7.228 Outside the application site, continuous scrub within the SSSI to the south of the boundary ditch creates dense cover. Although this area would be capable of supporting a laying up place (or possibly a holt), there are no past records of otter in this locality indicating the likelihood is low.

7.229 A very small proportion of the reed and scrub habitat with high potential to be used by otter within the Newport Wetlands falls within the zone that could be influenced by disturbance from general construction activities. This includes piling close to the existing power station buildings.

7.230 Piling for silo foundations in the central and southern part of the coal stockyard is expected to last up to 5-6 months with an unavoidable increase in noise generated during this period. Noise from piling has the potential to result in temporarily localised effects on otter behaviour in the vicinity of the working area including, on the western periphery of the Newport Wetlands where there is potential for resting sites and laying up places situated in dense cover. If otters are regularly active in this part of the wetlands reserve, activity levels could reduce during the second phase of piling.

7.231 However, otters have very large territories and individuals will have a number of alternative resting sites (Chanin, 2003).

7.232 Overall with no potential impact on the integrity of the otter population from the development, the magnitude of the impact is predicted to be low during construction in the coal stockyard. The worst case effect would have a minor adverse significance, which is not significant in terms of this EIA chapter methodology.

Water Voles

7.233 Water vole occur in boundary habitats adjoining the working area for the construction of the primary silos. Unmitigated activities associated with Proposed Development have the potential to cause indirect disturbance to the ditch banks (outside of the working area) or affect the ditch channel through surface water run-off from the construction area. However, the interceptor ditch around the coal stockyard is an integral part of the existing surface water management system. This would be retained and continue to function throughout the construction periods. The scheme design aims to retain the 3 m wide strip of neutral grassland creating a buffer between construction area and the ditch channel. These measures in combination would minimise the impacts on the water vole colony through the integrated protection measures.

7.234 During construction, when piling for the foundations of the primary silos takes place, there would be high levels of noise and some ground vibration within the vicinity of the ditch and within 50 m of water vole burrows. Dispersal of the small colony of water voles from this section of the boundary ditch is a potential outcome. Approximately 300 m of the boundary ditch would fall within 50 m of the piling areas, but the ditch extends for 430 m to the west beyond the application site boundary and to the east where the ditch is heavily shaded and currently of lower suitability for water vole.

7.235 The ditch habitat will be retained and subject to protection for future recolonisation following construction but piling could result in a high magnitude of impact if a colony is temporarily displaced into ditch habitat further from the construction area for the duration of noise generating activities.

7.236 The significance of the effect on water vole has the potential to be of moderate adverse which would be significant in terms of this EIA chapter methodology.

Badger

7.237 With the existing railway line being subject to full operational reinstatement, there may be ground disturbance associated with adjoining construction. The works required are yet to be defined in detail. The railway lines are located 10 m from the single hole entrance to a badger outlier sett.

7.238 The works have potential to cause disturbance to an active badger sett. It was classified as in intermittent use in autumn 2019 based on the associated signs. The Uskmouth Conversion Project could require temporary or permanent closure of the low status badger sett. The main sett located off-site in Julian's Gout woodland and the many associated lower value setts are located a significant distance from the Proposed Development, with no potential for effects.

7.239 Badgers forage in the grassland areas within the application site and construction activities are expected to result in temporarily disturbance of areas used by the badger social group.

7.240 Badgers regularly forage within the short sward regenerated grassland between the railway lines. There would be some temporary disturbance of the grassland during construction and any structural works to maintain the existing railway lines. Much of the grassland would be retained outside of the Uskmouth Conversion Project working areas. The level of foraging in other areas within the application site is likely to be limited and construction activities in the coal stockyard would not affect any features of value for badgers.

7.241 Badgers are known to tolerate high levels of human activity and are active in the power station site with clear habituation to people.

7.242 During construction it is possible that site activities could result in a reduction in foraging activity within the application site but without fencing, badgers could be attracted into the application site at night where ground disturbance could provide easier access to earthworms, a key prey species particularly during the winter months.

7.243 Overall, the badger population is expected to be largely unaffected by the Uskmouth Conversion Project. The magnitude of the impact is negligible and the potential significance of the effect on the badger population is negligible adverse, which is not significant in terms of this EIA chapter methodology.

Breeding Birds

7.244 The habitats of highest value for breeding birds within the application site (boundary ditch and Lamby's Lake) would be retained and protected through the use of stand off and pollution preventions measures.

7.245 The establishment of the construction site and increase in human activity would change the context of retained on-site features and habitats adjacent to the site boundary, with the potential for some displacement of breeding birds from nesting habitat directly adjoining construction areas. Given the operational nature of the site and level to which resident breeding birds are habituated to human activity, any effect is expected to be limited.

7.246 Bird species nesting on the power station buildings, such as house martin and swallow, are also tolerant of high levels of human activity. Both species would likely be temporarily displaced during construction due to the levels of noise generated during the building conversion.

7.247 Peregrine could continue to nest on the chimney stack, but again, the noise generated from the conversion of buildings could also result in the nest site being unfavourable for part of all of the construction phase. Within the coal stockyard, a single oystercatcher has nested on top of small pile of coal fines situated north-east area of stockyard. This temporary man-made habitat would be lost as part of the Proposed Development.

7.248 During piling in the central and southern section of the coal stockyard, increased levels of noise could result in reduced numbers of nesting pairs building nests in scrub on the boundary of the coal stockyard. With the relatively small number of pairs of scrub nesting species that are widespread in the local area affected, this temporary impact would not affect their conservation status.

7.249 Species of higher conservation value that could be breeding in the Newport Wetlands at the time of piling include bittern, marsh harrier and bearded reedling. All three species are Schedule 1

species protected from disturbance while at or near nest sites. Given the size of the reserve, extent of reedbed habitat and relatively small area of the wetlands that would be subject to elevated noise, there is a low probability of either species nesting within the zone of influence.

7.250 The potential magnitude of impact around the main power station on nesting birds is expected to be of medium magnitude.

7.251 During piling in the coal stockyard, the zone of influence would be greater and the magnitude of the impact would be dependent on the method, timing and duration of piling as well as the assemblage of breeding species at that time. The detailed methods of piling would be defined following investigation of ground conditions and potential contamination. Different methods would be reviewed, and the detailed specification would be subject to a Piling Risk Assessment addressing the protection of environmental conditions, the designated sites, and qualifying species.

7.252 The temporary effects on breeding birds during construction are also classified as of medium magnitude with the potential for displacement from the vicinity of noise generating activities into nearby habitats of equivalent value.

7.253 Overall, the significance of this effect would be minor adverse, which is not significant in terms of this EIA chapter methodology.

Wintering Birds

7.254 Lamby's Lake is used by small numbers of common wildfowl species which contribute to the overall assemblage of wintering bird populations in the local area. Wildfowl are sensitive to human activity and there is potential for lower levels of use during daytime construction activities.

7.255 Lamby's Lake is a small area of habitat used by a few individuals from the much larger populations using the Newport Wetlands as a whole. There are no predicted impacts on use of intertidal habitat by any of the wintering bird populations with very low levels of use of intertidal habitat closest to the power station.

7.256 Elevated noise levels on the western boundary of the Newport Wetlands SSSI during piling operations on coal stockyard could alter the behaviour of wildfowl in waterbodies and reedbed closest to the application site. As stated in the breeding birds section above, the detailed methods of piling would be defined following investigations and would address potential effects on wintering birds as qualifying species of designated sites. The elevated noise levels are expected to affect only a very small proportion of the total open water habitat. Noise below this threshold is considered a low level noise and is classified as unlikely to cause a response in birds based on observed activity.

7.257 A medium magnitude of impact would occur as a result of a reduction in the use of habitats closest to the working areas during the construction activities required in the vicinity of Lamby's Lake and adjacent to the Newport Wetlands. The movement of birds would be a minor change in activity (during a single winter period) and the integrity of the wintering populations in the wider area would remain unaffected. The effect has the potential to be of minor adverse significance (district level), but is not significant in terms of this EIA chapter methodology.

Reptiles

7.258 Construction activities have the potential to affect individual grass snakes utilising established habitats within the application site and adjoining the working area. The retention of the interceptor ditch, neutral grassland, Lamby's Lake and boundary ditch would retain the habitats of value for grass snake. The first two features would create a buffer between the construction area in the central and southern parts of the coal stockyard, dense tall herb and open water.

7.259 In contrast, the more open ephemeral vegetation has lower value but the patchy ephemeral vegetation (which is subject to partial loss and disturbance during construction) could be used by basking animals especially in adjoining dense grass or scrub cover.

7.260 Disturbance of the open structured regenerating grassland located between the railway lines would also be unlikely to impact on grass snakes due to the lack of cover and shelter.

7.261 The distance between the first phase of construction and the reptile habitats (Lamby's Lake, boundary ditch) should avoid the potential for any impact on the population. The lack of cover coupled with the low level of noise and vibration from general construction activities should deter individuals from entering active working areas.

7.262 Piling for the foundations of the primary silos would result in higher levels of noise and ground vibration closer to known reptile habitat, with the potential for individuals to move further away from the piling/working area into the Newport Wetlands or drain and scrub habitats in the south-eastern section of the power station landholding.

7.263 Under a precautionary approach the magnitude of impact is classified as medium, with likely changes in behaviour and potential temporary displacement of grass snakes from the western side of the lake although the ability of the population to breed and survive should not be affected. The significance would be minor adverse, not significant in terms of this EIA chapter methodology.

Invertebrates

7.264 Construction of primary storage silos may result in the partial loss of ephemeral/short perennial vegetation on the perimeter of the coal stockyard. This habitat (adjoining neutral grassland, open water and scrub) contributes to the value of the site for invertebrates.

7.265 In the centre of the application site, the disturbance/temporary loss of open regenerating grassland would have a lower impact on invertebrates with the flat ground having little variation in ground conditions (fewer niches) and a lower abundance of pollen and nectar.

7.266 The retention of high value invertebrate habitat (boundary ditch banks, neutral grassland and part of short ephemeral/perennial vegetation) substantially limits the magnitude of impact, which is defined as low. Overall, the significance of the effect on the invertebrate assemblage from construction would be negligible adverse, which is not significant in terms of this EIA chapter methodology.

Accidents/Disasters

7.267 During the construction phase, the existing Uskmouth Power Station pollution prevention and control procedures would apply to the Uskmouth Conversion Project, with all the relevant modern environmental controls required to respond to and minimise the risk of harm from accidents or disasters.

Assessment of Operational Effects

Statutory Designated Sites

SAC/SPA/Ramsar

Air Quality During Operation

7.268 Air quality modelling defines predicted emissions, which have been compared against the relevant critical level/load for the relevant habitat type/interest feature. The modelling has defined that either:

- the process contribution (PC) does not exceed 1% of critical level/load for any of the emissions at the receptors (designated sites); or
- if the PC exceeds 1%, the resulting predicted environmental concentration (PEC) is below 100% of the relevant critical level/load for the emission.

7.269 These criteria are defined in the current Environment Agency guidelines (EA, 2019) and the Institute of Air Quality Management: A guide to the assessment of air quality impacts on designated nature conservation sites (IAQM, 2019).

7.270 Overall, the magnitude of impact on ecological features associated with emissions to air from the operational power station is negligible, and the significance of effect negligible adverse, which is not considered significant.

Habitats

7.271 The existing outfall into Julian's Pill and the River Usk SAC is part of the permitted power station operations. As such, robust environmental control measures are integrated into the operation of the power station and protection of the SAC.

7.272 The Uskmouth Conversion Project would form part of the permitted operations and would be covered by the existing control measures, largely re-instating previous operational activity. Consequently, there would be a negligible magnitude of impact and negligible significance of effect on the River Usk SAC.

Noise During Operation

7.273 The modelling of operational noise shows that maximum average noise levels at the boundary between the power station landholding and the closest intertidal areas of the River Usk indicate levels below 38 dB $L_{Aeq,T}$ during the day, and levels below 35 dB $L_{Aeq,T}$ during the night.

7.274 Noise modelling on the closest boundary of Julian's Pill indicates levels below 39 dB $L_{Aeq,T}$. The modelled noise levels at the western end of the Newport Wetlands SSSI are slightly higher but indicate levels below a maximum average of 45 dB $L_{Aeq,T}$. The model indicates noise levels on the boundary of the Severn Estuary, 440 m to the west, would be significantly lower.

7.275 Based on behavioural studies, noise levels below 45 dB is considered very unlikely to result in changes in bird behaviour. It should also be considered that birds present in the area are somewhat habituated to noise through their use of a range of disturbed habitats across the wider River Usk, River Ebbw, and Severn Estuary area. All of these factors mean that significant disturbance impacts through operational noise are not considered possible, and therefore there is no potential for effects on qualifying bird species from operational noise.

7.276 The levels of noise and site activities associated with the operation of the Uskmouth Conversion Project are not anticipated to have any effect on the continued use of habitat across the local area by the resident otter population, a qualifying feature of the SPA.

7.277 There would be no loss of habitat or creation of new barriers to movement within the application site, which comprises a long-standing operational power station. The predicted effect on the River Usk and Severn Estuary Natura 2000 sites during daytime and night-time operations has a negligible magnitude of impact and a negligible adverse significance of effect.

7.278 Impacts and effects on species which utilise the Natura 2000 sites is also assessed in the relevant species sections.

SSSI

7.279 The boundary of Newport Wetlands SSSI would be adjacent to the primary silos which would be installed on the coal stockyard. No environmental impacts on the SSSI are envisaged as result of operation due to the continued functioning of a robust surface water management system, including the collection of run-off from operational areas into an interceptor ditch and via a silt trap into Lamby's Lake.

7.280 The Uskmouth Conversion Project is located within an existing operational power station site and the potential for adverse effects would relate to any changes in context required for the site safety and operation, for example lighting.

7.281 In the absence of lighting controls, and if there were a need for extensive security lighting around the silos, there would be potential for an increase in light spill at the boundary ditch and the dense scrub on the SSSI boundary affecting the species activity. There would be a negligible impact on the criteria for which the SSSI is designated. However, it is not anticipated that the Proposed Development operational areas (silos, de-dusting building and conveyors) would require continuous external lighting during hours of darkness. It is likely that task lighting would be required at the silos, de-dusting building and conveyors in the event that operation and maintenance activities are required during the hours of darkness.

7.282 Lighting along the walkways and roads would be comparable to the existing lighting scheme. Lighting spill to perimeter drainage reens would be avoided to minimise disturbance to wildlife. The final lighting strategy would be provided at the detailed design phase by the conversion contractor prior to operation.

7.283 Potential effects on breeding birds and wintering birds as a result of operational noise are set out in the relevant species sections.

7.284 Based on current baseline information, the magnitude of impact on the SSSI features would be negligible and significance of effect classified as negligible adverse, which is not significant.

Non-statutory Designated Sites

7.285 The single county wildlife site within the power station landholding would not be directly or indirectly affected by operations. Tall ruderal, bramble and dense scrub create a strong buffer between the operational railway line and Julian's Gout Woodland SINC.

7.286 The potential for air quality change has been modelled for all five non-statutory SINC sites and the single area of ancient woodland located within 2 km of the development boundary. Modelling of nitrogen oxides (NO_x), sulphur dioxide (SO_2), and ammonia (NH_3) confirmed that for each of the habitats within the designated sites the process contribution was less than 100% of the critical load. This equates to a negligible magnitude of impact with an effect of negligible adverse significance.

Habitats

7.287 As detailed in the Assessment of Construction Effects section, the Proposed Development would involve the loss of the coal stockyard (bare ground and ephemeral/short perennial vegetation) and small sections of other habitats. During operation, there would be no indirect impacts on habitats within the application site or surrounding area during the operational phase.

7.288 All the habitats of negligible (site/local) value (including the ephemeral/short perennial vegetation, regenerated grassland and neutral grassland) will remain as retained, enhanced or extended habitats in the completed development that is already operational. The magnitude of the impact in each of these habitats is negligible, with no reduction in area (above that considered in the construction phase) and only a minor change in context with the habitats located within an existing industrial context. The significance of effect from operations on these habitats will be negligible adverse.

7.289 The open water boundary ditch, the associated neutral grassland and Lamby's Lake all with low (local) value, will be retained with only low potential for accidental pollution during operations. The potential impact magnitude is negligible and the significance of effect from operations on these habitats will be negligible adverse.

7.290 The establishment of new habitats and restoration of disturbed grassland is considered in the additional mitigation measures and referenced in the assessment of residual impacts.

Species

Roosting Bats

7.291 The bat roosts in the flyover bridge adjacent to the application site would not be directly impacted by the operation of the power station. Any additional operational lighting along the main access road would have the potential to increase artificial lighting in the vicinity of the roost with the potential for changes in the use of the structure. However, it is not anticipated that the Proposed Development operational areas (silos, de-dusting building and conveyors) would require continuous external lighting during hours of darkness. Lighting along the walkways and roads would be comparable to the existing lighting scheme. Lighting to perimeter drainage ditches would be avoided to minimise disturbance to wildlife.

7.292 There are no plans to illuminate the flyover bridge. The reinstatement of the railway line would increase rail activity beneath the bridge, equivalent to operational use in 2017. Bats frequently roost in railway bridges and the use of the line should not have any impact on the bat roosts.

7.293 In the absence of any mitigation/protection, the magnitude of impact on the local populations of roosting species has the potential to be high. In the absence of protection measures the significance of the effect would be minor adverse, which is not significant in terms of this EIA chapter methodology.

Foraging Bats

7.294 The existing bat flight lines and foraging habitat would be retained as part of the Uskmouth Conversion Project, with no potential for direct impacts. Operational lighting requirements for the Uskmouth Power Station would have the potential to increase artificial light spill alongside retained boundary habitats used as bat flight lines, commuting routes and foraging habitat, affecting their potential to be used by species that typically light areas.

7.295 With the Proposed Development located predominantly on existing operational land (coal stockyard) that is already subject to light spill, additional lighting would be expected to have a low magnitude of impact on the local bat populations.

7.296 This would be an effect of negligible adverse significance, which is not significant in terms of this EIA chapter methodology.

Otter

Human Activity

7.297 Operational activity around the developed site will be consistent with current levels of use, being located around the main power station and in an operational coal stock yard which is already subject to the deposition, storage and removal of large volumes of material.

7.298 There will be low levels of human activity close to the boundary drain comprising daily security walkover, maintenance of new infrastructure and occasional habitat management including grass cutting and periodic monitoring. Lamby's Lake will remain an operational part of the surface water management system. Standard operational site activities close to Lamby's Lake and the boundary drain will be during the daytime when otters would not be active in or close the operational area. All locations of dense cover with the potential to be used as above ground resting places will be separate from human activity.

Noise

7.1.1 During the daytime, operational noise will be higher with dense scrub to the south of the power station (on the boundary of the Newport Wetlands) subject to modelled noise levels of between 40 and 45dB with further areas of scrub to the north-east, east and south subject to modelled noise levels of 35-40dB. With a documented tolerance to noise, these decibel level would have a minimal risk of disturbance to otter behaviour. Noise levels in any below ground resting places would be very significantly insulated from airborne noise. Decibel levels of 40 to 45dB at any laying up resting places would have a minor risk of disturbance of individuals.

7.1.2 Elevated noise during the night only associated with the buildings, surrounding hard standing and current coal stocking area. A minor increase in decibel levels in along the north-western site boundary would not have any effect on otter activity in the intertidal habitats located below the sea wall or activity in the River Usk.

7.1.3 Otters will be tolerant of low level noise associated with operational noise with past records of otters in many cities and towns throughout the UK. Features used by resting otter are typically in relatively disturbed areas located where they are at minimal risk of direct physical disturbance or damage (Chanin, 2003).

7.1.4 Low level operational use will not displace otters from habitats that have the potential to be used by this species and will not reduce the range of the local otter population. Therefore, under a precautionary approach the impact magnitude would be low. This would be an effect of minor adverse significance, which is not significant in terms of this EIA chapter methodology.

Water Vole

7.299 The boundary ditch would remain as a habitat of potential value for water vole (and reptiles – grass snake).

7.300 Permanent buffers and the presence of the interceptor ditch and surface water management system to protect water quality is anticipated to avoid direct or indirect impacts on this species from operations.

7.301 With this separation, the magnitude of impact from operations would be low under a likely worst case scenario with the significance this effect no more than minor adverse, which is not significant in terms of this EIA chapter methodology.

Breeding Birds

7.302 During operation, activity within the application site should return to previous operational levels. The Uskmouth Conversion Project area, including the coal stockyard, would have been subject to daily site activities when the power station was fully operationally active until April 2017.

7.303 The modelled average daytime noise levels at Lamby's Lake indicate levels between 50 dB and 55 dB. The modelled noise levels at the western end of the Newport Wetlands SSSI indicate slightly higher levels below a maximum average of 45 dB $L_{Aeq,T}$.

7.304 Birds nest at Lamby's Lake, the boundary ditch habitat and on-site buildings and structures, though many species are expected to be habituated to site activities (vehicles, staff on foot, noise etc.). As a result, there should be no effect on breeding bird activity within the adjoining SSSI on the basis that significant noise levels are primarily limited to the areas immediately around the power station building.

7.305 There is a possibility that small numbers of swallows and house martins could be displaced from the application site when the power station becomes operational, especially if they had not previously nested within the power station during operation.

7.306 The Proposed Development site is located within a frequently used part of the power station. The continued use of largely inaccessible dense scrub on the boundary of the coal stockyard by a range of nesting birds would be expected.

7.307 Overall, the magnitude of the impact of operational effects are predicted to be low and this would have at most a negligible adverse effect on breeding birds, which is not significant in terms of this EIA chapter methodology.

Wintering Birds

7.308 High level auditory disturbance to birds is related to a sudden noise event of over 60 dB at the birds location or a more prolonged noise level of over 72 dB. Moderate noise disturbance is typified as high-level noise which has occurred over long periods so that birds become habituated to it, or lower level noise which causes some disturbance to birds. The Uskmouth Conversion Project site is located within an industrial landscape associated with the power station, steel works and docks on either side of the River Usk; the wintering populations are habituated to this context.

7.309 Average noise levels of less than 55 dB are classified as low level noise, unlikely to cause a response in birds using intertidal habitats or waterbodies. This encompasses occasional noise events above 55 dB, regular noise levels between 60-72 dB and long term regular noise above 72 dB at locations where birds have become habituated.

7.310 The modelled airborne noise emitted during operational activities is judged to be unlikely to result in effects on qualifying bird species of the SPA or the assemblage of overwintering species.

7.311 During operation, loading and unloading of conveyors occurs within buildings or enclosed conveyors. No impulsive/sudden sounds that would be readily audible off-site are anticipated from the operational activities within buildings. Only low level background noise is anticipated within the external environment.

7.312 Operational noise from the Uskmouth Conversion Project has been modelled as part of the Environmental Permit application (RPS 2019b). These indicate that maximum average noise levels at the boundary between the power station landholding and intertidal areas are below 38 dB $L_{Aeq,T}$ during the day and less than 35 dB $L_{Aeq,T}$ during the night.

7.313 The average daytime noise levels modelled at Lamby's Lake, habitat located close to the power station, indicate levels between 50 dB and 55 dB.

7.314 Higher levels of bird activity were associated with Julian's Pill including a redshank high roost. The average daytime decibel levels modelled at Julian's Pill, over 450 m from the noise sources in the operational power station indicate levels below 40 dB.

7.315 The modelled noise levels at the western end of the Newport Wetlands SSSI would be slightly higher but below a maximum average of 45 dB $L_{Aeq,T}$. The modelled noise levels on the boundary of the Severn Estuary, 440 m to the west, would be significantly lower than a maximum average of 45 dB $L_{Aeq,T}$.

7.316 The noise levels could reduce the low levels of wintering bird activity in Lamby's Lake. However, the predicted noise levels are equivalent to the previous baseline associated with the operational power station. During operation, the waterfowl species using the waterbody in small numbers may become habituated to the operational noise.

7.317 Overall, the magnitude of the impact from operations is predicted to be low on all wintering populations of bird species within the Uskmouth Conversion Project site and surrounding areas.

7.318 This would have at most a negligible adverse effect on wintering birds, which is not significant in terms of this EIA chapter methodology.

Reptiles and Invertebrates

7.319 No additional adverse effects, beyond those identified during the construction phase, are associated with the operation of the Uskmouth Conversion Project. In the absence of mitigation and management, areas of the construction working area that become disturbed would naturally regenerate with the establishment of ephemeral vegetation and long term succession to grassland.

7.320 Overall, the magnitude on both species groups during the operation of the site is at worst low, and the significance of effect would be no more than negligible adverse.

Additional Mitigation/Monitoring

Species Protection (Legislation Compliance)

7.321 All construction and operational activities need to be compliant with wildlife legislation. Based on the baseline species surveys, the legally protected species confirmed to be present nesting or resident within and adjoining the construction areas are nesting birds, grass snake, badgers and water vole.

Water Vole

7.322 The magnitude of impact on the water vole colony from piling on the coal stockyard would be assessed following the detailed design of the piling method. Given the relative proximity of the works to the ditch, displacement of water vole within the perimeter ditch may be required.

7.323 Water vole displacement involving advanced ditch habitat enhancement (under consent from NRW if required) to create an open water channel between 1 and 2 m in width. The northern bank of the boundary ditch would be modified to create a narrow berm (ledge) at the base of the bank, into which emergent species can colonise, increasing the level of cover and availability of food. The banks would remain steep and may l be regraded where the slope is greater than 60°.

7.324 Advanced ditch habitat enhancement can be conducted 12 months prior to the start of piling within 50 m of the boundary ditch.

7.325 Should temporary water vole displacement be required, a detailed method statement would be prepared to support the licence application. The length of ditch affected and estimated number of animals that would be displaced would be assessed through surveys in spring and late summer prior to the application.

Badger

7.326 The badger sett within the regenerating grassland would be resurveyed prior to the start of construction to confirm its status. following granting of the planning permission. If indirect disturbance of the sett cannot be avoided through species protection the single hole outlier badger sett would be closed under licence from NRW, either temporarily during construction or permanently should its location conflict with the operation of the power station.

Breeding Birds

7.327 The timing of construction and operational activities would be assessed to avoid the removal of habitats supporting active nest sites during the breeding season which typically runs from the start of March to the end of August. Habitat clearance and the establishment of the construction area in the coal stockyard during this time period would require advanced checks by an ecologist to confirm the presence/absence of nest sites. Bare ground in the coal stockyard has the potential to be used by ground nesting birds and is classified as potential nesting habitat.

7.328 For the bird species listed under Schedule 1 of the Wildlife and Countryside Act (WCA) 1981; peregrine, Cetti's warbler, along with the protection of the nest, eggs and fledglings any actions

that could disturb the adult birds while at or near the nest must also ensure compliance with legislation.

7.329 WCA protection would be considered in the programme of works around the main power station relative to (peregrine) and around the boundary of the coal stockyard (Cetti's warbler). Prior to piling works, the potential presence/absence of active nests of WCA Schedule 1 species in off-site habitats where noise levels are predicted to be higher than 55 dB, would need to be confirmed and mitigation measures adopted to meet legislative requirements.

7.330 The timing of construction activities with the potential to disturb nesting peregrines on the stack, or Cetti's warblers in scrub adjoining the coal stockyard would be assessed. These construction activities should be initiated outside of the nesting period with the adult birds protected from disturbance (including noise) when at or near the nest, as well as the nest itself. By ensuring that noise generating activities are ongoing each day from the end of February through to early June, birds selecting nest sites in or adjoining the construction areas are expected to be habituated to construction activities. These measures should avoid nest desertion as a result of a construction activity which would be deemed unlawful.

Reptiles (and Amphibians)

7.331 General good practice protection measures should be implemented during the establishment of the construction site to ensure that any reptiles or other common amphibians present in the application site can safely disperse into adjoining habitats.

7.332 It is recommended that he shortly mown amenity grassland should be stripped systematically, working towards Lamby's Lake under the supervision of an Ecological Clerk of Works. The noise and disturbance from the enabling works encouraging movement into cover outside of the construction working area. Prior to stripping, any areas of longer vegetation must be initially cut to 100 mm above ground level systematically working towards Lamby's Lake with all arisings removed from the working area. All potential refuges within the working area would be lifted and removed from the working area. Natural features, such as logs, would be placed in habitat adjacent to the boundary reen.

Habitat Protection

Construction

7.333 The habitat protection measures would be robust and fully installed during the enabling works prior to construction.

7.334 Tree protection excludes the root protection zones of all trees from the working area to protect them from direct damage and compaction of the root plate. This would include all the mature and semi-mature trees growing in grassland between the railway lines.

7.335 Fencing (Heras or an appropriate equivalent) would also be installed between the interceptor ditch and boundary ditch for the full duration of the second phase of construction in the southern section of the coal stockyard.

Habitat Creation and Establishment

Construction and Operation

7.336 Ecological enhancement would be delivered as an integral part of the Uskmouth Conversion Project, alongside retention of higher value habitats and species protection measures.

7.337 It is anticipated that permanent habitat loss would be limited to bare ground, amenity grassland, and ephemeral vegetation. New habitats would be established in the coal stockyard through a

combination of native seeding and natural colonisation supported by the monitoring of developing habitat and targeted management.

7.338 Additional areas of neutral grassland and flower rich ephemeral vegetation would be established, which would extend habitat extent and increase the carrying capacity for invertebrates, upon which a range of species will prey.

7.339 The objective would be to create and maintain intricate patchy mosaic of neutral grassland and pioneer grassland with seasonal pooling within part of the coal stockyard. These new habitats would adjoin established neutral grassland, the boundary ditch and established dense scrub creating a more diverse overall habitat mosaic.

7.340 The substrate would be used to create linear banks which would be managed as patches of grassland and ephemeral vegetation. The varied topography and the deliberate creation of multiple niches directly benefits botanical and invertebrate diversity within the application site.

7.341 Specific measures would be included to attract pollinator species including bees with the inclusion of key foodplants and abundant sources of nectar.

7.342 Areas of existing pioneer vegetation with species diversity, falling within the application site would be stripped, and stored separately from other materials for reuse in the creation of new habitats. The stripped vegetation and surface substrate (containing roots and seeds) would be stored on-site until required for the landscaping works. Areas allocated for habitat creation would be subject to ground preparations to promote the establishment of the desired vegetation.

7.343 The development of an 'open mosaic habitat' would rely on natural regeneration with substrate manipulation to create a varied topography. Where appropriate supplemented by the seeding of locally native wildflower species. The use of the low nutrient substrate with developing thin skeletal soil should continue to promote botanical diversity with a low risk of ubiquitous grasses and ruderals becoming dominant. An additional thin layer of low nutrient substrate may be added to aid seed germination and seedling establishment.

7.344 Enhancement of habitats in the boundary ditch on the southern boundary of the application site and to the west of the application site would be carried out in advance of construction. These enhancements would open-up ditch channels overhung by scrub to remove shading which in turn would promote the diversity of the assemblages of flora and fauna, an approach aligned to ditch habitat management promoted by NRW in the Gwent Levels.

7.345 Blocks of native tree and shrub planting may be undertaken on raised restored landform in the wider site which would create an additional habitat and in the medium to long term establish additional new woodland habitat comprising locally native species appropriate to the location.

Environmentally Sensitive Lighting Scheme

7.346 An environmentally sensitive lighting scheme would be designed for the Uskmouth Conversion Project to avoid increased artificial light spill onto boundary habitats and Lamby's Lake. Construction lighting and the permanent lighting scheme would be developed with reference to the recommendations published by the Institution of Lighting Professions and Bat Conservation Trust (BCT and ILP, 2018). The scheme would ensure that each part of the site is 'suitably and adequately lit' for essential operational reasons. Wherever possible, 'warm white' (i.e. with peak wavelength greater than 550nm or a colour temperature of 2700K to 3000K for LED lights) LED lamps would be used, preferably on posts and directed downward to minimise upward and lateral light spill. If LED lamps are not available, then lighting position and shielding including the use of hoods and cowls should be employed to minimise light spill.

Construction

7.347 Construction lighting would not be directed towards Lamby's Lake or the southern boundary ditch. Dense scrub beyond the western and eastern site boundaries would also be protected from additional light spill. It is intended to retain the boundaries of the coal stockyard within its dark context to protect the value of the boundary with the SSSI as a bat commuting route throughout the duration of construction.

Operation

7.348 All permanent operational lighting adjacent to retained habitats would be directional where possible to direct artificial light to where it is needed and minimise light spill that could affect the behaviour of fauna, in particular bats, breeding birds and water vole.

7.349 The boundary ditch adjoining the SSSI would be maintained as a permanent dark corridor. Artificial light levels over Lamby's Lake would be minimised.

7.350 Other than task lighting and existing highway lighting, no additional lighting is anticipated along the main access road to ensure there is no additional light spill onto the flyover bridge (pipistrelle roosts) or the adjoining scrub habitat to maintain the context of roosts and promote the continued use of cavities in the structure.

7.351 During construction and for the duration of the operation ditch and the continuous scrub boundaries should remain as a protected dark corridor maintaining their value as flight lines/foraging habitats for a range of bat species, including those that have higher sensitivity to lighting.

Other Species Protection and Enhancement Measures

Construction

7.352 Badgers are known to forage and traverse the site and otters are known to use the intertidal habitat, reen and scrub on the boundary of the power station.

7.353 To minimise the risk of mammals being harmed, a means of escape from any larger excavations (i.e. excavations over 0.5 m depth) left open overnight would be provided as necessary, such as the provision of a scaffold plank as a ramp (at no more than 45° angle), or the profiling of at least one wall of an excavation to provide a gentle slope (no more than 45°) that an individual could use to exit the excavation.

7.354 Where grassland may be subject to disturbance, species protection should be built into the working method to protect fauna. With the known presence of grass snake population precautionary working methods would be employed for any ground disturbance of grassland with linkage to Lamby's Lake.

7.355 Where any excavation of mammal burrows is required, the precautionary working method would include seasonal restrictions relating to the potential presence of hibernating animals below ground and destructive searches under direct ecological supervision.

Operation

7.356 Bat boxes and bird boxes would be installed within suitable habitat around the site to provide additional roosting and nesting locations. A selection of bird boxes would target national and local priority species appropriate for installation of buildings including house sparrow, starling, swift, and house martin. Outside of the application site, additional bat boxes would be installed in Julian's Gout Woodland and on larger trees in the western half of the power station.

7.357 All retained badger setts within and adjacent to the application site boundary would remain undisturbed by operational activities.

Habitat Management

7.358 Long term management for biodiversity benefits would be incorporated into the management regime for the Uskmouth Conversion Project. A low intensity management approach would be adopted, appropriate for the habitats. After five years, following the operational phase, the ruderal vegetation (plant species that is first to colonize disturbed lands) would be subject to the removal of colonising shrubs and the control of dominant plants that reduce species diversity. Neutral grassland would be subject to cuts once or twice annually, with cuts in spring/early autumn.

7.359 In selected areas of the regenerated grassland between the railway lines, a reduction in the frequency of mowing to between two and four cuts a year would promote a patchwork of longer grass and short sward which would increase the number of species associated with the habitat.

7.360 The boundary ditch (west of the main access road into the site) would be subject to ongoing management for water vole which should also improve the aquatic plant community and assemblage of aquatic invertebrates.

7.361 The native scrub adjoining grassland would be managed to control encroachment. Any native tree and shrub planting would be subject to aftercare during the operational period including watering during periods of dry weather, weed control and replacement of damaged or diseased plants. Periodic monitoring would review the health of the planted shrubs, identifying if shrub management practices need to be modified and where replacement planting is required.

7.362 Habitat management would be required over the lifetime of the operation in order to continue to deliver the biodiversity enhancement set out in this chapter.

Control of Invasive Non-native Plants

7.363 Giant hogweed is locally frequent within the wider power station, there are also several small stands of Japanese knotweed, but neither species currently occurs within the application site. Sea buckthorn a further non-native species also occurs locally.

7.364 Giant Hogweed is extensively distributed on the lower River Usk and the active control of the plant is part of NRW's Usk Management Catchment Strategy. The presence of giant hogweed in the wider power station is a negative factor and where it has established damages the grassland and ditch habitats.

7.365 A comprehensive site-wide invasive plant species management plan would be prepared including an action plan with clear specifications of actions and timing. The key aim would be to stop seed production and prevent seeds from spreading within the site.

7.366 Current distribution of the non-native invasive species would be mapped for the whole landholding with information collated on the location, size and structure of the stands.

7.367 A detailed management schedule would be prepared for each species with specifications for treatment/control, timing of visits, also the frequency and timing of monitoring in order to review the results of treatment of all the known Giant Hogweed stands

7.368 This systematic long term approach would reverse the ongoing spread in the short term and over time, seek to remove all established stands from within the whole of the power station. There is potential for re-colonisation from plants growing outside the site.

7.369 Periodic surveys of the whole landholding would be required over the Uskmouth Conversion Project's lifetime to identify and map any new plants for inclusion on the eradication schedule.

Residual Effects

7.370 Based on the implementation of the short term and long term additional measures outlined above, the following residual effects on biodiversity would be expected.

Residual Construction Effects

Designations

7.371 The residual effect on the SSSIs and Natura 2000 sites, including the qualifying species during construction, would be negligible adverse, which is not significant.

7.372 The residual effect on species using the SSSI and the SPA/Ramsar bird populations during construction would depend on the detailed specification for construction and in particular, the piling for the primary silos in the southern part of the coal stockyard. The conclusion remains the same as for the assessment, with no requirement for additional mitigation.

Habitats

7.373 Limited permanent loss of low value habitats would be unavoidable in the construction of the Uskmouth Conversion Project. The majority of loss relates to bare ground within the existing operational site with localised areas of recently established but flower-rich ephemeral vegetation.

7.374 Temporary loss of habitat would relate to regularly mown regenerating grassland with wildflowers. This habitat would be retained outside of the construction working area where possible. Areas where disturbance to grassland is unavoidable would be subject to restoration at the end of the construction period.

7.375 The residual effects on habitats during construction remain as negligible adverse.

Species

Bats

7.376 The species protection measures, commitments to minimal additional light levels at the flyover bridge during construction should maintain the potential value of the flyover bridge with the protection of the roosts from indirect impacts including noise, vibration and dust.

7.377 Sensitive construction lighting would maintain dark corridors and foraging areas, including Lamby's Lake. However, the use of the railway line area, regenerated grassland and mature trees as foraging habitat by pipistrelle and noctule bats is predicted to be reduced during construction.

7.378 With the implementation of additional protection, the significance of effect would be negligible adverse and remains not significant.

Badger

7.379 Closure of a single outlier sett due would be unavoidable due to its location close to the railway lines and proximity to the working area. As a species of low conservation importance, the effect remains of negligible adverse and not significant.

Otter

7.380 Construction activities may result in minor modifications to the behaviour of individual otters with potential for occasional use of Lamby's Lake and the boundary ditch as a corridor to move through the site. There would be no impact on the key intertidal habitat or night time activity including the movement of individuals between Julian's Gout and Julian's Reen on the north-western boundary of the power station.

7.381 Noise generation from piling in the coal stockyard would be unavoidable during construction. There is no evidence of otter activity in the vicinity of the section of boundary ditch adjoining the coal stockyard, but off-site dense scrub could provide daytime laying up locations.

7.382 Elevated noise during construction would affect a small proportion of otter territory. As a result, the residual effect has been classified as a minor adverse, which is not significant.

Water Vole

7.383 Potential construction impacts on water vole would relate to piling on coal stockyard. The scale of the impact would be reviewed following detailed design of the piling method and programme. Displacement of a small water vole colony for the duration of the piling may be unavoidable. Enhancement techniques within the boundary ditch habitats for water vole prior to construction would increase its potential value for water vole and other species.

7.384 Enhancement of the off-site ditch habitat would minimise the effect of water voles temporarily dispersing from the section of ditch closest to the primary silos during their construction. As result, the residual effect would reduce to minor adverse, which is not significant.

Breeding Birds

7.385 The residual effect of construction activities on bird populations within the application site would relate to the loss of habitat of low value used by a small number of nesting pairs – coal stockyard and buildings.

7.386 Indirect impacts from construction noise could also result in temporary reduction in the suitability of habitats adjacent to noise sources. A relatively small number of nesting pairs could be affected by construction work around the buildings and conveyors but it could result in the existing nest on the chimney stack being temporarily vacated during construction. Peregrine pairs often have more than one nest site and rotate use avoiding returning to the same nest site each year. Piling in the coal stockyard could result in elevated noise across a wider area over an extended period and would have the potential to affect a significantly higher number of breeding birds in scrub and reedbed outside the site boundary.

7.387 Following the adopting of environmentally sensitive methods and work programme the significance of the effect should be no higher than minor adverse, which is not significant.

Wintering Birds

7.388 Due to separation of the Uskmouth Conversion Project from intertidal habitat and waterbodies in the adjoining wetlands, the residual effect of construction activities would have a negligible adverse effect on wintering birds using intertidal habitat and Newport Wetlands.

7.389 Piling closer to the SSSI boundary has the potential to be minor adverse with a potential localised dispersal of small numbers of wintering birds from Lamby's Lake and a very small proportion of nearby reedbed/waterbodies in the Newport Wetlands.

7.390 The implementation of environmentally sensitive methods and programme would ensure that the significance of the effect would at worst be minor adverse, which is not significant.

Reptiles

7.391 The loss of a small extent of habitat and indirect disturbance of habitats supporting a breeding grass snake population would be unavoidable. The residual significance of effect would be negligible adverse.

Invertebrates

7.392 The redevelopment of the coal stockyard would result in a relatively small area of invertebrate habitat within the working area during construction. The residual effect of construction activities on invertebrates would be negligible adverse.

Residual Operational Effects

Designations

7.393 The residual effect on the SSSIs and Natura 2000 sites, including the qualifying species from the operation of the power station site, remains the same on the basis that no effects above negligible adverse significance are reported and therefore, no additional mitigation is proposed.

Habitats

7.394 Mitigation measures include the establishment of open mosaic grassland and ephemeral habitats on parts of the coal stockyard and would deliver a net gain for biodiversity – if supported by appropriately funded long term management for wildlife informed by targeted monitoring. The stripping and re-use of flower-rich vegetation and the associated substrate would seek to increase the extent of this habitat and provide opportunities for natural colonisation and spread of less common plant species and the diversity of self-sustaining populations of plants.

7.395 Enhancement of the boundary ditch would directly benefit several species groups and supported by periodic management these gains would be maintained and built on. The retained larger trees would be a maturing ecological resource within the application site.

7.396 The habitat creation and enhancement, with appropriate long term commitments to management for biodiversity would make a significant long term contribution to biodiversity value of the power station.

7.397 The residual effects are expected to be negligible beneficial for the boundary ditch, neutral grassland, ephemeral/short perennial vegetation in the mid to long term as result of the additional mitigation measures. The residual effects on other habitats would remain as negligible adverse.

Species

Bats

7.398 The species protection measures, commitments to minimal additional light levels at the flyover bridge should maintain the potential value of the flyover bridge for the pipistrelle bats. The lighting commitments and retention of dense scrub and woodland would also protect the flight lines used by bats that roost in the bridge.

7.399 The provision of additional artificial bat boxes within the wider power station site would provide further roosting opportunities in unlit locations. Importantly, commitments to deliver an environmentally sensitive lighting scheme with connected dark corridors would maintain the value of the site for commuting and foraging bats. The residual effect on the roosting and foraging local bat populations would be negligible adverse.

Otter

7.400 Commitments to deliver an environmentally sensitive lighting scheme with connected dark corridors would maintain the potential for otter to use the south boundary as a wildlife corridor and potentially hunt in Lamby's Lake alongside the site operations. The Uskmouth Conversion Project would not result in any barriers to movement of otters. There would be no light spill onto the intertidal areas.

7.401 The significance of effect on otter (high importance) during operation would remain, at worse, minor adverse, which is not significant.

Water Vole

7.402 During operations there are no anticipated adverse impacts on the boundary ditch or the water vole population. If water voles disperse during the construction of the primary silos, the ditch habitat and burrows would remain in place and available for recolonisation when the nearby construction activities are completed.

7.403 In the absence of management, natural successional changes can reduce the value of the ditch habitat for water vole. The scrub that is spreading along the banks would increase in extent and ultimately shade out most of the herbaceous bankside vegetation and increase the shading of the channel. Deep shade would also reduce the value of the ditch for water vole and over time significantly lower its ability to sustain a water vole colony.

7.404 The habitat enhancement and management specified in the additional mitigation section would lead to a negligible beneficial effect at least in the context of the site with the potential to establish new colonies within the wider landholding with the potential for benefits in a local context.

Breeding and Wintering Birds

7.405 The residual effect of operational activities on bird populations within the site would relate to background noise and general operational activities within the site.

7.406 Avoidance of light spill onto the scrub habitats and lake through sensitive lighting design would also ensure no decline in the value of these habitats for breeding birds. Operational noise may continue to indirectly effect the use of buildings and structures close to the main power station with the potential for the species currently nesting to find alternative nest sites in the surrounding area. The breeding bird activity during operation should be equivalent to 2016 when the power station was fully operational.

7.407 The residual effect for both breeding birds and wintering birds is classified as negligible adverse.

Reptiles

7.408 The retention and protection of existing habitats and creation of new areas of grassland would ensure any residual effect would be at least negligible adverse, and potentially negligible beneficial.

Invertebrates

7.409 The additional mitigation measures to establish a mix of grassy and open habitats, south facing banks and seasonal pooling which would establish many niches associated with invertebrate diversity. Specific measures would be included to attract pollinator species, including bees.

7.410 By recreating post-industrial habitats, the residual effect would be negligible beneficial.

Future Monitoring

7.411 Prior to piling, updated survey information would be obtained for wintering bird activity in any areas where noise levels could be higher than 40 dB. This would be expected to include Lamby's Lake and the western part of the Newport Wetlands SSSI. The survey would include all species that are qualifying features of the Natura 2000 sites.

7.412 A spring survey of the breeding bird activity of Schedule 1 bird species would be undertaken over several visits in spring prior to the second phase of construction and would include scrub habitats around the coal stockyard and the adjoining part of the Newport Wetlands in order to inform the piling methodology.

7.413 The habitat creation being delivered as part of the Uskmouth Conversion Project would be supported by ongoing targeted ecological monitoring initially during the first few years after construction to document habitat establishment and the continued use of the site by key species.

7.414 Ephemeral vegetation, grassland and native tree/shrub planting would all be subject to ecological monitoring for five years following their initial creation. The monitoring would assess the extent to which relocated plant population species are establishing in the green space. Monitoring would specifically inform the need for remedial measures such as weed control.

7.415 The positive biodiversity balance predicted is dependent on long term good management for biodiversity over the lifetime of the Uskmouth Conversion Project. After the initial five years, periodic monitoring of the habitats would be undertaken and ensure that management continues to promote and maintain the habitat types, structure and diversity set out in the ES chapter to inform the impact assessment and residual effects. Monitoring would identify where the management outcomes are not as anticipated and would set out changes in management actions/specifications to be consistent with the long term objectives for biodiversity.

7.416 Species activity in the wider power station would be monitored following each phase of construction. Use by otters would be assessed through surveys for evidence of activity and the use of camera traps at key locations including the northern crossing from the Julian's Gout to Julian's Reen.

7.417 Bat roost activity in the flyover bridge would also be monitored by following each phase of construction to assess any change in the level of use alongside the operational power station.

7.418 Water vole activity would be monitored in the enhanced section of the boundary ditch, initially annually during and for two years after construction, then periodically to assess the ongoing status of the population.

7.419 Following the installation of the operational lighting scheme, bat activity around the power station would be monitored over three survey visits in June, July and August to record the species and levels of activity and provide a comparison with the pre-development baseline.

7.420 For the first 2 years of operation the use of buildings and artificial nest boxes by nesting birds (peregrine, swallows and house martin) would be assessed each spring.

7.421 Invasive plant species would be monitored alongside the control measures that would be defined in the updated Invasive Plant Species Management Strategy to review the progress towards eradication from the power station.

Accidents/Disasters

7.422 Best practice measures would be implemented by the construction teams and as part of the operation of the Uskmouth Conversion Project. Pollution and other environmental protection measures would be built into the working practices for all relevant construction activities and as an integral part of the normal operation of the power station to prevent the River Usk SSSI/SAC, Newport Wetlands SSSI and Julian's Gout Land SINC from potential indirect impacts. Safeguarding would include monitoring of environmental conditions and devising a protection system with definition of the remedial measures in the event of potential incidents.

Potential Changes to the Assessment as a Result of Climate Change

7.423 Whilst there are potential effects of climate change on the future ecological baseline, it should be recognised that ecosystems are complex and are affected by a wide range of factors, and that there are limited data and modelling capability. It is likely that anthropogenic effects on biodiversity through the management and use of the land would be of much more significance than any effects

of climate change. Thus, climate change is not likely to affect the significance levels reported in this assessment.

Assessment of Cumulative Effects

7.424 The developments considered in the assessment of cumulative effects are employment land development allocations on the eastern side of Newport located over 1 km to the north of the power station landholding. There is the potential for the Uskmouth Conversion Project to have cumulative ecological effects with the employment developments listed below.

7.425 The two employment development allocations are located on greenfield sites located within agricultural land comprising small fields divided by ditches and hedgerows, woodland and scrub with a small area of brownfield field land.

7.426 It is expected that the developments would include the retention of watercourses and reens and woodland blocks and at least the partial retention of the field ditches and hedgerows with appropriate buffers. The developments would be expected to result in the loss of agriculturally improved grassland and potentially localised areas of less improved more cover species-rich vegetation diversity.

7.427 The Uskmouth Conversion Project would affect brownfield land with no impact on agricultural land. Protection of the biodiversity of the boundary ditch is built into the design of the Uskmouth Conversion Project within the power station. Should the employment land result in adverse effects on the field ditch network or reens, there would not be any cumulative impact from the Proposed Development.

7.428 The residential and mixed-use developments are also greenfield sites located within agricultural land comprising small fields divided by ditches and hedgerows, woodland and scrub with a small area of brownfield field land.

7.429 Therefore, the developments individually and in combination would not have a significant impact on any brownfield habitats which could be cumulative with the low-level effect associated with the Uskmouth Conversion Project within the power station. There would be no cumulative impact.

Inter-relationships

7.430 In identifying and assessing the impacts of the Uskmouth Conversion Project on terrestrial ecology, the inter-relationships with the environmental impacts identified in other ES chapters have been considered.

7.431 The information set out in Chapter 2: Scheme Description and Chapter 3: Scheme Construction has provided the basic information upon which to base the assessment of the effects of the Uskmouth Conversion Project as a result of land take, operation and construction.

7.432 The modelling of changes in air quality set out in Chapter 12: Air Quality has informed the assessment of the ecological effects on habitats. Similarly, Chapter 11: Noise and Vibration has provided the modelling of changes in noise which has informed the assessment of disturbance of sensitive species.

7.433 Chapter 6: Hydrology has provided information on management and treatment of run-off from construction and the operation of the Uskmouth Conversion Project.

7.434 This chapter assesses the effects of the Uskmouth Conversion Project upon terrestrial ecology. This, together with the assessments provided in the associated HRA (Appendix 7.11), provide a full assessment of the ecological impacts of the Uskmouth Conversion Project.

Summary of Effects

7.435 The residual effects of the Uskmouth Conversion Project within Uskmouth Power Station on terrestrial ecology are summarised in Table 7.5.

7.436 All impacts on nature conservation designations and habitats during construction and operation of the Uskmouth Conversion Project are negligible.

7.437 In the absence of any species protection measures there is the potential for minor adverse effects on several groups of species and under a precautionary approach, a moderate adverse effect of water vole cannot be ruled out. The ES sets out a series additional measures including species protection, maintaining the context of the surrounding environment, ecological enhancement through habitat creation, and long term management.

7.438 Residual effects on off-site bat roosts would be avoided through appropriate lighting and controls on maximum permitted noise levels close to the structure of the flyover bridge.

7.439 There is potential for minor adverse residual effects wintering birds, breeding birds, water vole and otter during the construction of the primary silos through noise. The design and implementation of sensitive construction working methods for the silos would control noise levels the worst-case residual impact would be expected to be negligible adverse. These effects are not significant for the EIA.

7.440 The operational residual effects on designated sites are negligible adverse while on habitats and some species the predicted effect is negligible beneficial as the habitats being created for biodiversity, on areas that are currently bare ground, become established and extent the resources for wildlife in and around the Uskmouth Conversion Project.

References

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Newport City Council (2015a) Newport Local Development Plan 2011-2026

Newport City Council (2015b) Wildlife and Development Supplementary Planning Guidance

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Welsh Government (2013) The Action Plan for Pollinators in Wales

Welsh Government (2018) Planning Policy Wales (Edition 10, December 2018)

Welsh Government, Department of the Environment, The Scottish Government and Defra (2012) A Climate Change Risk Assessment for Wales

Table 7.5: Summary of Likely Environmental Effects on Ecology

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact	Significance of effect (without additional mitigation)	Significance of effect (residual)	Residual Impact Significant / Not significant
Construction phase							
Designated Sites							
Severn Estuary SAC	Very High (International)	None	Short term	Negligible	Negligible adverse	Negligible adverse	Not significant
Severn Estuary SSSI	High (National)	None	Short term	Negligible	Negligible adverse	Negligible adverse	Not significant
Severn Estuary SPA and Ramsar	Very High (International)	Potential disturbance to birds through increased noise levels during construction activities.	Short term	Negligible	Negligible adverse	Negligible adverse	Not significant
River Usk SAC	Very High (International)	Potential disturbance of otter through increased noise levels during construction activities.	Short term	Negligible	Negligible adverse	Negligible adverse	Not significant
River Usk SSSI	High (National)	Potential disturbance of otter through increased noise levels during construction activities.	Short term	Negligible	Negligible adverse	Negligible adverse	Not significant
Newport Wetlands SSSI, NNR and RSPB Reserve	High (National)	Potential disturbance to birds through increased noise/activity levels within application site.	Short term	Negligible	Negligible adverse	Negligible adverse	Not significant
Julian's Gout Land SINC	Medium (County)	None	n/a	No change	No change	No change	Not significant
Alpha Steel Site SINC	Medium (County)	None	n/a	No change	No change	No change	Not significant
Solutia Site SINC, WTR	Medium (County)	None	n/a	No change	No change	No change	Not significant
Habitats							
Buildings and hardstanding	Negligible (Site)	Internal building renovation works, new building adjoining main power station. Construction on existing hardstanding.	n/a	No change	No change	No change	Not significant

Coal stockyard: bare ground and ephemeral/short perennial vegetation	Negligible (Site)	Partial permanent loss and extensive temporary disturbance of ephemeral/short perennial habitat within the construction working area.	Medium and Long term	Medium	Negligible adverse	Negligible adverse	Not significant
Regenerated (neutral) grassland	Negligible (Site)	Temporary disturbance of part of area from construction activities. Small extent of permanent habitat loss.	Medium and Long term	Low	Negligible adverse	Negligible adverse	Not significant
Amenity grassland	Negligible (Site)	Permanent small-scale loss for building works and associated hardstanding.	Long term	Medium	Negligible adverse	Negligible adverse	Not significant
Coal stockyard: open water – interceptor ditch	Negligible (Site)	Occasional maintenance disturbance of pioneer habitats in environmental protection feature for surface water management.	Medium term	Low	Negligible adverse	Negligible adverse	Not significant
Lamby's Lake: open water and marginal vegetation	Low (Local)	Low potential of disturbance or pollution from nearby construction activities.	Medium term	Low	Negligible adverse	Negligible adverse	Not significant
Boundary ditch: open water and tall herb/coal stockyard: neutral grassland	Low/Negligible (Local)	Low potential of disturbance from nearby construction activities. Potential for indirect effects – dust deposition, inadvertent disturbance.	Medium term	Low	Negligible adverse	Negligible adverse	Not significant
Species							
Common pipistrelle and soprano pipistrelle roosts	Low (District)	Potential disturbance of off-site day roosts from noise and lighting.	Medium term	Medium	Minor adverse	Negligible adverse	Not significant
Foraging bats	Low (Local)	Potential temporary reduction in suitability of habitats bounding development areas for foraging bats due to noise and lighting.	Medium term	Low	Minor adverse	Negligible adverse	Not significant
Otter	On-site – Low (District) Off-site – High (National)	Potential indirect disturbance of foraging areas (noise). Elevated noise within the adjoining habitats in the Newport Wetlands.	Medium term	Low	Minor adverse	Minor adverse	Not significant
Water vole	Low (District)	Potential for disturbance of ditch banks (outside of the working area) – for example surface water run off.	Short term	High	Moderate adverse	Minor adverse	Not significant
Badger	Negligible (Site)	Potential disturbance of foraging activity.	Medium term	Negligible	Negligible adverse	Negligible adverse	Not significant

Breeding birds	Low (Local/District)	Loss of nest site in coal stockyard. Potential indirect (noise) disturbance of Sch. 1 species (peregrine nesting on chimney stack and Cetti's warbler in scrub). Increased noise/activity levels to other species using Lamby's Lake.	Short term and Long term	Medium	Minor adverse	Minor adverse	Not significant
Wintering birds	Site – Negligible (Site) Off-site – High (National)	Elevated noise levels primarily during piling with potential for temporary displacement.	Short term	Medium	Minor adverse	Minor adverse	Not significant
Reptiles	Low (Local)	Potential for disturbance of reptiles present in habitats adjoining the working area through ground vibration – potential for localised displacement.	Short term	Medium	Minor adverse	Negligible adverse	Not significant
Invertebrates	Low (District)	Potential temporary loss of regenerating grassland and permanent partial loss of short ephemeral/perennial habitat as a result of adjacent construction works extending into the area.	Short term and Long term	Low	Negligible adverse	Negligible adverse	Not significant
Operational phase							
Designated Sites							
Severn Estuary SAC	Very High (International)	Emissions to air from the operation of the power station.	Long term	Negligible	Negligible adverse	Negligible adverse	Not significant
Severn Estuary SSSI	High (National)	Emissions to air from the operation of the power station.	Long term	Negligible	Negligible adverse	Negligible adverse	Not significant
Severn Estuary SPA and Ramsar	High (International)	Potential disturbance to birds through noise/activity levels within operational power station.	Long term	Negligible	Negligible adverse	Negligible adverse	Not significant
River Usk SAC	Very High (International)	Emissions to air from the operation of the power station. Potential disturbance to otter through noise/activity levels within operational power station.	Long term	Negligible	Negligible adverse	Negligible adverse	Not significant
River Usk SSSI	High (National)	Emissions to air from the operation of the power station. Potential disturbance to otter through noise/activity levels within operational power station.	Long term	Negligible	Negligible adverse	Negligible adverse	Not significant

Newport Wetlands SSSI, NNR and RSPB Reserve	High (National)	Potential indirect disturbance to birds and otter through increased noise/activity levels within development.	Long term	Negligible	Negligible adverse	Negligible adverse	Not significant
Julian's Gout Land SINC	Medium (County)	Emissions to air from the operation of the power station.	Long term	Negligible	Negligible adverse	Negligible adverse	Not significant
Alpha Steel Site SINC	Medium (County)	Emissions to air from the operation of the power station.	Long term	Negligible	Negligible adverse	Negligible adverse	Not significant
Solutia Site SINC, WTR	Medium (County)	Emissions to air from the operation of the power station.	Long term	Negligible	Negligible adverse	Negligible adverse	Not significant
Habitats							
Coal stockyard	Negligible (Site)	Part of the permanent operational area bounded by soft landscaping.	Long term	Negligible	Negligible adverse	Negligible adverse	Not significant
Ephemeral/short perennial	Negligible (Site)	Habitat retention and creation increasing the habitat extent. Long term biodiversity management.	Long term	Negligible	Negligible adverse	Negligible beneficial	Not significant
Regenerated (neutral) grassland	Negligible (Site)	Habitat restoration following construction disturbance.	Long term	Negligible	Negligible adverse	Negligible adverse	Not significant
Coal stockyard: open water – interceptor ditch	Negligible (Site)	Occasional maintenance disturbance of pioneer habitats in environmental protection feature for surface water management.	Long term	Negligible	Negligible adverse	Negligible adverse	Not significant
Lamby's Lake: open water and marginal vegetation	Low (Local)	Habitat retention. Low potential for pollution.	Long term	Negligible	Negligible adverse	Negligible adverse	Not significant
Boundary ditch: open water and tall herb/coal stockyard: neutral grassland	Low/Negligible (Local)	Habitat retention. Low potential for pollution.	Long term	Negligible	Negligible adverse	Negligible beneficial	Not significant
Species							
Common pipistrelle and soprano pipistrelle roosts	Low (District)	Potential disturbance of off-site day roosts – noise, lighting, activities close to the flyover bridge.	Long term	Potentially High	Minor adverse	Negligible adverse	Not significant
Foraging bats	Low (Local)	Potential fragmentation of flight lines and reduction in foraging activity around the development.	Long term	Low	Negligible adverse	Negligible adverse	Not significant
Otter	On-site – Low (District)	Potential disturbance to otter through noise/activity levels within operational power station.	Long term	Low	Minor adverse	Minor adverse	Not significant

	Off-site – High (National)						
Water vole	Low (District)	Potential for indirect disturbance of water vole populations in the boundary ditch but protection through stand off.	Long term	Low	Minor adverse	Negligible beneficial	Not significant
Breeding birds	Low (Local/District)	Potential indirect disturbance of birds in off-site habitats as a result of increased site activity levels.	Long term	Low	Negligible adverse	Negligible adverse	Not significant
Wintering birds	Site – Negligible (Site) Off-site – High (National)	Potential disturbance to wintering using the lake and off-site habitats as a result of noise and site activities within operational power station.	Long term	Low	Negligible adverse	Negligible adverse	Not significant
Reptiles	Low (Local)	Potential for indirect disturbance of reptiles in habitats adjoining the built development operational area. Increase in extent of reptile habitat with commitments to habitat protection and management.	Long term	Low	Negligible adverse	Negligible beneficial	Not significant
Invertebrates	Low (District)	No additional adverse impact from operations. Long term increase in habitat extent alongside retained existing key habitats.	Long term	Low	Negligible adverse	Negligible beneficial	Not significant

8 LANDSCAPE AND VISUAL IMPACTS

Introduction

8.1 This chapter of the Environmental Statement (ES) presents the results of an Environmental Impact Assessment (EIA) regarding potential landscape and visual impacts resulting from the conversion of a former coal fire power station to one which combusts waste derived fuel pellets to generate electricity, hereafter referred to as the 'proposed development'.

8.2 It is intended that the ES will provide statutory and non-statutory consultees with sufficient information to determine any potential significant impacts the energy conversion project could impose on the receiving environment and will inform the issue of the appropriate planning consent by the local authorities. It will also inform any consent conditions.

8.3 In particular this ES chapter:

- Presents the existing environmental baseline established from desk studies and consultation.
- Presents the potential environmental effects of the landscape and visual impacts arising from the power station conversion project at Uskmouth, based on information gathered, analysis and assessments undertaken.
- Presents the potential environmental effects on the visual amenity of the study area and from the selected viewpoints. This includes changes to the composition of views and the perception and response by receptor groups to these changes.
- Identifies any assumptions and limitations encountered in compiling the environmental information.
- Highlights any necessary monitoring and/or mitigation measures which could prevent, minimise, reduce or offset the possible environmental effects identified in the EIA process.

8.4 The site, hereafter referred to in this report as the 'Application Site', is centred on National Grid Reference (NGR) ST 332898 (E), 183724 (N) approximately 14.7 km to the south of Newport city centre. It lies within the administrative boundary of the Newport City Council (NCC).

8.5 A plan showing the location of the Application Site and its context are shown in the Landscape Designations Plan (Figure 8.1).

8.6 This report considers the effects on:

- Landscape Character;
- Seascape Character; and
- Visual Amenity.

8.7 This chapter provides an overview of the Application Site within the landscape and visual context of the surrounding area and sets out the planning context of the Application Site with reference to landscape issues. The existing baseline landscape features and landscape character, which together make up the landscape resource, are described and reference is made to published landscape character studies and any relevant landscape designations. The current visibility of the Application Site from selected representative viewpoints in the surrounding landscape is also assessed.

8.8 A description of the proposed development is provided and the potential effects of these proposals on the landscape resource and visual environment are identified. Mitigation measures, which form an integral part of the proposed development, are also described together with how these measures are likely to prevent, reduce or offset any perceived adverse effects.

8.9 Landscape effects refer to changes arising from the proposed development on the physical elements that make up the landscape and which influence its character. These, together, form the landscape resource. Visual effects refer to changes to the existing views available from representative viewpoints within the landscape surrounding the Application Site.

8.10 An assessment has been made of the effects of the proposed development on the visual environment during the first winter following completion of the development (year 1) and for the summer 15 years after completion of the development (year 15). The latter reflects the mitigation provided by proposed planting and further growth of existing vegetation within and on the boundary of the land holding.

Assessment Methodology

Planning Policy Context

Planning Policy Wales and Technical Advice Note 23 (TAN 23)

8.11 Chapter 7 of Planning Policy Wales Edition 10 (PPW10) and TAN23: Economic Development, set out the Welsh Government's planning objectives and policies in respect of economic development. They state that the planning system should support economic and employment growth alongside social and environmental considerations and within the context of sustainable development.

8.12 Particularly relevant to this assessment is that:

- Environmental quality and amenity should be maintained and opportunities sought to enhance biodiversity, landscape and cultural heritage through development in the Enterprise Zone.
- High quality design principles should be adopted, ensuring that sustainable development is enshrined in proposals for the Enterprise Zone.

National Character Areas

8.13 LANDMAP is the formally adopted methodology for landscape assessment and is advocated by PPW10 and is promoted by Natural Resources Wales (NRW). It is considered to be a "whole" landscape approach that covers all landscapes, designated and non-designated in Wales (see paragraphs 8.123 to 8.153).

Newport Local Development Plan LDP (January 2015)

Policy CE9: Coastal Zone

8.14 The proposed development falls within The Newport City Council (NCC) area. The Adopted Proposal Map indicates that the proposed development falls within the 'Developed Coastal Zone' policy CE9.

"Development will not be permitted in the coastal area or adjoining the tidal river unless:

- *In the undeveloped coastal area such development is required to be on the coast to meet an exceptional need which cannot reasonably be accommodated elsewhere.*
- *The area is not itself at risk nor will the proposed development exacerbate risks from erosion, flooding or land instability.*

Development which requires a coastal location should be sited within the developed coastal zone."

Policy CE10: Renewable Energy

8.15 Policy CE10 sets out the Council's policy on renewable energy.

"Renewable energy schemes will be considered favourably, subject to there being no over-riding environmental and amenity considerations. Small scale micro-generation will be encouraged within the settlement boundary. Large scale proposals may be more appropriately located outside of the defined settlement boundary if no appropriate brownfield sites exist. The cumulative impacts of renewable energy schemes will be an important consideration."

8.16 It goes on to outline specific requirements in the Gwent Levels:

"In particular, care should be taken in assessing proposals for renewable energy projects in sensitive, designated areas, such as areas of high landscape quality, and areas of nature conservation, or archaeological or historical importance. The Gwent Levels are recognised as an internationally important resource in terms of landscape and heritage and nationally important for ecology. Proposals which affect the special qualities of the Gwent Levels, or any other protected site, will be resisted unless it can be demonstrated that there will be no significant adverse effects."

8.17 In terms of landscape and visual impacts the following strategic policies are relevant to the proposed development, relevant extracts from the Local Development Plan (LDP) (Newport City Council, 2015) are provided here.

Policies SP6: Green Belt and SP7: Green Wedges

8.18 The Local Development Plan proposals map indicates that the Application Site does not fall within these policy areas.

Policy SP8: Special Landscape Areas (SLAs)

8.19 The policy for Special Landscape Areas is set out as follows:

"Special landscape areas are designated as follows within which proposals will be required to contribute positively to the area, through high quality design, materials and management schemes that demonstrate a clear appreciation of the area's special features:

- *North of Bettws*
- *West of Rhiwderin*
- *Wentlooge Levels*
- *River Usk*
- *Caldicot Levels*
- *Wentwood"*

8.20 The SLAs have been designated based on the LANDMAP assessment and include 3 SLAs within the 5 km radius study area, Wentlooge Levels, River Usk and Caldicot Levels.

8.21 The policy goes on to outline:

"The designation of an SLA does not preclude development, but any proposals must demonstrate that they have been designed to respect the valued characteristics of the recognised landscape as well as being in accordance with other Policies of this Plan."

Policy SP9: Conservation of the Natural, Historic and Built Environment

8.22 The policy for Special Landscape Areas policy is set out as follows:

"The conservation, enhancement and management of recognised sites within the natural, historic and built environment will be sought in all proposals."

8.23 The policy makes specific mention of landscapes of*: "Outstanding Historic Interest"* and that *"The protection, retention, safeguarding, conservation and enhancement of heritage assets will be sought, and where new development is proposed that affects the building or site or its setting, this*

should be of the highest quality". The Gwent Levels Landscape of Outstanding Historic interest adjoins the Usk industrial area where the Application Site is located.

GP5: General Development Principles – Natural Environment

8.24 Parts v, vi and vii of Policy GP5 are particularly relevant to landscape and visual impact assessment, whereby:

"Development will be permitted where, as applicable:

iii. the proposals are designed and managed to protect and encourage biodiversity and ecological connectivity, including through the incorporation of new features on or off site to further the UK, Welsh and/or Newport Biodiversity Action Plans;

iv. the proposals demonstrate how they avoid, or mitigate and compensate negative impacts to biodiversity, ensuring that there are no significant adverse effects on areas of nature conservation interest including international, European, National, Welsh Section 4232 and local protected habitats and species, and protecting features of importance for ecology;

v. the proposal will not result in an unacceptable impact on water quality;

vi. the proposal should not result in the loss or reduction in quality of high quality agricultural land (grades 1, 2 and 3a);

vii. there would be no unacceptable impact on landscape quality;

viii. the proposal includes an appropriate landscape scheme, which enhances the site and the wider context including green infrastructure and biodiversity networks; and

ix. the proposal includes appropriate tree planting or retention where appropriate and does not result in the unacceptable loss of or harm to trees, woodland or hedgerows that have wildlife or amenity value."

8.25 The policy goes on to state at Paragraph 3.32 that: *"the location, scale and design of any proposed development should take account of its landscape setting"* and *"the impact of proposals will be assessed against Policy SP8: Special Landscape Areas and Policy CE4: Historic Landscape Parks, Gardens and Battlefields."*

CE4 Historic Landscapes, Parks, Gardens and Battlefields

8.26 The policy for historic landscapes, parks, gardens and battlefields is set out as follows:

"Sites included in the register of landscapes, parks and gardens of special historic interest and identified historic battlefields should be protected, conserved, enhanced and where appropriate, restored. Attention will also be given to their setting."

8.27 Policy CE4 makes specific mention of the Register of Landscapes of Outstanding Historic Interest in Wales and, in particular identifies the Gwent Levels.

8.28 The overlap between the historic environment impact assessment and this chapter, the LVIA, is considered in the subsequent sections of this assessment.

Gwent Levels – Green Infrastructure Strategy

8.29 *'This Green Infrastructure (GI) Strategy for the Gwent Levels was commissioned in 2016 by Monmouthshire County Council as part of the suite of documents required to support a bid for the Heritage Lottery Fund's Landscape Partnership programme, which provides grants for schemes aiming to conserve areas of distinctive landscape character. The 'Living Levels' Landscape Partnership Scheme aims to bring together local stakeholders, communities and farmers to collectively restore, enhance and protect the Gwent Levels landscape for all to enjoy*.' Partners

include local authorities including Newport City Council. The objectives and key principles in the Strategy are relevant to this assessment.

8.30 GI assets are multifunctional and relevant principles in relation to this assessment include *'strengthening landscape character and distinctiveness of the Gwent Levels'*. In particular, '*Reinforcing the strong sense of tranquillity, remoteness and wildness found within many places on the Gwent Levels that makes a contribution to people's mental well-being'*.

8.31 The visual impact from GI assets is considered in this assessment by way of the representative viewpoints that have been selected and the broad categories such as Public Rights of Way and Recreational visual receptors.

Relevant Guidance

8.32 This chapter has been prepared with regard to best practice as described in the documents below:

- Guidelines for Landscape and Visual Impact Assessment, Third Edition Landscape Institute and the Institute of Environmental Management and Assessment GLVIA3 (2013);
- GLVIA3 Statement of Clarification 1/13;
- An Approach to Landscape Character Assessment, Natural England (2014);
- Technical Guidance Note 06/19: Visual Representation of development proposals (replaces Advice Note 01/11) Landscape Institute (2019);
- Planning Policy Wales LANDMAP Guidance Note 1: LANDMAP and Special Landscape Areas (2016); and
- Planning Policy Wales LANDMAP Guidance Note 3: (2013).

8.33 The Guidelines for Landscape and Visual Impact Assessment (GLVIA3) are broad guidelines rather than detailed prescriptive methodologies. The methodologies tailored for the assessment of the proposed development are based on GLVIA3 guidance and are presented in detail below.

8.34 Landscape and visual studies provide analysis of the physical and perceptual attributes of an area. The assessment of landscape issues relates to the potential effect of development on the landscape resource, which encompasses landscape character, quality and distinctive features, including topography, drainage, vegetation and built features, whereas the study of visual constraints is concerned with the potential effect on views and visual amenity.

8.35 The analysis of visual constraints includes the identification of important views towards the Application Site, which are generally from a range of visual receptors, both public (highways and Public Rights of Way (PRoW)) and private (residential properties and places of employment). Visual receptors are of varying sensitivity to change, with views from the ground floors of private residences generally accepted as being more sensitive to change than those from highways or places of work where attention is focussed elsewhere. PRoW through rural areas with attractive landscapes, which are used for recreational purposes, are also usually accepted as being of high sensitivity to change.

Study Area

8.36 The study area for the assessment covers a radial distance of 5 km from the Application Site boundary. However, the main focus of the assessment was taken as a radius of 2 km from the site as it is considered that beyond this distance, even with good visibility, the proposals would not generally be perceptible in the landscape.

8.37 Whilst there may be potential for effects of the proposed development to extend beyond this limit, it is considered that the visual perception within the landscape will likely diminish with ever

increasing distance and where visible, would be seen as an increasingly smaller component of the wider composite view.

Consultation

8.38 A summary of the consultation relevant to population and health and how/where this is addressed is provided in Table 8.1.

Table 8.1: Summary of the consultation carried out in the LVIA process

Date	Consultee and Issues Raised	How/ Where Addressed
June 2019	Scoping Opinion NCC 13/02. Pre application advice relating to landscape and visual matters was received from Newport County Council (NCC): *'The site adjoins the Caldicot Levels Special Landscape Area and Wales Coast Path as acknowledged in the pre application information.* • The likely scale of the proposals in a flat open landscape of national historic and biodiversity interest will require professional landscape architect input to ensure the character and visual impacts are independently analysed and appropriately mitigated for where possible. • A Landscape and Visual Impact Appraisal (LVIA) will be required. The open site and size of the proposal is likely to require a computer generated Zone of Theoretical Visibility (ZTV). Following initial site assessment by the landscape architect, based on the proposals and likely impacts, discussion with the local authority will be required to agree view-points for analysis. • The historic field pattern and drainage features should be conserved and remain unaffected by any proposed level changes. • Mitigation measures should be appropriate to conserving the strong landscape character. • Proposals for new tree and hedgerow planting, and wildflower seeding should be discussed with NCC Biodiversity to ensure they are appropriate for the site location given the SSSI designation. • There may be opportunities to link with the Living Levels project. This is HLF funded, led by the RSPB with Newport City Council as a partner. The following documents were produced for the project by Chris Blandford Associates and should be referred to: – Living Levels Landscape Character Assessment 2017 – Gwent Levels Green Infrastructure (GI) Strategy 2017	Character and visual impacts assessed by professional landscape architects at RPS. LVIA and ZTV produced within this Chapter, including agreement with the LPA over viewpoints. Historic landscape character assessed as part of the Historic Landscape Aspect Area assessment. Mitigation measures include the potential for tree and shrub planting on the former restored ash tip site which would strengthen character and be in keeping with the scrub and woodland character in the vicinity. These proposals will be produced to ensure no net loss in biodiversity. The Living Levels Landscape Character Assessment and Gwent levels GI Strategy have informed this assessment.
December 2019	Conversation with Geraint Roberts – NCC regarding location of viewpoints	Incorporated NCC suggestion to include viewpoint from Uskmouth Sailing Club.
20 December 2019	Geraint Roberts - NCC – consultation on candidate viewpoints	Thirteen Candidate Viewpoints and a draft ZTV were submitted to NCC by RPS on 20 December 2019. NCC replied 24 December advising no new viewpoints were required.

Baseline and Assessment Methodology

8.39 This Appraisal of Landscape Effect has been undertaken with reference to best practice, as outlined in the following published guidance:

- Guidelines for Landscape and Visual Impact Assessment, Third Edition Landscape Institute and the Institute of Environmental Management and Assessment GLVIA3 (2013);
- GLVIA3 Statement of Clarification 1/13;
- Technical Information Note 08/2015: Landscape Character Assessment, (Landscape Institute, February 2016);
- An Approach to Landscape Character Assessment, Natural England (2014);
- Technical Guidance Note 06/19: Visual Representation of development proposals (replaces Advice Note 01/11) Landscape Institute (2019);
- Planning Policy Wales LANDMAP Guidance Note 1: LANDMAP and Special Landscape Areas (2016); and
- Planning Policy Wales LANDMAP Guidance Note 3: (2013).

8.40 GLVIA3 states within paragraph 1.1 that *"Landscape and Visual Impact Assessment (LVIA) is a tool used to identify and assess the significance of and the effects of change resulting from development on both the landscape as an environmental resource in its own right and on people's views and visual amenity."*

8.41 GLVIA3 also states within paragraph 1.17 that when identifying landscape and visual effects there is a *"need for an approach that is in proportion to the scale of the project that is being assessed and the nature of the likely effects. Judgement needs to be exercised at all stages in terms of the scale of investigation that is appropriate and proportional."*

8.42 GLVIA3 recognises within paragraph 2.23 that *"professional judgement is a very important part of LVIA. While there is some scope for quantitative measurement of some relatively objective matters much of the assessment must rely on qualitative judgements"* undertaken by a landscape consultant or a Chartered Member of the Landscape Institute (CMLI).

8.43 The effects on cultural heritage and ecology are not considered within this report.

Landscape Assessment Methodology

8.44 The landscape assessment combines the results of both an objective and subjective appraisal of the landscape. This appraisal consisted of three stages, a desk study, a field survey and analysis of the likely effects resulting from the proposed development in the light of these studies.

Desk Study

8.45 The desk study involved an examination of 1:25,000 scale Ordnance Survey maps and aerial photographs to establish the general context of the study area. This was followed by analysis of relevant documentation (reports, development plans, assessments, government guidance etc.) to clarify the landscape and planning context.

8.46 Fieldwork involved a visual survey of the Application Site and surrounding area in order to assess its character and identify key landscape elements and features. This was carried out on 10 January 2020 in clear sunny conditions.

Analysis

8.47 Based on the findings of a desk study and field survey, distinctive elements in the landscape, the pattern of their arrangement and any dominant features were identified, and the existing character and quality of the affected landscape described.

8.48 An assessment was then made of the degree of change to various landscape components or elements, the overall landscape character that would result from the proposed development and the nature of any potential effects.

8.49 Effects on the landscape can be defined as the relationship between the sensitivity of the landscape receptor and the magnitude of any change which the proposals would create. Effects may be adverse, beneficial or neutral in nature.

Visual Assessment Methodology

8.50 An assessment has been undertaken to determine the degree of visual effect of the proposed development upon visual receptors in the surrounding landscape.

Desk Study

8.51 In order to help determine the extent of the study area for a landscape and visual assessment, a computer-generated Zone of Theoretical Visibility (ZTV) is frequently used. Preparation of a ZTV is recommended in GLVIA3 which states: "*it makes clear that the area so defined only shows land from which the proposal may theoretically be visible*" (para. 6.8, p.103).

8.52 The ZTV Plan (Figures 8.3a and 8.3b) show areas from which the proposed development may be visible. The ZTV takes account for the screening effects of existing significant vegetation blocks (modelled at 12 m) and built form (modelled at 9 m), uses an assumed observer height of 1.5 m. Three origin points have been used to represent the parameters of the proposed development. Landform data was taken from OS Terrain 5 mapping, using point data across the Application Site.

8.53 The extent of the study area uses a 5 km radius from the centre of the proposed development for this assessment. The location is shown on Figures 8.1 to 8.5, which is considered to be consistent with GLVIA3 guidelines which refer to a "*need for an approach that is in proportion to the scale of the project that is being assessed and the nature of the likely effects. Judgement needs to be exercised at all stages in terms of the scale of investigation that is appropriate and proportional*."

8.54 Visual receptors include the public or community at large also residents and visitors to an area. Viewpoints looking towards the proposed development have been selected from varying distances and directions to represent these visual receptors. These include views from the PRoW and areas of access land, highways, places of recreation and other potentially important areas including Scheduled Ancient Monuments.

8.55 Thirteen representative Candidate Viewpoints were put forward to NCC on 20 December 2019.

Fieldwork

8.56 The provisional identification of representative Candidate Viewpoints was refined by subsequent fieldwork. These Candidate Viewpoints included those from highways and PRoW. Existing views, from or near to these locations were recorded photographically as representative viewpoints and included an additional viewpoint (see Figures 8.3a and 8.3b for representative viewpoint locations).

8.57 Baseline photographs were taken at eye level from the representative viewpoints, using a digital SLR camera with an f1.450mm fixed focal length lens in 35mm film format in accordance with Landscape Institute guidelines. The representative viewpoints are shown in Figures 8.4a to 8.4n of this assessment, and a description of each representative viewpoint is provided in Table 8.15. Three of the viewpoints were selected for representative wireline computer generated images of the proposed development (shown on Figures 8.6a to 8.6f).

Analysis

8.58 The existing views were then compared with those that would result if the proposed development were to be constructed. The comparative changes in the views have been assessed for the winter

of the first year following completion, and then for the anticipated views in the summer months 15 years after construction.

Assessment Criteria and Assignment of Significance

Effects Assessed

8.59 Landscape and visual effects are assessed through professional judgements on the sensitivity of landscape elements, landscape character, visual receptors and representative viewpoints combined with the predicted Magnitude of Impact arising from the proposals.

8.60 The landscape and visual effects have been assessed in the following sections:

- Effects on landscape character; and
- Effects on visual amenity.

8.61 Sensitivity is defined in GLVIA3 as *"a term applied to specific receptors, combining judgments of susceptibility of the receptor to a specific type of change or development proposed and the value related to that receptor".*

8.62 Various factors in relation to the susceptibility and value of landscape elements, landscape character, visual receptors or representative viewpoints are considered below and are cross referenced to determine the overall sensitivity, as shown in Table 8.2.

Table 8.2: Overall sensitivity of landscape and visual receptors

		Value			
		Outstanding	High	Medium	Low
Susceptibility	High	Very High	Very High	High	Medium
	Medium	Very High	High	Medium	Low
	Low	Medium	Medium	Low	Negligible

8.63 Magnitude of Impact is defined in GLVIA3 as *"a term that combines judgements about the size and scale of the effect, the extent over which it occurs, whether it is reversible or irreversible and whether it is short or long term in duration"*. Various factors contribute to the Magnitude of Impact on landscape elements, landscape character, visual receptors and representative viewpoints.

8.64 The sensitivity of the landscape and visual receptor and the Magnitude of Impact resulting from the proposed development are cross referenced in Table 8.9 to determine the degree of landscape and visual effects.

Sensitivity of Landscape Elements

8.65 Sensitivity is determined by a combination of the value that is attached to a landscape element and the susceptibility of the landscape element to changes that would arise as a result of the proposed development – see pages 88-90 of GLVIA3. Both value and susceptibility are assessed as high, medium or low.

8.66 The criteria for assessing the value of landscape elements and landscape character is shown in Table 8.3.

Table 8.3: Criteria for assessing landscape value

Value	Description

High	Designated areas at an International, National or Local scale (including but not limited to World Heritage Sites, National Parks, AONBs, SLAs, etc.) considered to be an important component of the country's character experienced by a high number of people. Landscape condition is good and components are generally maintained to a high standard. In terms of seclusion, enclosure by land use, traffic and movement, light pollution and presence/absence of major infrastructure, the landscape has an elevated level of tranquillity. Rare or distinctive landscape elements and features are key components that contribute to the landscape character of the area.
Medium	No formal designation but (typically) rural landscapes, important to the setting of towns and villages also considered to be a distinctive component of the national or local landscape character experienced by a large proportion of its population. Landscape condition is fair, and components are generally well maintained. In terms of seclusion, enclosure by land use, traffic and movement, light pollution and presence/absence of major infrastructure, the landscape has a moderate level of tranquillity. Rare or distinctive landscape elements and features are notable components that contribute to the character of the area.
Low	No formal designations but a landscape of local relevance (including but not limited to public or semi-public open spaces, village greens of allotments) also green infrastructure and open spaces within residential areas likely to be visited and valued by the local community. Landscape condition may be poor and components poorly maintained or damaged. In terms of seclusion, enclosure by land use, traffic and movement, light pollution and presence/absence of major infrastructure, the landscape has limited levels of tranquillity. Rare or distinctive elements and features are not notable components that contribute to the landscape character of the area.

8.67 The criteria for assessing the susceptibility of landscape elements and landscape character is shown in Table 8.4.

Table 8.4: Criteria for assessing landscape susceptibility

Susceptibility	Description
High	Scale of enclosure – landscapes with a low capacity to accommodate the type of development being proposed owing to the interactions of topography, vegetation cover, built form, etc. Nature of land use – landscapes with no or little existing reference or context to the type of development being proposed. Nature of existing elements – landscapes with components that are not easily replaced or substituted (e.g. ancient woodland, mature trees, historic parkland, etc.). Nature of existing features – landscapes where detracting features, major infrastructure or industry is not present or where present has a limited influence on landscape character.
Medium	Scale of enclosure – landscapes with a medium capacity to accommodate the type of development being proposed owing to the interactions of topography, vegetation cover, built form, etc. Nature of land use – landscapes with some existing reference or context to the type of development being proposed. Nature of existing elements – landscapes with components that are easily replaced or substituted. Nature of existing features – landscapes where detracting features, major infrastructure or industry is present and has a noticeable influence on landscape character.
Low	Scale of enclosure – landscapes with a high capacity to accommodate the type of development being proposed owing to the interactions of topography, vegetation cover, built form, etc. Nature of land use – landscapes with extensive existing reference or context to the type of development being proposed. Nature of existing features – landscapes where detracting features or major infrastructure is present and has a dominating influence on the landscape.

8.68 Various factors in relation to the susceptibility and value of landscape elements are assessed and cross referenced to determine the overall sensitivity as shown in Table 8.2.

Magnitude of Impact on Landscape Elements

8.69 Professional judgement has been used to determine the Magnitude of Impact on individual landscape elements within the site as shown in Table 8.5.

Table 8.5: Criteria for assessing Magnitude of Impact for landscape elements

Magnitude of Impact	Description
High	Total loss of a landscape element.
Medium	Partial loss or alteration to part of a landscape element.
Low	Minor loss or alteration to part of a landscape element.
Negligible	No loss or very limited alteration to part of a landscape element.

Effects on Landscape Character

8.70 Landscape character is defined as the "distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse." The assessment of effects on landscape character considers how the introduction of new landscape elements physically alters the landform, landcover, landscape pattern and perceptual attributes of the site or how visibility of the proposed development changes the way in which the landscape character is perceived.

Sensitivity of Landscape Character

8.71 Sensitivity is determined by a combination of the value that is attached to a landscape and the susceptibility of the landscape to changes that would arise as a result of the proposed development – see pages 88-90 of GLVIA3. Both value and susceptibility are assessed as high, medium or low.

8.72 The criteria for assessing landscape character value are shown in Table 8.3.

8.73 The criteria for assessing landscape character susceptibility are shown in Table 8.4.

8.74 The overall sensitivity of landscape character is determined through cross referencing the value and susceptibility of landscape character as shown in Table 8.2.

Magnitude of Impact on Landscape Character

8.75 Professional judgement has been used to determine the magnitude of impact on landscape character as shown in Table 8.6.

Table 8.6: Criteria for Magnitude of Impact for landscape character

Magnitude of Impact	Description
High	Introduction of major elements into the landscape or some major change to the scale, landform, land cover or pattern of the landscape.
Medium	Introduction of some notable elements into the landscape or some notable change to the scale, landform, landcover or pattern of the landscape.
Low	Introduction of minor new elements into the landscape or some minor change to the scale, landform, landcover or pattern of the landscape.
Negligible	Introduction of very minor new elements into the landscape or some very minor change to the scale, landform, landcover or pattern of the landscape.
No Change	No alteration or appreciable introduction of new elements into the landscape or change to the scale, landform, landcover or pattern of the landscape.

Effects on Visual Amenity

8.76 The effects on visual amenity consider the changes in views arising from the proposed development in relation to visual receptors including settlements, residential properties, transport routes, recreational facilities and attractions; and on representative viewpoints or specific locations within the study area as agreed with the Local Planning Authority.

Sensitivity of Visual Amenity

8.77 Sensitivity is determined by a combination of the value that is attached to a view and the susceptibility of the receptor to changes in that view that would arise as a result of the proposed development – see pages 113-114 of GLVIA3. Both value and susceptibility are assessed as high, medium or low.

8.78 The value attached to a view includes a recognition of value through landscape designations, indicators of value attached to views by visitors such as the inclusion on maps or reference within guidebooks, provision of facilities, presence of interpretation boards, etc.

8.79 The criteria for assessing visual susceptibility is shown in Table 8.7.

Table 8.7: Criteria for assessing visual susceptibility

Susceptibility	Description
High	Includes occupiers of residential properties and people engaged in recreational activities in the countryside such as using PRoW.
Medium	Includes people engaged in outdoor sporting activities and people travelling through the landscape on minor roads and trains.
Low	Includes people at place of work e.g. industrial and commercial premises and people travelling through the landscape on A roads and motorways.

Magnitude of Impact on Visual Amenity

8.80 Professional judgement has been used to determine the magnitude change on landscape character as shown in Table 8.8.

Table 8.8: Criteria for Magnitude of Impact for visual receptors

Magnitude of Impact	Description
High	Dominant. Major change in the view that has a defining influence on the overall view with many visual receptors affected.
Medium	Prominent. Some change in the view that is clearly visible and forms an important but not defining element in the view.
Low	Visible but nor prominent. Some change in the view that is not prominent with few visual receptors affected.
Negligible	Very minor loss or detrimental alteration to one or more characteristics, features or elements in the view. The proposed development is at such a distance or is heavily screened so to be barely perceptible and may only be visible in clear conditions. May go unnoticed.
No Change	No loss or alteration or observable impact in the change to the view.

Degree of Effect for Landscape and Visual Receptors

8.81 The degree of effects is assessed by professional judgements based upon all the factors in terms of landscape and visual sensitivity and the magnitude of impact arising from the proposed development. The cross referencing of landscape and visual sensitivity and the magnitude of impact determines the overall degree of effects as shown in Table 8.9.

Table 8.9: Degree of landscape and visual effects

Sensitivity	Magnitude of Impact				
	No Change	Negligible	Low	Medium	High
Negligible	No change	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	No change	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	No change	Negligible or Minor	Minor	Moderate	Moderate or Major
High	No change	Minor	Minor or Moderate	Moderate or Major	Major or Substantial
Very high	No change	Minor	Moderate or Major	Major or Substantial	Substantial

8.82 For the purpose of this LVIA any effects with a significance level of moderate or less are considered to be not significant in EIA terms.

Nature of Effects

8.83 GLVIA3 includes an entry that states "*effects can be described as positive or negative (or in some cases neutral) in their consequences for views and visual amenity*." GLVIA3 does not, however, state how negative or positive effects should be assessed and therefore becomes a matter of subjective judgement rather than reasoned criteria. Due to inconsistencies with the assessment of negative or positive effects a precautionary approach is applied to this assessment of landscape and visual effects that assumes all landscape and visual effects are considered negative or adverse unless otherwise stated.

Limitations of the Assessment

8.84 The visual assessment has been based on analysis of OS mapping of the Application Site and the surrounding area and on a field survey of views towards the Application Site from publicly accessible viewpoints in the surrounding landscape. Although every effort has been made to include viewpoints in sensitive locations and also locations from which the development would be most visible, not all public viewpoints from which the development would be seen have been included in the assessment.

8.85 The visual assessment and associated field work has been carried out during early January 2020 with no leaf canopies on deciduous trees and hedgerows. Views towards the proposed development may decrease during the late spring, summer and early autumn months with trees and hedgerows in full leaf. Given the timing of the field work, professional judgement has been used to anticipate the likely visibility of the proposed development during the summer months.

8.86 With the exception of the Application Site itself, no access to private land or property was obtained during the course of the assessment.

Baseline Environment

Landscape Baseline

8.87 The aim of the baseline study is to describe the individual components of the physical landscape present on the Application Site and within the 5 km radius study area and to provide an understanding of how the landscape's constituent elements, including its character, spatial

variation, geographic extent, condition and the way in which the landscape is experienced also, how the value attached to it may be effected by the proposed development.

8.88 The Application Site is centred on National Grid Reference (NGR) ST 330104 (E), 183918 (N) approximately 4.3 km to the south-east of Newport city centre, close to the mouth of the River Usk. Situated on the site of the former coal-fired power station located at the southern end of the industrial area on the eastern side of the River Usk and less than 1 km from the Newport Wetlands National Nature Reserve.

8.89 The Application Site is relatively flat and low lying at approximately 6 m AOD. Artificial mounding around the site has been used to lessen the visual impact of the power station from the immediate surroundings. This includes raised land to the south-west and embankment earthworks to the south which separate the power station from the Newport Wetlands National Nature Reserve. The local freight railway line terminates at the site. The perimeter comprises of native vegetation, trees and scrub. There are some specimen trees, with some areas laid to grass on the eastern approaches to the site.

8.90 Much of the study area is below 15 m AOD within Newport and on the coastal levels landscape. The land rises either side of the River Usk north of Spittles Bridge also known as City Bridge, with the highest parts of the study area in the north-west, such as Caerau Park generally 95 to 105 m AOD and Lawrence Hill to the north-east where the M4 runs 95-105 m AOD.

Description of Surrounding Area

Landscape Designations

8.91 A Landscape Designation Plan is provided in Figure 8.1. The Application Site does not form part of any National Park or Area of Outstanding Natural Beauty (AONB), nor are these designations present within the 5 km radius study area.

8.92 However, the Application Site is located in the Caldicott Levels SLA and adjoins the Usk SLA. The Gwent Levels Landscape of Outstanding Historic Interest lies a short distance to the east of the Application Site and extends west of the Usk parallel with the coast. This designation occupies a large swathe of the study area between the built-up area of Newport and the Severn Estuary coastline.

8.93 There are International Ramsar and European nature conservation designations, Special Area of Conservation (SAC) and a Special Protection Area (SPA), associated with the intertidal areas at the mouth of the Usk with the Severn Estuary SAC and SPA. The SAC extends up the River Usk immediately to the west of the Application Site. Although a wildlife designation, the international designations attract interest from visitors which are considered in the experiential impacts.

Settlements and Built Form

8.94 The closest residential properties within the ZTV and would therefore have potential views of the application site are:

- Nash Village (approximately 1.24 km to the east);
- Pye Corner (approximately 2.46 km to the north-east); and
- Goldcliff (approximately 3.48 km to the south-east).

8.95 There are a small number of individual farm complexes and private residences within the surrounding area. These include:

- On Saltmarsh Lane:
  - Saltmarsh Farm (2.2 km south-east of the Application Site);
  - Elmtree Farm (approximately 2.18 km south-east of the Application Site); and

  - Level Court Farm (2.32 km south-east of the Application Site).
- Adjacent to Nash Road between Nash and Pye Corner:
  - Little Cross Farm (2 km north-east of the Application Site); and
  - Fair Orchard (2.05 km north-east of the Application Site).
- On Henton Road:
  - Cross Farm (2.21 km east of the Application Site); and
  - Henton Farm (2.1 km east of the Application Site).
- On or adjacent to Lighthouse Road on the west side of the river Usk:
  - Fair Orchard Farm (approximately 2.82 km west of the Application Site);
  - Ty-mawr Farm (approximately 2.97 km west of the Application Site);
  - New Dairy farm (approximately 2.42 km west of the Application Site);
  - Whitecross Farm (approximately 3 km west of the Application Site); and
  - New Farm (approximately 3.23 km west of the Application Site).

8.96 The visual baseline for these residential receptors are discussed later in this section (8.162 to 8.197) and grouped for assessment purposes.

Listed Buildings and Conservation Areas

8.97 The Conservation Areas within the Study Area are all to the north of the Application Site, within the townscape settings and shown in Figure 8.1.

- Waterloo Conservation Area (approximately 2.6 km from the north-western boundary of the Application Site).
- Lower Dock Street Conservation Area (approximately 3.5 km from the north-western boundary of the Application Site).
- Belle View Conservation Area (approximately 3.84 km from the north-western boundary of the Application Site).

8.98 The other Conservation Areas within the study area are located further away and potential views of the proposed development would be obstructed by intervening development.

8.99 Listed Buildings are shown on the Landscape Designation Plan in Figure 8.1. There are a number of listed buildings in the study area. These are generally located in clusters and associated with the Conservation Areas listed above. There are some which fall outside the Conservation Areas and may have potential inter-visibility with the proposed development noted below:

- Grade I listed building Church of St Mary at Nash (1.31 km to the east of the Application Site);
- 2 Grade II listed buildings associated with Fair Orchard (approximately 2.78 km to the north-east of the Application Site);
- Grade II listed Pye Farm at Pye Corner (approximately 1.95 km to the north-east of the Application Site); and
- Grade II former West Usk Lighthouse (approximately 2.16 km to the south-west of the Application Site).

Scheduled Monuments

8.100 There are two Scheduled Monuments in the study area from which receptors may have potential views of the Application Site. There may be the potential for their setting to be adversely affected by the proposed development:

- The Goldcliff Moated Site (approximately 3.14 km to the east of the Application Site); and
- Tredegar Fort (approximately 4.92 km to the north-west of the Application Site – approximately 90 m AOD).

Historic Landscapes, Parks and Gardens

8.101 The Gwent Levels landscape of Outstanding Historic interest is listed on the Register of Landscapes, Parks and Gardens and covers an extensive area of coastal levels either side of the Application Site and former power station and industrial areas which are located on both sides of the Usk. The boundary is shown on Figure 8.1. The justification for the designation is connected with the deep time depth and multiple layers of historic landscape or palimpsest (CBA, 2017):

"The Register describes the Levels as a landscape of extraordinarily diverse environmental and archaeological potential. Although they are an important wetland resource in their own right, archaeologically the area contains a variety of landscapes of different dates, and nowhere else is it possible to make the period distinctions so easily. People's past activities in the area have been governed by the vast tidal range within the Severn Estuary, which has seen major and minor fluctuations in the heights and range of tides since the last glaciation, caused by variations in both the land and sea level. The Levels reflect people's evolving and often precarious relationship with these circumstances over the last ten thousand years".

8.102 The presence of historic parks and gardens within the study area is attributable to the fine views and prospect these sites have over the coastal landscape and their slightly elevated position above the Levels landscape. The modern expansion of Newport may have restricted the quality of the setting, but these designations have the potential to be adversely affected by the proposed development.

8.103 Tredegar House Grade I listed and Grade II* listed gardens, owned by the National Trust is some 2.3 km distance to the north-west of the Application Site. Figures 8.3a and 8.3b indicate that the existing development (Uskmouth Power Station stack) ZTV extends over part of this designation but the ZTV of the proposed development does not overlap with the House or Garden. Consequently, this visual receptor will not be considered further in this assessment. However, the scheduled monument designation of Tredegar Fort described previously in this section, forms part of the Historic Parks and Gardens designation and maybe potentially adversely affected by the proposed development.

8.104 Belle Vue Park is a Grade II listed park and garden situated on the south side of Newport, 2.16 km from the Application Site. The ZTV does extend over part of the site but the Belle Vue Park is surrounded by development which reduces potential for the site to be significantly impacted by the proposed development. Therefore, it is not considered further in this assessment.

8.105 Beechwood park (4.42 km away) and St Woolos Cemetery (4.9 km away) are both located within the urban setting of Newport and a sufficient distance from the Application Site not to be significantly affected by the proposed development, so are not considered further in this assessment.

Public Highways

8.106 The highway network immediately surrounding the Application Site to the east is characterised by small rural lanes. In the Gwent Levels Landscape Character Assessment, the lanes in the Nash/Goldcliff Coastal Zone (A2.13) are collectively described as a 'sinuous with roadside waste'.

8.107 West Nash Road within area A2.13 which serves the former power station where the Application Site is located provides two-way traffic for the majority of its length. It is less sinuous than smaller lanes more typical of the area and is white lined, partially kerbed also partially lit.

8.108 The A4810 is a modern road which runs east to west to the south of the Tata steel works site.

8.109 Across the River Usk from the Application Site and Wentlooge levels, the Eastern St. Brides Sub Area (A3.1) has a network of 'sinuous roads with remnants of roadside waste', with fewer main or A roads than to the east of the Usk.

8.110 There are numerous roads within Newport Road receptor views of the Application Site are generally blocked by the proximity and heights of the adjoining roadside development and are not considered further in the assessment.

8.111 The M4 crosses the landscape to the north of the 5 km radius study area and the ZTV shows that there would be no significant effect on road receptors due to distance and the intervening built environment and is not considered further in this assessment.

Rail

8.112 The coastline railway connects the Severn crossing with Newport and runs through the centre of Newport. A branch line spur runs through the rail gates near Julian's Pill, and into the rail unloading facility within the proposed development, this was previously used for coal deliveries and will be used for fuel pellet delivery post conversion.

Trees, Woodland and Hedgerows

8.113 The Levels landscape is situated south of Newport and within the study area. Either side of the Application Site is described as mainly hedge bounded fields to the north with fields drained by Reens in the south. This area is located in the Habitats Aspect Area LANDMAP classification.

8.114 Woodland blocks are generally absent from the Levels landscapes and remaining study area. However, there are small blocks of scrub and woodland around the boundary of the landholding and the RSPB Wetland Nature Reserve to the south and the Welsh Water sewage works to the east. The hedgerows are a mixture of clipped low hedges and taller treed character.

8.115 Immediately south of the Application Site and landholding boundary the RSPB Nature Reserve is dominated by tall reedbeds which persist year-round.

8.116 Overall, the Uskmouth Power Station landholding and the sewage works have a thick belt of scrub and woodland separating them from neighbouring land uses, apart from the western boundary with the River Usk.

Public Rights of Way and Public Access

8.117 The Wales Coastal Path takes a sinuous route immediately to the east of the Application Site. It passes less than 700 m at its closest point. Some sections are slightly elevated above the Levels landscape, such as the coastal embankment which overlooks the Severn estuary. This will have the likely effect of increasing visibility of the surroundings for users.

8.118 The Levels landscape has a fragmented network of footpaths and bridleways with PRoW, these are often short and connect farms with hamlets and the wider highway network Access and Recreation (Gwent Levels Landscape Character Assessment – CBA, 2017).

8.119 There is a Sustrans national cycle route which runs east to west within the Levels landscape but inland from the coast and some 1.53 km to the north-east of the Application site at its closest point, near Pye Corner.

8.120 There are no areas of Open Access Land within the Application Site, the Levels landscapes or Study Area. Inaccessible areas such as the intertidal mudflats on the west side of the Usk and

river mouth and small areas which are relatively remote from the Application Site, such as a small corner opposite the electricity sub-station off Whitson Common road do have open access. Tredegar House County park on the western edge of the study area has open access and is managed by the National Trust.

Watercourses and Waterbodies

8.121 The dense network of drainage ditch water courses in the Caldicot and Wentlooge Levels landscapes are a defining characteristic of these landscapes, they form many of the field boundaries and are a key extant historic landscape feature which persists today. The dense network of drainage features which consist of reens, banks, grips, surface drainage and bridges in the Nash/Goldcliff Coastal Sub Zone and Eastern St. Brides Sub Area (Gwent Levels Landscape Character Assessment – CBA, 2017) are of 13th to 14th century origin. Most of the reens follow a meandering course apart from Monks Ditch (also known as Goldcliff Pill) which is regarded as having historic significance *"is a raised watercourse that carries water from an upland stream to the coast, preventing the fresh water from flooding the Levels"*. Monks Ditch is some 4.35 km to the east of the Application Site. There is no associated PRoW access along its length but Whitson Common Road runs parallel for much of it.

8.122 The meandering River Usk bisects the 5 km study area, the Application Site lies close to the mouth of the river where it broadens to meet the Severn Estuary. There are several loading wharves along the Usk some of which are disused and served historic land uses.

LANDMAP Aspect Areas

8.123 LANDMAP is the formally adopted methodology for landscape assessment and is advocated by PPW10, is promoted by the Countryside Council for Wales (CCW) and is considered to be a "whole" landscape approach that covers all landscapes, designated and non- designated in Wales.

8.124 LANDMAP separates each character area into nationally consistent data sets into the following five categories (Aspects):

- Geological Landscape;
- Landscape Habitats;
- Visual and Sensory Landscape;
- Historic Landscape; and
- Cultural Landscape.

8.125 Each category is provided with an evaluation level as follows:

Table 8.10: LANDMAP Evaluation categories

Evaluation	Definition
Outstanding	Of international or national importance
High	Of regional or county importance to the aspect
Moderate	Of local importance to the aspect
Low	Of little or no importance to the aspect
Unknown	Insufficient information exists to evaluate the area

Refer to LANDMAP Aspect Area Plans in Figures 8.5a to 8.5g

Visual and Sensory Landscape Aspect Areas

8.126 A summary of each LANDMAP Aspect Area and description covering the site are provided in the Table 8.11.

Table 8.11: LANDMAP Visual and Sensory Aspect Areas within the 5 km Study Area

Visual and Sensory Aspect Area	Classification	Condition	Evaluation Value	Proportion covered by ZTV within 5 km radius study area
Eastern Usk Industrial Area NWPRTVS041	Development/Built Land/Urban (Level 3)	Poor	Low	Low to Medium
Caldicot Level NWPRTVS037	Lowland / Flat Lowland / Levels / Flat Open Lowland Farmland (Level 3)	Fair	High	High
Wentlooge Level NWPRTVS001	Lowland / Flat Lowland / Levels / Flat Open Lowland Farmland (Level 4)	Poor	High	Medium to High
Nash Wetlands NWPRTVS005	Lowland/Flat Lowland/Levels/Lowland Wetland (Level 3)	Good	High	High
Estuary Saltmarsh NWPRTVS006	Lowland/Coastal/Intertidal (Level 3)	Fair	High	High
Estuary Mudflats NWPRTVS007	Lowland/Coastal/Intertidal (Level 3)	Fair	Outstanding	High
St Brides Estuary Grassland NWPRTVS009	Lowland/Flat Lowland/Levels/Flat Open Lowland Farmland (Level 3)	Fair	High	High
Docks and Level of Mendalgief NWPRTVS040	Development/Built Land/Urban (Level 3)	Poor	Low	Medium
Dyffryn NWPRTVS039	Development/Built Land/Urban (Level 3)	Fair	Moderate	Very Small

8.127 Whilst all LANDMAP Aspect areas have been considered, the main foci are on the Landscape Habitat, Visual and Sensory, Historic Landscape and Cultural Landscape LANDMAP Aspect Areas. An assessment of these and their relevance to the site are described below.

8.128 The ZTV for the proposed development was used to guide the selection of LANDMAP Visual and Sensory Aspect Areas for the landscape part of the assessment. For the purposes of this report the Visual and Sensory areas which potentially fall within the visual envelope of the proposed development (identified from the ZTV Fig 8.5b) have been considered (see Table 8.11). Those Aspect Areas which are directly affected or have been judged to be of high value in the LANDMAP assessment are described below.

8.129 Parts of the ZTV extent that overlap with a very small proportion of the remaining Visual and Sensory Aspect Areas towards the edge of the 5 km study area would not have the potential to be significantly affected by the proposed development and will not be considered further. These Aspect Areas are: M4 NWPRTVS012; Gaer NWPRTVS019; Tredegar Park and Sports Ground NWPRTVS021; Tredegar Park NWPRTVS023; Llanwern Park NWPRTVS034; Wilcrick Moor NWPRTVS036; LG Park NWPRTVS038; Usk Built Urban Corridor NWPRTVS042; Llanwern

NWPRTVS044; St Woolos Cemetery and Park NWPRTVS055; Newport West NWPRTVS056; and Newport East NWPRTVS057.

8.130 Those Aspect Areas which are likely to be directly affected or have been judged to be of high value in the LANDMAP assessment are described below. A judgement is made at the end of each description as to whether it has potential to be adversely affected by the proposed development.

Eastern Usk Industrial Area (host Visual and Sensory Aspect Area)

"Primarily commercial and industrial area with some housing, educational and recreational uses. Located on the levels below 10 m AOD. The largest building is Uskmouth power station and pylons carrying power lines to the area. The old industrial buildings are rundown in places and boundaries are overgrown with little management input. The boundary with the Usk is particularly prone to this condition. There are a number of derelict and empty sites. Newer development has occurred to the east and is generally better maintained and manicured in places. The peripheral distributor road forms the northern boundary crossing over the Usk new bridge. There is significant landscape treatment adjacent to this road."

8.131 Host Visual and Sensory Aspect Area. The proposed development may have the potential to cause adverse landscape impacts.

Caldicot Level

"Caldicot Level is an extensive area landscape below 10 m AOD, large in scale. It is primarily pastoral land with limited arable value. The pattern of linear rectangular fields to the east is distinctive, some enclosed by cut or outgrown hedges or lined with willows but all bounded by ditches. A more sinuous pattern prevails to the west of Whitson Common around Goldcliff. The most distinctive feature is the drainage network including undulating fields, field ditches and Reens of various sizes. These have strong reed and other marginal vegetation which contributes to the lowland character of the area. There are some other uses such as recreational facilities including a permanent caravan park. Cypress trees have been used to screen detractors including agricultural buildings. Settlement pattern tends to be focused on a few minor roads which pass through the area. There is evidence of fly tipping particularly to the north. Between the clustered settlements there is a significant amount of linear development, mostly dwellings associated with small holdings such as at Whitson Common. There are some fine farmhouses and buildings associated with the older villages including small churches which act as minor landmarks. The dispersed linear pattern of farms set back from the road at Whitson are notable. A significant number of power lines with pylons converge on the power station at Uskmouth. These dominate the landscape on the western fringes. There are relatively few rights of way and accesses to the flood embankment by the Severn estuary making the area a relatively inaccessible landscape. In places, the area is open allowing extensive views although it is not possible to see the adjacent Severn estuary because of the flood embankment. This 5 m high embankment is mainly covered in maintained grass although in places rip rap with a concrete capping is used to strengthen the outward facing slope. The top of the embankment is accessible for walkers in places with stiles to control access."

8.132 Immediately to the east of the proposed development, and within this Aspect Area is a 'Special Landscape Area' and it is also within the 'Gwent levels Landscape of Outstanding Historic Interest'. This Aspect Area has the potential to be adversely affected. In particular, the lorry service route passing through this Aspect Area.

Wentlooge Level

"Distinctive flat levels of landscape around 7mAOD with Reens and ditches draining fields which range from small pastures to the south to large arable fields to the north where boundaries have

been removed. The pattern is highly rectilinear indicating its reclaimed nature. The Faendre reen is sinuous but the other Reens form straight field boundaries including the Tarwick Reen. Sometimes Reens are associated with strong outgrown but often gappy hedges and willows or other field trees. Roadside Reens are larger and allow open views across parts of the area from the east and are crossed with low timber bridges. There is distinct linear undulation in some fields a system to aid drainage. The enclosure of the smaller fields makes wider views difficult to the south. The area is cut by the mainline railway and views are also possible of housing and development to the north and west which combine to reduce tranquillity. Fly tipping is apparent. Overall the area is difficult to access with no usable public footpaths, so a feeling of remoteness and isolation is possible in parts. The neglect in parts gives a feeling of threat also."

8.133 Located to the south-west of the proposed development and less than 1.8 km away at its closest point it is also within a 'Special Landscape Area' and within the 'Gwent levels Landscape of Outstanding Historic Interest'. This Aspect Area has the potential to be adversely affected by the proposed development.

Nash Wetlands

"Newport wetland reserve consists of a series of saline lagoons, reed beds and lowland wet grassland. The area is surrounded by bunds and lies adjacent to the Severn estuary. There are various walks for visitors and a car park with limited interpretation facilities. Views to the West are dominated by pylons and a power station visible above outgrown hedgerows."

8.134 This Aspect Area is less than 550 m away from the proposed development and lies directly south and south-east of it. The wetlands Reserve is within the 'Caldicot Special Landscape Area' (SLA). The public are encouraged to visit the Newport Nature Reserve and enjoy the international wildlife designation to the south and therefore there is the potential for the Aspect Area to be adversely affected by the proposed development.

Estuary Saltmarsh

"Areas of saltmarsh with water channels bordering the Severn estuary. The areas are very exposed, covered with water at the highest tides. The areas are generally inaccessible. Superb views are possible across the Severn estuary although there are detractors looking towards Newport and the power station."

8.135 This Aspect Area is geographically split either side of the Usk estuary mouth. The closest part is less than 700 m to the south-west of the proposed development. It falls within the 'Wentlooge and Caldicot' SLAs. There is potential for the Area to be adversely affected by the proposed development to users accessing the edge of this Aspect Area.

Estuary Mudflats

"An extensive area of intertidal mud bordering the Severn estuary accommodating the second highest tidal range in the world. The area is very exposed, covered with water at high tide and forms part of the raw seascape. Relict structures exist such as posts probably relating to a former fishing use. Superb views are possible across the Severn estuary."

8.136 This Aspect Area is mainly within an intertidal area which is subject to international wildlife designations as well as falling within the 'Wentlooge and Caldicot' SLAs. The attraction for users is related to its wildlife and coastal amenity setting. The proposed development may have the potential to adversely affect this landscape regarded as having outstanding value.

St Brides Estuary Grassland

"A small flat area of saline tolerant grasses with a rip rap edge bordering the Severn estuary. The area is very exposed, covered with water at the highest tides. The area is accessed from the levels over the embankment from the adjacent lane and nearby caravan park and is used by fishermen and others. Superb views are possible across the Severn estuary although there are detractors looking east towards Newport and the power station."

8.137 This Aspect Area is less than 650 m away from the proposed development and lies directly to the south-west. It is within the 'Wentlooge Special Landscape Area' (SLA). The Aspect Area description mentions the attraction for people to enjoy the coastal setting amenity and international wildlife designations to the south and therefore there is the potential for the Aspect Area to be adversely affected by the proposed development.

Docks and Level of Mendalgief

"Newport Docks- primarily dock related commercial and industrial area with some waste disposal use around the level of Mendalgief. Located on the levels below 10 m AOD. The area is dominated by the extensive docks and by the raised mound of the waste disposal site and is a mixture of old and new commercial and industrial buildings bordering the Usk. It is difficult to discern a logical pattern to development other than the buildings around the docks. The peripheral distributor road with associated landscaping runs east west allows views into the area making it prominent. The old industrial buildings are rundown in places and boundaries and unused land is overgrown with little management input. The boundary with the Usk is particularly prone to this condition. There are a number of derelict and empty sites. Newer development has occurred and is generally better maintained. The waste disposal tip is an alien feature in this flat landscape although contouring is carefully applied. Change detection 2014: new developments/less dereliction."

8.138 This Aspect Area is less than 500 m from the proposed development. However, it's condition and value are low and the proposed development is not considered to have potential to reduce its qualities from the baseline. Therefore, it is not considered further in this assessment.

Dyffryn

"Dyffryn- a late 20th-century mixed extension to Newport fringing the Wentlooge levels to the south and Tredegar Park to the West. The core of the area is the distinctive 1970s two-storey housing with its continuous sinuous built form enclosing courtyards. Commercial development lies to the west and north, the latter of which [high quality offices] is highly visible from the M4. To the South are a school, playing fields and private housing estates which are beginning to encroach further on to the levels. The development, in particular, the offices, appear to occupy what was once part of Tredegar Park. Their proximity to the house and existing park and gardens have an adverse effect on the setting and approach. Mature trees, remnant of the park, on the road to the east help integrate the development and make the area feel fairly enclosed, limiting views. Fly tipping occurs on rural lanes to the south, visible to the rail corridor. Change detection 2014: increase in housing developments - expansion of area."

8.139 The ZTV overlaps with a very small part of the eastern edge of the Aspect Area. It is over 3.5 km from the proposed development. The proposed development is not likely to have a significant adverse impact on the character of this predominantly residential Aspect Area and therefore is not considered further in this assessment.

8.140 In addition, and in accordance with 'LANDMAP Information Guidance Note 3' (June 2010), plans have been prepared to show the following LANDMAP data with respect to the Visual and Sensory' aspect layer (see Figures 8.5c to 8.5g):

- Question 46 – 'Scenic Quality';

- Question 48 – 'Character Evaluation'; and
- Question 50 – 'Overall Evaluation'.

Table 8.12: Visual and Sensory Aspect Layer evaluation of Aspect Areas which may experience "likely significant effects"

Visual and Sensory	Evaluation	Justification text
Eastern Usk Industrial Area		
46	Low	There are numerous detractors in the area.
48	Low	This mixed commercial area has a weak sense of place.
50	Low	This commercial area has a weak sense of place and the presence of many detractors mean that the area has a low value overall.
Caldicot Level		
46	High	The levels have aesthetically pleasing elements and patterns particularly the reens and field boundaries interspersed with views of churches and fine farmhouses.
48	High	The area has a highly distinctive character and a strong sense of place due to its flatness, the presence of reens and a strong field pattern interspersed with old settlements.
50	High	The Caldicot Levels are a rare, distinctive landscape of rectangular and sinuous fieldscapes with reens, hedges and field boundary trees, attractive settlements and farmhouses with a strong sense of place. The area would be of outstanding value if there were not some degrading of the landscape and detractors in places.
Wentlooge Level		
46	High	The levels have aesthetically pleasing elements and patterns particularly the reens and field boundaries interspersed with views of churches and fine farmhouses.
48	High	The area has a highly distinctive character and a strong sense of place due to its flatness, the presence of reens and a strong field pattern interspersed with old settlements.
50	Low	The Levels are a rare, distinctive landscape of rectangular fieldscapes with reens, hedges and field boundary trees, attractive settlements and farmhouses with a strong sense of place. The area would be of outstanding value if there were not some degrading of the landscape and detractors in places.
Nash Wetlands		
46	High	The reed fringed lagoons are attractive, creating pleasing patterns and reflections.
48	High	The series of lagoons have a distinctive character with a strong sense of place.
50	High	The extensive and attractive series of lagoons with their fringing reed beds form a distinctive and rare waterscape/landscape in the context of the levels.
Estuary Saltmarsh		
46	Outstanding	Superb views across Severn estuary to which this area provides a natural edge.
48	High	The area has a strong sense of place as the edge of the Severn estuary.
50	High	A semi-natural edge landscape/seascape with a strong sense of place with superb views across the Severn estuary.
Estuary Mudflats		
46	Outstanding	Superb views across Severn estuary to which this area provides a natural edge.
48	High	The area has a strong sense of place as the edge of the Severn estuary.
50	High	A wild edge landscape/seascape accommodating the second highest tidal range in the world with a strong sense of place with superb views across the Severn estuary.
St Brides Estuary Grassland		
46	Outstanding	Superb views across Severn estuary to which this area provides a natural edge.
48	High	The area has a strong sense of place as the edge of the Severn estuary.

Visual and Sensory	Evaluation	Justification text
50	High	An edge landscape/seascape with a strong sense of place with superb views across the Severn estuary.

8.141 LANDMAP Guidance Note 2 (2010) has been used to inform an understanding of how the proposed development may affect the various LANDMAP aspects. Paragraph 6.2.3 states *"is advised that the Visual & Sensory overall evaluation is mapped, (Collector survey question 50) as well as the scenic quality and character evaluation criteria (Collector survey questions 46 and 48) to help identify aspect areas which may experience "likely significant effect". Attention should be focused on the outstanding, high and moderate aspect areas for further assessment. Aspect areas with an outstanding or high overall evaluation-score, or aspect areas with a moderate overall evaluation score but an outstanding or high evaluation in either scenic quality or character evaluation criteria, could be starting points for the assessment of significant effect."*

8.142 The overall evaluation for the Visual and Sensory Aspect Areas are Outstanding for the Estuary Mudflats, High for the Caldicot Level, Wentlooge Level, Nash Wetlands, Estuary Saltmarsh and St Bride's Estuary Grassland and Moderate for the Lower River Usk. The other Visual and Sensory Aspect Areas are either evaluated as Low or they are Moderate but there is very little or no overlap with the ZTV for the proposed development and therefore unlikely to be significantly adversely affected.

Historic Landscape Aspect Areas

8.143 With regards to the Historic Landscape Aspect Area analysis, attribute HL40 gives overall evaluation judgement as High: Rarity and HL35: Integrity together form the components of sensitivity. The overall historic evaluation within the 5 km study area is reproduced in Figure 8.5d. The Application Site falls within East Usk and Llanwern Industrial Aspect Area (NWPRTHL022) which is evaluated as High. The reason is given as:

"In spite of the fact that the dominant character of this landscape is undeniably industrial, represented by the modern Llanwern Steelworks and the Gwent Euro Park, this area is, nevertheless, of high value because of its demonstrable and significant potential"

8.144 Much of the interest is related to buried archaeology such as Buried-dry. Buried-Waterlogged. Buildings & Structures. Documentary. Industrial Archaeology from Prehistoric to recent times.

8.145 Other Historic landscape Aspect Areas which fall within the shadow of the ZTV of both the existing development and proposed development on the Application Site which are categorised as Outstanding and therefore suggests that significant effects may be likely include Nash/Goldcliff coastal zone (NWPRTHL017), Whitson (NWPRTHL019), Wentlooge Level (NWPRTHL021), Peterstone and the Portland Grounds (NWPRTHL047) and River Usk (NWPRTHL048). The above Aspect Areas which are located on the Gwent Levels have been classified as Outstanding Historic landscape (HLW(Gt)2) because they represent the largest and most significant example in Wales of a ''hand-crafted'' landscape. The Levels are entirely the work of humans and the substantial time depth of human influence from Prehistoric times and broad historic palimpsest including Prehistoric, Roman, Medieval and Post Medieval, industrial and recent. The littoral and nearshore historic environment is outstanding for below ground archaeological potential.

8.146 **The Nash/Goldcliff coastal zone** is described as "*A complex, diverse irregular landscape, largely the product of monastic land reclamation carried out during the medieval period, characterised by a well-preserved network of small irregular fields, sinuous lanes with roadside waste, dispersed settlement".*

8.147 **Whitson** on the eastern edge of the 5 km radius study area is described, as *"This landscape is of exceptional significance on two counts. The central and western parts (represented by Whitson*

and Porton) have been characterised as a unique and fascinating example of a planned landscape and linear settlement dating to the 12th-14th century".

8.148 The **Wentlooge Level** is described as "*An extremely well preserved, visually coherent regular landscape, the result of several phases of wetland reclamation during the Roman and medieval periods, with an extremely high potential for the survival of buried waterlogged deposits of high archaeological potential".*

8.149 The **Peterstone and Portland Grounds** which is mainly an intertidal area including the mouth of the River Usk is described as "*The intertidal zone is a multi-period landscape of international importance, due to the exceptional conditions for preservation of an extremely diverse range of buried remains of all periods in the deep intertidal peats, attesting to human activity dating from Prehistoric times".*

8.150 The **River Usk** is also considered to be Outstanding because it is "*An historically important tidal landscape and communications corridor for trade and commerce since the medieval period, with considerable potential for the excellent preservation of remains of high archaeological and paleoenvironmental significance".*

Cultural Landscape Aspect Area

8.151 In respect of the Cultural landscape aspect layer, the Application Site falls within the Uskmouth Power Station Landscape (NWPRTCL005). The overall evaluation is Outstanding "*as it is a prominent industrial structure in an otherwise rural landscape on the fringe of the Gwent Levels and Usk River. The assessment describes it as follows: For nearly 50 years since 1960 the original coal-fired electricity power station at Uskmouth has dominated the skyline of the western Gwent Levels. The depositing of its waste in adjacent ash pits, irretrievably altering the original Levels landscape has had the unforeseen benefit of the operator donating the ash pits to the newly created Newport Wetlands Reserve. Following a turbulent financial history, resulting in part of the original power station being demolished in 2002, the mothballed portion has been refurbished and began to produce power again in 2004-5. Most recently (August 2007) it has been announced that an additional £400 million gas power station will be built and will operate alongside the refurbished coal facility by 2010. Efforts are to be made to alleviate the environmental impact, though the numbers and intrusiveness of the massive electricity pylons marching across the Levels is unlikely to decrease*". The recommendations advice is "*reinvestment in the new build will result in rehabilitation of the facility".*

Landscape Habitat Aspect Area

8.152 The Application Site falls within the Dry (Relatively) Terrestrial Habitats/Mosaic Aspect Area classification. This area covers the Power Station site and part of the Caldicot Level rural landscape to the east including Newport Wetland Nature Reserve. The Area as a whole is evaluated as High and described as follows: "*Although there is much industrial development in this area, there are also some important wetland pastures and reedbeds which form part of the Levels. These support significant species and the area therefore has been evaluated as having a high significance. Pertinent to this proposed development the recommendations is: that the native vegetation communities need to be actively managed in this area to maintain their biodiversity, especially where reens and hedgerows are present. It would also be good to have an active management plan to look at how biodiversity can be maximised in some of the industrial sites".*

Geological Landscape Aspect Area

8.153 The Application Site falls within the Newport (Barnardstown-Green Moor) Aspect Area (NWPRTGL004). It is classified as man-made/engineered features and reclaimed/infilled land. It is evaluated as being of Low value 'as few natural features remain'.

The Gwent Levels Landscape Character Assessment

8.154 The Gwent Levels Landscape Character Assessment (LCA) produced by Chris Blandford Associates (2017) draws on the LANDMAP information and covers the equivalent extent of the Gwent Levels HLF – 'Living Levels Landscape Partnership Scheme'. The LCA falls within three local authority areas Monmouthshire County Council; Newport City Council; and Cardiff City Council.

8.155 The LCA has been used to inform this assessment but the significance of effect will be reported by LANDMAP Visual and Sensory Aspect Area. Figure 3.2 within the Gwent Levels Landscape Character Assessment produced by Chris Blandford Associates (CBA,2017), shows the classification of the rural landscape. The predominant landscape type in the 5 km radius study area is the type A Flat/Lowland Levels, which extend landward from the mean high-water mark across the coastal levels landscape and contains the SLAs and the Gwent levels Landscape of Outstanding Historic Interest.

8.156 The Application site falls within character type E 'Built up Land' and there is a short description of Newport within the document, rather than a townscape assessment.

8.157 The landscape character areas are similar in extent to the LANDMAP Visual and Sensory Aspect Areas. Table 8.13 below shows this relationship.

Table 8.13: Relationship between LANDMAP Visual & Sensory aspect Areas and the Gwent Levels Landscape Character Assessment

LANDMAP Visual & Sensory Aspect Area	Gwent Levels LCAs
Caldicot level	LCA A2: Caldicot Levels including sub areas: A2.11 Whitson (western part) A2.12 Christchurch/Nash/Whitson Back-Fen (western part) A2.13 Nash/Goldcliff Coastal Zone
Nash Wetlands	A2.14 Newport Wetlands
Wentlooge levels	LCA A3: Wentlooge Levels including sub areas: A3.1 Eastern St Brides A3.2 Western St Brides (eastern part) A3.7 Maerdy (eastern part)
St Brides Estuary Grassland	A3.1 Eastern St Brides (eastern part)
Estuary Mudflats	LCA B1: Severn Estuary B1.1 The Welsh Grounds (western part) B1.2 The Usk Estuary B1.3 Cardiff Bay (eastern part)
Lower River Usk	C2: Lower River Usk

8.158 The Gwent Levels Landscape Character Assessment by CBA builds on the LANDMAP assessment by expanding on the evaluation of the landscape. The effect of the proposed development will be assessed against the key qualities that are sensitive to change described in the Gwent Levels LCA broad landscape character areas. As the Application Site is not located within any of the LCAs the effects of the proposed development will be indirect, apart from the impact of the traffic on the access route which services the Power Station.

Table 8.14: Gwent levels LCA 'key qualities that are sensitive to inappropriate change'

Gwent Levels LCAs	Key Qualities that are sensitive to inappropriate change
LCA A2: Caldicot Level	• Strong rural and historic landscape character associated with the traditional management of the field drainage system.

	• Proximity to, and setting within national and international environmental designations. • Setting within an Area of Archaeological Sensitivity, presence of numerous SAMs. • Open, level, unique landscape type with clear panoramic and long distant views over Caldicot Level. • Development and flood risk.
LCA A3: Wentlooge Level	• Strong rural and historic landscape character associated with the traditional management of the field drainage system. • Location of the area within a number of designated nature conservation sites. • Notable presence of archaeologically sensitive remains and proximity to Scheduled Monuments. • Visual context and unique topographical features. • High quality, long distance views over the Severn Estuary from sea wall.
LCA B1: Severn Estuary	• Location of the area within a number of designated nature conservation sites. • Notable presence of archaeologically sensitive remains. • Visual context and unique topographical feature. • High quality, long distance views along and over the Severn Estuary. • Lack of existing development and subsequent sensitivity to vertical elements.
LCA C2: Lower River Usk	• Visual context, backdrop and setting as gateway to the Wye Valley AONB.

Seascape Character Assessment

8.159 Marine Character Areas (MCAs), highlight the key natural, cultural and perceptual influences that make the character of each seascape distinct and unique.

MCA29 Severn Estuary (Wales)

8.160 The key characteristics of this MCA emphasise the long historic human exploitation and reclamation for food production as follows:

- *MCA's rich natural resources exploited by humans for millennia, with evidence dating back to the earliest hunter-gatherers roaming what was previously a much larger coastal plain (prior to sea level rise around 6,000 BC).*
- *Long history of coastal reclamation, embankments and diches, notably the extensive Gwent and Wentlooge levels*

8.161 The Uskmouth Power Station together with the two Severn bridges and docks are cited in the MCA description as components of the coastal backdrop and amongst dockside and industrial features which form 'prominent skyline features' from the marine area.

8.162 Shipping is comprised mainly of commercial cargo rather than leisure and tourism. This is important in terms of characterising the type and sensitivity of visual receptors that are likely to have views from the MCA towards the land.

'Although Cardiff and Newport's port functions have declined since their 19th century peak, they still play an important role in the import and export of a range of products including containers, steel, aggregates forest products and dry and liquid bulks.'

Visual Baseline

8.163 The ZTV and representative viewpoints are provided in Figures 8.3a and 8.3b.

Baseline Visual Receptors

8.164 The ZTV shows that the most prominent areas of potential visibility of the proposed development occurs in areas to the west and east of the Application Site over the Wentlooge and Caldicot Levels, respectively. It would also be visible from much of the offshore intertidal landscape and seascape. To the north the potential visibility extends over the industrial riverside uses but the ZTV shadow diminishes rapidly moving northwards through the built-up areas of Newport and potential visibility being confined to small areas of higher ground overlooking the River Usk.

8.165 Significantly the ZTV shows that most areas within the shadow already have views of the existing power station and chimney stack, the areas from which, both the existing and proposed development would potentially be seen are hatched green. There would be very few new areas from which only the proposed development would be seen, these are hatched blue, and not the existing station and chimney stack, hatched yellow. Hence, for most views the proposed development will be assessed against the baseline situation of receptors already having views of the existing power station development.

Residential Properties

8.166 Distances are taken from the centre of the Application site to the closest edge of the settlement.

8.167 Nash village (approximately 1.24 km to the east); views from this small village are across farmland from west facing receptor residential properties on the west side of Nash towards the Application Site. Views of the existing power station in the mid distance are heavily filtered by existing intervening vegetation. The effect on views from some of these properties is not considered to have the potential to be significant and so not all are considered further in this assessment. Those that are assessed have been grouped as Group R1, shown on Figures 8.3a and 8.3b.

8.168 Pye Corner (approximately 2.46 km to the north-east); consists of several isolated detached properties. Those that have south-west facing windows are orientated towards the existing power station. However, the intervening vegetation particularly around garden plots severely restricts the potential for any views of the existing power station including the tall chimney. The effect on views from all these properties is not considered to have potential to be significant so are not considered further in this assessment.

8.169 Goldcliff (approximately 3.48 km to the south-east); here potential residential visual receptors are from west facing elevations along Goldcliff Road and Chapel Road. The intervening vegetation particularly around garden plots and flat landscape severely restricts the potential for any views of the existing power station including the tall chimney. The effect on views from all these properties is not considered to have potential to be significant so they are not considered further in this assessment.

8.170 There are a small number of individual farm complexes and private residences within the surrounding area. These include the following groups along off parts of the highway:

8.171 Group R2: Old House Nash Road and nearby properties off Nash Road. (approximately 1.9 km to the north-east); here potential residential receptors are those with south-west facing elevations. Views across wet meadow (part of Great Traston Meadows) in the foreground have intervening trees and hedgerow around the sewage works which block views of the Application Site. Only the upper parts of the boiler house building and stack are visible from this receptor group. The upper parts of the Liberty Steel Mill are visible. The wind turbine on adjacent land measures 130 m to tip of the blade. Overall, the view comprises of rural wet meadow in the foreground with a predominantly industrial developed skyline above the trees and hedgerow.

8.172 Group R3: Little Cross Farm and nearby properties off West Nash Road (approximately 1.9 km to the east); here potential residential receptors are those with west facing elevations. Views are across pasture fields, with ditches in the foreground, also low hedges, scrub and trees which separate the farmland from the steel mill (Liberty Steel), sewage works site, and Uskmouth and

Severn power stations on the skyline. Wind turbines (130 m to tip of blade) are prominent in views to the right with high voltage pylons (46 m high inferred 275kw, L7(C)) and powerlines prevalent. Overall the near view is rural in contrast with the industrial buildings and infrastructure which make up most of the skyline.

8.173 Group R4: Moorcroft, west of Nash, (approximately 960 m to the east) consists of a very small group of residential properties and farm buildings with commercial use. Potential residential receptors are those with west facing elevations. Views are across West Nash Road and open grazed fields bounded by low trimmed hedges. Most of the stack and boiler house building are visible but the lower parts of the building and infrastructure are screened by the intervening hedgerow bounding the Sewage Works. The twin stacks and upper parts of the Severn Power Station together with high voltage pylons (46 m high) are visible to the left of Uskmouth Power Station. Overall the industrial and power generating infrastructure appears prominently but lower parts of the features are screened by intervening field boundary hedges.

8.174 Single property R5: Great House, west of Nash, (approximately 730 m to the east-south-east). Views from the west facing gable end, across West Nash Road to the roadside hedgerow have tall in field vegetation and partial views across grazed fields bounded by a mixture of low trimmed and high treed hedges. Some of the Uskmouth Power Station stack and boiler house building may be visible but lower parts of the building and infrastructure are screened by the intervening hedgerow, scrub and trees bounding the Sewage Works. The twin stacks and upper parts of the Severn Power Station together with high voltage pylons (46 m high) are likely to be visible to the left of Uskmouth Power Station. Overall the industrial and power generating infrastructure is filtered and screened by intervening vegetation. Therefore, the visual effects on this residential receptor are not considered further in this report.

8.175 Single property R6: Arch Cottage West Nash, (approximately 1.45 km to the east-north-east). Views from the west facing gable end are either blocked or truncated by hedgerow and tall vegetation around the Sewage Works. Some of the upper parts of the Uskmouth Power Station stack and boiler house building may be visible but lower parts of the building and infrastructure are well screened by intervening vegetation. Views of the twin stacks and upper parts of the Severn Power Station together with high voltage pylons (46 m high) are likely to be partially blocked by the Uskmouth Power Station. Overall the industrial and power generating infrastructure is likely to be well screened by intervening vegetation in the view. Therefore, the visual effects on this residential receptor are not considered further in this report.

8.176 Single property R7: Ty Portra, west of Nash, (approximately 1 km to the east); potential residential receptors are those with west facing elevations. Views from the west facing gable end of the property are either blocked or truncated by hedgerow and tall vegetation around the farm. Some of the upper parts of the Uskmouth Power Station stack and boiler house building may be visible but the lower parts of the building and infrastructure are well screened by intervening vegetation. Overall the industrial and power generating infrastructure is likely to be well screened by intervening vegetation. Therefore, the visual effects on this residential receptor are not considered further in this report.

8.177 There are a few individual, detached farm residencies on Saltmarsh Lane, these include Saltmarsh Farm (2.2 km south-east of the Application Site), Elmtree Farm (approximately 2.18 km south-east of the Application Site) and Level Court Farm (2.32 km south-east of the Application Site). Residential receptor views of the existing power station are likely to be predominantly from upper floor windows facing west across open farmland set against the backdrop of the hills surrounding Newport to the north. The potential effect on views from these properties is not considered to be significant and so they are not considered further in this assessment.

8.178 Off Nash Road between Nash and Pye Corner the following visual receptors may be affected; Little Cross Farm (2 km north-east of the Application Site) and Fair Orchard (2.05 km north-east of the Application Site). Although there are other houses along this road. Residential receptor views

of the existing power station are likely to be predominantly from upper floor windows facing south-west across open farmland, but views are often blocked by small areas of woodland and thick hedgerows, particularly around the artificial waterbodies to the east of the Power Station, sewage works and steel works. The potential effect on views from these properties is not considered to be significant so they are not considered further in this assessment.

8.179 On Henton Road the residential farm receptors potentially affected are; Cross Farm (2.21 km east of the Application Site) and Henton Farm (2.1 km east of the Application Site). Residential receptor views of the existing power station are likely to be predominantly from upper floor windows facing west across open farmland which in turn is set below the hills surrounding Newport. The potential effect on views from these properties is not considered to be significant so they are not considered further in this assessment.

8.180 On the west side of the Usk, the following farmstead residencies off Lighthouse Road may be affected are Fair Orchard Farm (approximately 2.82 km west of the Application Site); Ty-mawr Farm (approximately 2.97 km west of the Application Site); New Dairy Farm (approximately 2.42 km west of the Application Site); Whitecross Farm (approximately 3 km west of the Application Site); New Farm (approximately 3.23 km west of the Application Site). Residential receptor views of the existing power station are likely to be middle distance views predominantly from upper floor windows facing east across flat open farmland and the Usk estuary, where the power station would be viewed on the skyline. The potential effect on views from these properties is not considered to be significant so they are not considered further in this assessment.

8.181 Lighthouse house residential park is located 3.4 km to the south-west of the Application Site, situated on the coast at St Brides on the southern edge of the Wentlooge Level. The dwellings are single storey and receptor views of the existing power station and chimney are likely to be blocked by existing mature vegetation around the residential park and intervening field hedgerows. The sea defence embankment also blocks views eastwards to Uskmouth Power Station. The potential effect on views from these properties is not considered to be significant so they are not considered further in this assessment.

Commercial and Industrial Facilities

8.182 There are numerous industrial, and dockside related visual receptors that are located mainly to the north of the Application Site. Some will have direct views of the existing power station and in this context the visual impact of the proposed development is unlikely to have a significantly adverse impact. Therefore, these receptors are not considered further in this assessment.

Dynamic Receptors

8.183 The Application Site is located away from major trunk and arterial roads. To the east and the immediate surrounding area, a network of rural lanes connects farms and small villages. Occasionally, road receptors using these roads, such as West Nash Road, Nash Road and Goldcliff Road have views of the existing Power Station, but most views are blocked by roadside vegetation and intervening field boundary hedges across a flat landscape. However, the chimney stack, overhead pylons and cables are often present above the tree and hedge lines. Additionally, there are long views across the drained marshland between gaps in the vegetation. Viewpoints 10 and 11 (shown in Figures 8.3a and 8.3b) are representative of these more exposed views of the existing power station and chimney stack. Generally, the minor lanes in this area such as Perry lane, Fish House Lane, Farmfield lane and Saltmarsh Lane are also characterised by high roadside hedges with views of the existing power station blocked or heavily filtered by vegetation, consequently these dynamic receptors are not considered further in this assessment

8.184 On the west side of the River Usk, Lighthouse Road (B4239) is the main north to south road connecting Newport to the coast. Views of the existing power station and chimney are predominantly blocked by roadside vegetation, intervening field boundary hedge and trees.

Occasional breaks in roadside vegetation afford glimpsed transient views, although views of Uskmouth Power Station are either blocked or framed intermittently by the dock development, infrastructure and earthworks west of the River Usk. These road receptors are not likely to be significantly impacted by the proposed development and therefore are not considered further in this assessment.

8.185 Fieldwork and the ZTV in Figures 8.3a and 8.3b show views of the power station for dynamic receptors using the service roads are more blocked and intermittent from the Docks to the north and north-west of the Application Site than those from the farmed 'Levels' landscapes to the east and west. The receptors are predominantly commercial users and change to views in the industrial context are not likely to be significant, therefore these receptors are not considered further in this assessment.

8.186 The road network on the southern side of Newport, including the A48 running east to west is shown to have overlap with the ZTV in places. However, these dynamic receptors have transient, intermittent views of upper parts of the power station and chimney stack set above intervening industrial and dockside development. These road receptors are not likely to be significantly impacted by the proposed development and therefore are not considered further in this assessment.

Public Rights of Way

8.187 The following PRoW within the 5 km radius study area and within the ZTV are considered below.

8.188 The Wales Coastal Path PRoW runs west to east across the study area often in close proximity to the coastline and typically, has open views of the Severn Estuary and River Usk. It is a long-distance tourist route which is promoted nationally. The effect on views from some stretches of path is not considered to be significant so these are not considered further in this assessment. Several viewpoints have been selected along the route in order to assess stretches of path most likely to be significantly affected by the proposed development.

8.189 Nash Village to the junction with Broad Street Common Road; PRoW footpaths 401/9/2 and 401/11/1 have near to mid distance intermittent views through gaps in hedgerows and trees westwards towards and across farmland to the existing Power Station. Mid distance views looking south-west and west contain pasture fields, with ditches, low hedges, scrub and trees which separate farmland from the steel mill (Liberty Steel) and sewage works. Uskmouth and Severn power stations are viewed on the skyline. Wind turbines (130 m to tip of blade) are prominent with high voltage pylons (46 m high inferred 275kw, L7(C)) and powerlines prevalent. The church spire at Nash is visible in some views north-east of Nash from footpath 401/11/1. Overall, the near views are over pasture fields in contrast with the industrial buildings and infrastructure which make up most of the skyline above hedgerow trees and scrub in the mid distance.

8.190 From Nash Village west and south-west, including PRoW footpaths 401/18/1, 401/15/1, 401/16/1 (all part of the Wales Coast Path) and 401/6/1 have near distance intermittent views through gaps in hedgerows and trees westwards across farmland to the existing Power Station. Upper parts of the Uskmouth Power Station stack and boiler house building are visible, but lower parts of the building and infrastructure are screened by intervening hedgerow bounding the Sewage Works. The twin stacks and upper parts of the Severn Power Station together with high voltage pylons (46 m high) are sometimes visible to the left of Uskmouth Power Station. Overall, the industrial and power generating infrastructure is prominent in the view, but lower parts and features are screened by intervening field boundary hedges.

8.191 Goldcliff to Henton Farm; PRoW footpath 392/24/1 has intermittent mid distance views through gaps in hedgerows and trees westwards across farmland to the existing Power Station. These PRoW receptors are not likely to be significantly impacted by the proposed development and therefore not considered further in this assessment.

8.192 Sustrans Route 4 from the Uskmouth docks to Pye Corner (follows same route as the Wales Coast Path for this stretch). Due to the thick hedgerow which lines either side of this route and intervening field boundaries the visual impact on Route 4 is not considered further in this assessment.

Recreation

8.193 The proposals are located within the surroundings of the following areas of recreation which have been identified within the 5 km radius study area. The following sites fall partly or completely within the extent of the ZTV.

8.194 Uskmouth sailing club to the north-west of the existing power station lies less than 0.5 km from the south-east boundary of the Application Site. Recreational sailors using the surrounding waters have direct and frequently unfettered views of the existing Power Stations north side from the sailing club with differing elevations visible from the water.

8.195 Gaer/Tredegar park on the far western edge of the 5 km radius study area has elevated views over Newport and the River Usk. Due to the distance and intervening built development and the industrial context of views towards the existing Power Station this visual receptor is unlikely to have significant adverse effects from the development and therefore is not considered further in this assessment.

Selection of Representative Viewpoints and Accessible Green Infrastructure Assets

8.196 The ZTV for the proposed development was used to guide the selection of representative viewpoints for the visual assessment. The selected viewpoints are not intended to cover every possible view, but rather are representative of a range of receptor types e.g. residents, horse riders, walkers, cyclists and road users from various directions and distances from the Application Site boundary.

Table 8.15: Representative viewpoints

Candidate View Point	OSGB 1936 BNG	View Point Description
VP1	333100.99 183759.26	Uskmouth Power Station entrance, looking south-west towards the Application Site
VP2	332971.42 184191.89	Uskmouth Sailing Club, boat park; looking south-west towards the Application Site
VP3	333068.68 182909.42	Track junction within RSPB reserve (Newport Wetlands NNR); short distance from and looking north-west towards the Application Site
VP4	333236.64 183101.19	Track junction within RSPB reserve (Newport Wetlands NNR); short distance from and looking north-west towards the Application Site
VP5	332775.56 182898.95	Wales Coast Path (Newport Wetlands NNR); short distance from and looking north to the Application Site
VP6	334688.95 183923.96	Nash Lane from edge of housing; mid distance view from the edge of the highway looking south-

		westwards towards the Application Site
VP7	331092.95 182781.74	Wales Coast Path (Former Lighthouse); short distance looking north-east towards the Application Site across the mouth of the River Usk
VP8	330041.81 181587.25	Wales Coast Path (Lighthouse Park); long distance view from the PRoW slightly elevated above the level of this residential area
VP9	334280.61 184568.83	Great Traston Meadows (Solutia) Nature Reserve; mid distance view from the PRoW footpath looking south-westwards towards the Application Site
VP10	335006.51 185032.31	Sustrans Route 4, mid to long distant view looking south-westwards towards the Application Site
VP11	336185.13 183710.56	Near Goldcliff Moated Site Scheduled Monument, long distance view looking westwards towards the Application Site
VP12	334311.03 183744.31	Waterloo inn car park at Nash short, distance view looking westwards towards the Application Site
VP13	331139.17 183339.62	Wales Coast Path near the confluence R Usk & R Ebbw); short to medium distance from the Application Site looking eastwards from the opposite bank of the Usk
VP14	331692.26 186255.59	Transporter bridge over the River Usk – from the entrance to the stairway to the gondola, west bank. It was not possible above the River Usk looking south towards the Application Site as the Transporter operates seasonally.

8.197 The Gwent Levels Green Infrastructure Strategy (CBA, 2017) and in particular, the Green Infrastructure Assets (Fig 2.1) and the Green Infrastructure network on Fig 5.1 in the Strategy were used in the selection of the representative viewpoints. The representative viewpoints have been selected with the published Green Infrastructure Network in the Strategy in mind and are shown in Figures 8.3a and 8.3b.

8.198 A visual assessment from the representative viewpoints was carried out in 10 January 2020 to determine how the proposed development might influence the visual amenity for these typical receptors. The assessment was carried out as part of the site survey, with the photographic assessment recording the character of the view and the existing visibility of the Application Site.

Future Baseline Conditions

8.199 Climate change predictions have been provided in this assessment to provide a description on how climate change might change the baseline in the future. This is in accordance with the 2017 EIA Regulations which require consideration of climate change.

Description of Development

Project Description

8.200 The proposed development comprises the conversion of the existing coal-fired Uskmouth Power Station to a plant that would generate electricity by combusting waste derived fuel pellets. The proposed development would also include supporting infrastructure (outlined below) to enable its operation using fuel pellets. The proposed conversion will refurbish two of the three existing combustions units, known as Units 13 (110 MWe) and Unit 14 (110 MWe), to provide 220 MWe (net generation export capacity). For the purposes of this chapter, the operational lifetime of the project is expected to be at least 20 years post commissioning.

8.201 The replacement and upgrade of equipment within the existing Uskmouth Power Station will be carried out within the existing building envelopes to enable the combustion of waste-derived fuel pellets either exclusively or co-fired with other biomass fuels for the sole purpose of electricity generation.

Buildings

8.202 The proposed development would comprise (see Table 8.16 for dimensions):

- Construction of fuel storage silos, connecting conveyor systems;
- Fuel de-dusting building;
- Upgrade to existing rail fuel unloading facilities; and
- Vessels and infrastructure for the delivery and storage of flue gas treatment (FGT) reagents and transportation of residues.

8.203 The outward appearance of the existing power station buildings and exhaust stack will remain unchanged. Changes to existing infrastructure will be made within the envelope of the existing buildings. The visible difference will be new fuel storage silos connected to the existing plant with new and refurbished conveyors. The primary storage silos will be constructed on the previous coal storage area. The footprint of fuel pellet storage silos is smaller than that required for the external storage of coal. As a result, sections of the previous coal stockyard will be re-vegetated.

Table 8.16: Summary of new buildings and approximate dimensions

Building	Approx. Dimensions	Approx. Height AGL
Day Silos (x2)	15 m radius	24 m (31 m including head house)
De-dusting Building	20 m x 20 m	10 m
Lime Silo (external cladding extension)	8.5 m x 5 m	23 m
Primary Storage Silos (x4)	34 m radius	42 m (48 m including head house)
Rail Unloading Facility Extension	40 m x 15 m	8 m

8.204 No demolition is required for the proposed development, the existing infrastructure will be reused where possible. The conversion process including, construction of the silos and conveyors, access and conversion of equipment within the power station buildings is anticipated to take around 18 months.

Mitigation Measures Adopted as Part of the Project

8.205 It is proposed that the former restored ash tip on the west side of the land holding would be planted with native trees and shrubs to help screen views of the proposed development. The detail of this proposal is to be developed at a later stage and will avoid any net loss in biodiversity.

Assessment of Construction Effects

Construction Phase Landscape and Seascape Effects

8.206 The construction site and activities for the proposed development would result in localised direct effects on the fabric of the Eastern Usk Industrial Area Visual and Sensory Aspect Area, East Usk and Llanwern Industrial Historic Aspect Area, Uskmouth Power Stations Cultural Aspect Area, Dry (Relatively) Terrestrial Habitats/Mosaic Landscape Habitat Aspect Area and Newport (Barnardstown-Green Moor) Geological Aspect Area. There would be temporary indirect effects on the neighbouring Aspect Areas of the five LANDMAP themes and the Severn Estuary seascape character area. The activities within the urban fringe landscape would temporarily form a slightly discordant addition to a small part of the urban character, although the scale of the activities would not be completely uncharacteristic of the industrial district of Newport either during the day or at night. The activities would be well contained from land to the north, although they would influence a wider context to the south at the flat landscape of the Gwent Levels. Whilst the nature of the construction site and activities is more discordant in the landscape/townscape/seascape than the completed scheme, this would be balanced by the short-term nature of effects.

Table 8.17: Construction Effects

Visual and Sensory Aspect Areas	Value	Susceptibility	Sensitivity	Magnitude	Effect
Visual and Sensory Aspect Areas					
Eastern Usk Industrial	Low	Low	Low	High to Low (Direct)	Moderate to Minor adverse (not significant)
Caldicot Level / LCA 2.13 Nash / Goldcliff Coastal Zone (proposed development)	High	Low	Medium	Negligible (Indirect)	Minor adverse (not significant)
Nash Wetlands / LCA 2.14 Newport Wetlands	High	Low	Medium	Medium (Indirect)	Moderate adverse (not significant)
Wentlooge Level / LCAA3.1 eastern St Brides	High	Low	Medium	Negligible (Indirect)	Minor adverse (not significant)
Estuary Saltmarsh	High	Low	Medium	Medium (Indirect)	Moderate adverse (not significant)
Historic Landscape Aspect Area					
East Usk and Llanwern Industrial Aspect Area (NWPRTHL022)	High	Low	Medium to Low	Low	Minor adverse (not significant)
Cultural Landscape Aspect Area					
Uskmouth Power Stations Landscape (NWPRTCL005)	Outstanding	Low	Low	Low	Minor beneficial (not significant)
Landscape Habitat Aspect Area					
Dry (Relatively) Terrestrial Habitats/Mosaic	High	Low	Low	Low	Minor adverse (not significant)
Geological Landscape Aspect Area					

Newport (Barnardstown-Green Moor) Aspect Area (NWPRTGL004)	Low	Low	Low	Low	Minor adverse (not significant)
Seascape					
MCA29 Severn Estuary (Wales)	Medium	Low	Low	Low to Negligible	Minor adverse (not significant)

Construction Phase Visual Effects

Residential Receptors

8.207 Sensitivity: Views gained by residents within main living spaces of residential properties with windows facing the development are generally considered to be of high susceptibility and overall sensitivity. The following residential receptor groups are considered of **High** sensitivity.

Group R1: Nash Village

8.208 Views across farmland from west facing residential properties in this small village on the west side of Nash would view the uppermost parts of the four primary storage silo construction, this would include high level construction cranes. Other low level construction plant and machinery would not be visible. The change would be temporary in nature and **Negligible** in magnitude, resulting in **Minor adverse** effects for occupiers of two or three properties, which is **not significant**.

Group R2: Old House Nash Road and nearby properties off Nash Road near Julian's Reen

8.209 Residents would gain views of uppermost parts of the construction activities at the four primary storage silos from the south-west facing upper floor windows of two properties, including Old House. The change in view would involve introduction of high level construction cranes. Views of other low level construction plant and machinery would not be visible. Overall the receptors at the affected properties would experience a **Negligible** magnitude of temporary change. This would result in **Minor adverse** effects for residents on the southern edge of this group and is **not significant**.

Group R3: Little Cross Farm and nearby properties off West Nash Road

8.210 Residents would gain views of the upper parts of the construction activities at the four primary storage silos from lower and upper floor windows of approximately five properties including Little Cross Farm. The change would involve introduction of high level construction cranes, however views of other low level construction plant and machinery would not be visible due to intervening vegetation. Overall, the change would be temporary and of **Negligible** magnitude and therefore result in **Minor adverse** effects, which is **not significant**.

Group R4: Moorcroft, west of Nash

8.211 Residents would gain views of the upper parts of high level construction activities at the four primary storage silos from south-west facing upper and lower floor windows of two properties. The change would involve the introduction of construction cranes into the view however, views of other low level construction plant and machinery would not be visible due to intervening vegetation. Occupiers of two properties would experience a **Low** magnitude of temporary change. This would result in **Minor adverse** effects, which is **not significant**.

Public Rights of Way

8.212 Sensitivity: Walkers using PRoW are considered of **High** sensitivity. The following assessment of the visual impact on receptors using the local PRoW network uses the Newport City Council right of way reference system, which is shown on Figure 8.3a.

Wales Coast Path PRoW footpath west of the River Usk

8.213 To the west of the River Usk, locations of rights of way where walkers would potentially be most affected by views of the proposed development are the northern part of section 412/13/7 and stretches of 412/13/8 and 412/13/9. Viewpoints 7 and 13 are representative of views from these stretches footpaths which follow the elevated sea defence bund.

8.214 Generally, walkers would gain open views across the estuary and upper parts of the construction activities of the four primary storage silos from the northern part of section 412/13/7 and stretches 412/13/8 and 412/13/9 within the context of extensive industrial development and energy infrastructure. Views of most low level construction plant and machinery would be obscured by intervening landform and vegetation. Overall, walkers using some sections of the Wales Coast Path would experience a **Low** magnitude of temporary change, as existing development would remain the most prominently in view. This would result in **Minor adverse** effects for a relatively long section of the Coast Path on the western banks of the estuary, which is **not significant**.

Wales Coast Path PRoW footpath east of the River Usk

8.215 On the east side of the River Usk the Wales Coast Path is routed in land to the east of the Liberty Steel Mill and Power Station Sites before returning to coastline at the RSPB Nature Reserve south-west of the application site. Walkers are likely to experience the greatest level of effects in the vicinity of representative viewpoint 5, at the western end of 401/12/1 and viewpoint 6, 401/19/1.

8.216 From the western section of the Coast Path 401/12/1 there would be relatively open views of upper parts of the construction activities at the four primary and two day storage silos. There are a few places within fields crossed by 401/9/1 (approximately 180 m length) and 401/18/1 to the north and south of Nash respectively, where views of the upper parts of construction activities at the four Primary silos would be visible above the field boundary hedges and trees. The change in view would involve introduction of high-level construction cranes however, views of low level construction plant and machinery would be largely obscured by intervening vegetation. Overall walkers using these specific stretches of the Coast Path would experience a **Low** magnitude of temporary change. This would result in **Minor adverse** effects for walkers using relatively long sections of the Coast Path, which is **not significant**.

Other PRoW – east of the River Usk in the Caldicott Levels

8.217 Walkers using a 550 m stretch of 401/9/2 would gain open views of the upper parts of the construction of the four primary storage silos. From other parts of the PRoW network, including 401/11/1, there would be glimpses of the uppermost parts of the high-level construction activities, including cranes. Views of low-level construction plant and machinery would be generally screened by vegetation and built development. Walkers using this specific stretch of 401/9/2 would experience a **Low** magnitude of impact that would be temporary in nature. This would result in **Minor adverse** effects for a relatively small section of the PRoW network, which is **not significant**.

Recreation

8.218 Sensitivity: Receptors engaged in recreational activities are considered of **Medium** sensitivity unless stated otherwise. Those recreational activities where views and landscape context form a

major part of the enjoyment of the recreational activity/facility are considered to be of **High** sensitivity.

Uskmouth Sailing Club

8.219 Representative viewpoint 2 was selected as the location where the most open views of the proposed development would be gained.

8.220 The judgements for the construction phase would be the same for the small grass area on the west side of the sailing club house. Other areas on the site would have a reduced effect because the proposals would be less visible and are from less sensitive locations. The magnitude of impact would be **Low** and the significance of effect would be **Negligible adverse** for the construction phase. and **not significant**.

Newport RSPB Reserve

8.221 Several representative viewpoints are located within the RSPB Reserve namely viewpoints 3, 4 and 5. These are all within the reed bed complex. These visitors are considered to be of **High** sensitivity as the views and landscape context form an important part of their enjoyment. People using the visitor centre, which is located at a low level behind the sea defences within scrub and trees would be less visually affected than the reedbed areas.

8.222 The assessment of effects for most of the western part of the Reserve during the construction phase would be similar to viewpoints 3, 4 and 5. At these locations and in the rest of the western part of the Reserve, visitors would experience a **Low to Medium** magnitude of impact to views and therefore, **Minor to Moderate adverse** effects in the construction phase, which is **not significant**. Visitors to the eastern part of the Reserve would experience slightly reduced levels of visual effects because the proposals would be at a greater distance with more intervening vegetation. Over the whole Reserve the magnitude of impact would be **Low to Medium**. Therefore, the significance of effect on visitors over whole of the Reserve would be **Minor to Moderate adverse** and **not significant** for the construction phase.

Further Mitigation

8.223 No further landscape mitigation is proposed.

Future Monitoring

8.224 No future monitoring is required.

Accidents and/or Disasters

8.225 There are no potential construction accidents/disasters (that could realistically occur) which are relevant to landscape, townscape or visual resources, that require further mitigation.

Assessment of Operational Effects

Operational Phase Landscape Effects

Landscape Designations

8.226 The Caldicot Levels SLA designation coincides with all the LANDMAP Aspect Areas previously assessed within the study area, including the Eastern Usk Industrial Area Visual and Sensory Aspect Area within the location of the proposed development. A **Moderate to Minor adverse** effect has been identified for the majority of these aspect areas, except the Cultural Aspect Area where a **Minor beneficial** effect has been identified. All effects on this designation are **not significant**.

8.227 The Gwent Levels Landscape of Outstanding Historic Importance coincides with the rural LANDMAP Aspect Areas to the south and south-east of the proposed development. Indirect effects ranging from **Moderate to Minor adverse** have been identified for these Visual and Sensory Aspect Areas. There would be no direct effects on the landscape within this designation, and all effects are **not significant**.

LANDMAP

8.228 The effect on the LANDMAP Visual and Sensory Aspect Areas relates to the direct and indirect effects on the characteristics of the landscape of the study area as a result of the proposals. The closest visual and sensory aspect areas and those that have a large overlap with the ZTV (see Figure 8.5b) are assessed here.

8.229 The equivalent landscape character areas in the Gwent Levels Landscape Character Assessment are quoted here.

Eastern Usk Industrial Area Aspect Area (NWPRTVS041)

Sensitivity

8.230 The Eastern Usk Industrial Area Visual and Sensory Aspect Area surrounds the proposed development and extends to the south of Newport on the eastern banks of the River Usk where it meets the Bristol Channel. The Caldicot Levels SLA extends over the southern parts of this Aspect Area. The Aspect Area is dominated by power generating and major dockside infrastructure and has low levels of tranquillity. The Aspect Area is intensively developed with no rural landscape. LANDMAP's evaluation of Value in Visual and Sensory terms is Low.

8.231 The Aspect Area offers some enclosure by way of its large industrial and power generation buildings to the north. The areas urbanising influence on the surroundings are limited by its proximity to other dockside development to the west side of the River Usk. However, the application site is fairly open to the south and east due to the neighbouring coastal levels landscape. The scale and height of the existing power station has a dominating influence in this part of the Aspect Area and has an indirect influence over the surrounding landscape. The similarity in scale and nature of existing industrial and energy infrastructure compared to the proposed development would ensure a consistency in character across the Aspect Area. The prominent backdrop provided by this Aspect Area for surrounding Aspect Areas to the south would not change significantly with the addition of the proposed development. The landforms and planting within the Application Site will not be significantly impacted by the development. The Aspect Area is considered to have a high capacity to absorb the proposed development. Therefore, the susceptibility of the proposed development is considered to be Low. Overall the Aspect Areas sensitivity to the proposed development is considered to be **Low.**

Magnitude

8.232 The proposed development would result in the reuse of the coal stock yard, a relatively small section of the southern part of the host Aspect Area, from external storage of coal to storage silos containing fuel pellets. The proposed development would result in an intensification of the existing large-scale power generating buildings and infrastructure within the Eastern Usk Industrial Aspect Area. In the context of the existing character of the Aspect Area there would be some minor change to the scale and pattern of the baseline situation through the addition of large-scale infrastructure into a relatively open parcel of land. The scale of the proposed new silos and conveyors would be similar to the existing buildings. These include the boiler house and turbine house buildings and stack which are large scale, tall structures. The Liberty Steel Mill and Severn Power Station, which make up the surrounding development, are similarly large scale and industrial in character. The proposed change to this Aspect Area would be similar in character and

scale to the existing landscape. Consequently, the magnitude of impact would be **High** locally within the application site and **Low** in the context of the whole Aspect Area.

Effect

8.233 The proposed development would have a **High** magnitude, direct impact on the urban landscape of the **Low** sensitivity Eastern Usk Industrial Visual and Sensory Aspect Area within the application site, resulting in a **Moderate adverse** effect locally, which is not significant. However, In the context of the whole Aspect Area the magnitude of impact is **Low**, resulting in a **Minor adverse** level of effect, which is **not significant**.

Caldicot Levels Aspect Area (NWPRTVS037) equivalent to LCA 2.13 Nash / Goldcliff Coast Zone

Sensitivity

8.234 This aspect area lies to the east of the proposed development, extending to the Bristol Channel to the south. LANDMAP's evaluation of Value in Visual and Sensory terms is High. The Caldicot Levels are a rare, distinctive landscape of rectangular and sinuous fieldscapes with reens, hedges and field boundary trees and have attractive settlements and farmhouses with a strong sense of place. It would be of outstanding value if there were not some evidence of degrading of the landscape and detractors in places. Major infrastructure or industry is present and has a noticeable influence on the largely rural landscape character. Consequently, the susceptibility of the Aspect Area to the development that is proposed is considered to be Low. Therefore, its overall sensitivity is considered to be **Medium**.

Magnitude

8.235 Although the scale of the proposed development is large, in the context of the extensive industrial development within the neighbouring Eastern Usk Industrial Aspect Area, any change in the overall urban context of the Caldicot Levels would be limited. The primary storage silos on the east side of the power station would be located against the backdrop of the main power station building. The proposed development would result in a very minor intensification of the prevailing character and setting of this Aspect Area. Consequently, the magnitude of impact would be **Negligible**.

Effect

8.236 This aspect area is considered to be of **Medium** sensitivity to this development but would experience a **Negligible** magnitude of impact resulting in a **Minor adverse** effect locally on the Caldicot Levels Visual and Sensory Aspect Area, which is considered **not significant**.

Nash Wetlands Aspect Area (NWPRTVS005) equivalent to LCA 2.14 Newport Wetlands

Sensitivity

8.237 This aspect area lies directly to the south and south-east of the proposed development. LANDMAP's evaluation of Value in Visual and Sensory terms is High. The Nash Wetlands are an extensive and attractive series of lagoons with fringing reedbeds forming a distinctive and rare waterscape / landscape in the context of the Gwent Levels. The setting to the north of this aspect area is dominated by power generating development, which provides an established context for the proposed development and reduces the Aspect Areas sensitivity to additional similar scale development. Consequently, the susceptibility of the Aspect Area is considered to be Low. Therefore, the Aspect Areas overall sensitivity to the proposed development is considered to be **Medium**.

Magnitude

8.238 The indirect effects and influence exerted over this Aspect Area are largely confined to the wetland path network around the RSPB reserve. Although the scale of the proposed development is large, in the context of the extensive industrial development within the neighbouring Eastern Usk Industrial Aspect Area, any change in the overall urban context of the Nash Wetlands would be limited. The proposals would generally result in a low degree of change and alteration to the setting of this Aspect Area. Locally and specifically in the western part of the aspect area the magnitude of impact would be Medium but in the context of the whole Aspect Area the change is considered to be Low. Therefore, the magnitude of impact is considered to be **Medium**.

Effect

Due to a **Medium** sensitivity and a **Medium** magnitude of impact, the proposed development would have a **Moderate adverse** effect locally on the Nash Wetlands Visual and Sensory Aspect Area, which is **not significant**.

Wentlooge Level Aspect Area (NWPRTVS001) equivalent to LCA A3.1 Eastern St. Brides

Sensitivity

8.239 This aspect area lies to the west of the proposed development on the opposite side of the River Usk. LANDMAP's evaluation of Value in Visual and Sensory terms is High. The Wentlooge Levels are a distinct landscape with attractive elements such as reens and small-scale undulating fields. The area has a consistent character but is in declining condition and influenced by development to the north and west. The area is very distinctive with an orthogonal field boundary pattern. Consequently, the susceptibility of the aspect area to the proposed development is considered Low. Therefore, the aspect areas overall sensitivity is considered **Medium**.

Magnitude

8.240 The mass and scale of the industrial development associated with the River Usk, which forms the context to this aspect area would not increase significantly as a result of the proposed development. The proposals would generally result in a low degree of change and alteration to the setting of this Aspect Area in the vicinity of the sea defence embankment and the Wales Coast Path. The existing rural qualities of this area would not be diminished significantly. Consequently, the magnitude of impact would be **Negligible** in the context of the whole Aspect Area.

Effect

8.241 Due to a **Medium** sensitivity and a **Negligible** magnitude of impact, the proposed development would have a **Minor adverse** effect locally on the Wentlooge Level Visual and Sensory Aspect Area, which is **not significant**.

Estuary Saltmarsh Aspect Area (NWPRTVS006)

Sensitivity

8.242 This aspect area lies to the west of the proposed development and is located either side of the mouth of the River Usk, which is susceptible to coastal flooding. LANDMAP's evaluation of Value in Visual and Sensory terms is High. The Estuary Saltmarsh is a semi natural edge landscape / seascape with a strong sense of place with panoramic views across the Severn estuary. Due to the flat and open nature of these wild coastal landscapes the large-scale industrial context of the River Usk forms a prominent and contrasting urban context. The proposed development would form an intensification of this character context. The aspects areas susceptibility to this

development is considered Low. Therefore, its overall sensitivity to this development is considered **Medium**.

Magnitude

8.243 The mass and scale of the industrial development associated with the River Usk, which forms the context to this coastal aspect area, would not increase significantly as a result of the proposed development. The proposals would generally result in a low degree of change and alteration to the setting of this Aspect Area. Whilst the scale of the proposed development is large, the existing wild, coastal qualities of this aspect area would not be diminished or compromised significantly. Consequently, the magnitude of impact would be **Medium** in the context of the whole Aspect Area.

Effect

8.244 Due to a **Medium** sensitivity and a **Medium** magnitude of impact, the proposed development would have a **Moderate adverse** effect locally on the Estuary Saltmarsh Visual and Sensory Aspect Area, which is **not significant**.

Summary of Effects on Visual and Sensory Aspect Areas

8.245 Table 8.18 provides a summary of the effects on Visual and Sensory Aspect Areas, detailed above.

Table 8.18: Summary of Effects on Visual and Sensory Aspect Areas

Visual and Sensory Aspect Areas	Value	Susceptibility	Sensitivity	Magnitude	Effect
Eastern Usk Industrial	Low	Low	Low	High to Low (Direct)	Moderate to Minor adverse (not significant)
Caldicot Level / LCA 2.13 Nash / Goldcliff Coastal Zone (Proposed development)	High	Low	Medium	Negligible (Indirect)	Minor adverse (not significant)
Nash Wetlands / LCA 2.14 Newport Wetlands	High	Low	Medium	Medium (Indirect)	Moderate adverse (not significant)
Wentlooge Level / LCAA3.1 eastern St Brides	High	Low	Medium	Negligible (Indirect)	Minor adverse (not significant)
Estuary Saltmarsh	High	Low	Medium	Medium (Indirect)	Moderate adverse (not significant)

Effects on other Aspect Area Themes

8.246 As well as the Visual and Sensory Aspect Areas the direct effects of the proposed development is considered on the other four Aspect Area themes as follows:

Historic Landscape Aspect Area

8.247 The Application Site falls within East Usk and Llanwern Industrial Aspect Area (NWPRTHL022) which is evaluated as High value. Much of the interest associated with this area is in the buried archaeology. The Application Site is largely made up of previously disturbed ground and made ground, including the former coal stockpiling areas where the primary silos are proposed.

Therefore, the susceptibility of this Aspect Area is Low to this development. The sensitivity is therefore **Medium to Low**. In the context of the rest of the Aspect Area, which comprises of heavy industry and power generating infrastructure, the proposed development is similar in character, therefore the magnitude of impact is considered **Low**. Overall the significance of effect would be **Minor adverse** and **not significant**.

Cultural Landscape Aspect Area

8.248 The Application Site falls within the Uskmouth Power Stations Landscape (NWPRTCL005). The overall evaluation is Outstanding. The proposed development complies with recommendations for the Aspect Area, namely the investment in new build and rehabilitation of the existing coal fired power station with a new, modern use to combust waste derived fuel pellets to generate electricity. Therefore, the Aspect Area's susceptibility to the proposed development is Low. The aspects areas sensitivity to this development is **Low** as it is compatible with the LANDMAP management recommendations for the Aspect Area. The magnitude of impact would be **Low** and the overall significance of effect is considered to be **Minor beneficial** and **not significant**.

Landscape Habitat Aspect Area

8.249 The Application Site falls within the Dry (Relatively) Terrestrial Habitats/Mosaic Aspect Area classification. The overall evaluation is High value, but this Aspect Area also encompasses the RSPB Wetland Nature Reserve, which is ecologically important, as well as the industrial power generating sites which have poor ecological value. The Application Site is located predominantly on the former coal stock piling area which has limited ecological value. The susceptibility to the proposed type of development and sensitivity is therefore considered **Low**. The magnitude of impact would be **Low** and the overall significance of effect would be **Minor adverse** and **not significant**.

Geological Landscape Aspect Area

8.250 The Application Site falls within the Newport (Barnardstown-Green Moor) Aspect Area (NWPRTGL004). The overall evaluation is Low value. The proposed development is on disturbed and made ground. Therefore, susceptibility to the proposed development is Low and the sensitivity to this development is **Low** as it does not affect natural features or geology of commercial value. The magnitude of impact would be **Low** and the overall significance of effect would be **Minor adverse** and **not significant**.

Night-time Effects

8.251 Lighting proposals are likely to include column mounted and building mounted luminaires. The proposals would extend the existing well-lit conditions provided by lighting columns on adjacent industrial land beside the River Usk into what is essentially an unlit site. This would be within the wider context of the existing building and tower mounted lights and lighting columns within industrial and residential areas to the north and north-west. The lighting at the proposed development would not change the existing character of the area, particularly given the measures adopted to ensure lighting is directional and that spillage is therefore controlled as far as practicable. There would be a **Low** magnitude of impact on a **Low** sensitivity receptor. The significance of night-time effects on the existing situation of the Eastern Usk Industrial Area Visual and Sensory Aspect Area would be **Minor adverse** in the long term, which is **not significant**.

8.252 Effects on the character of surrounding Visual and Sensory Aspect Areas would range from **Negligible to Minor adverse** and would be **not significant**.

Effect on Seascape Character

8.253 The closest seascape character area to the proposed development is MCA29 Severn Estuary (Wales). The Gwent Levels character assessment identifies the intertidal and estuary mouth as The Usk Estuary (B1.2). The main aesthetic and perceptual qualities of the MCA are the open expansive views across the estuary to the surrounding landscape of the Brecon Beacons uplands rising above the flat coastline, conveying a sense of remoteness. The Value is considered Medium. Locally the backdrop to this part of the coast is large scale industry at Newport which has an influence over the seascape character. The proposed development would form an extension of this urban character in the context of the natural and wild seascape. Therefore, this area has a high capacity to absorb the proposed form and scale of energy infrastructure development and its susceptibility to the proposed development, and sensitivity is **Low**. The indirect change to the MCA would be the introduction of a characteristic new element and intensification of existing local land use. The magnitude of impact is considered **Low to Negligible**. Overall the significance of effect on the seascape character would be **Minor adverse** and **not significant**.

Operational Phase Visual Effects

Residential Receptors

8.254 Sensitivity: Views gained by residents within main living spaces of residential properties with windows facing the development are generally considered to be of high susceptibility and overall sensitivity. The following residential receptor groups are considered of **High** sensitivity.

Group R1: Nash Village

Operational Phase Year 1 (Winter)

8.255 Upper parts of the four primary storage silos (48 m high) which are part of the proposed development, finished in muted matt colours, would be visible, but not prominent in residential receptor views. The Primary silos would appear to the left of the main stack at a similar height to that of the Severn Power Station behind and of similar height to the existing Boiler House of Uskmouth Power Station. The smaller day silos would not be visible in this view. The change to the view would be a small intensification of the industrial character, but within a skyline already dominated by pylons, power lines, the existing power stations and wind turbines The overall change is visible and more prominent than the current view of the Severn Power Station. There would be an intensification of development in front of the Severn Power Station, but this would not be discordant with the existing character. The magnitude of impact would be **Low**. This would result in **Minor adverse** effects for occupiers of two or three properties, which is **not significant**.

Operational Phase Year 15 (Summer)

8.256 Views of the upper parts of the four primary Storage silos which are part of the proposed development, would be more obscured and filtered by the existing intervening hedges and scrub, including the vegetation around the Uskmouth Power Station site, which will have matured further and be in full leaf. Overall the change through the addition of the energy infrastructure would be visible, but not discordant with the existing character. The magnitude of impact would be **Negligible**. This would result in **Minor adverse** effects for occupiers of two or three properties, which is **not significant**.

Group R2: Old House Nash Road and nearby properties off Nash Road near Julian's Reen

Operational Phase Year 1 (Winter)

8.257 The upper parts of the four new primary storage silos, finished in muted matt colours, would be potentially visible from south-west facing windows of properties, although they would not form prominent additions to the view. The primary silos would appear to the left of the existing stack, just above the hedgerow and scrub in the mid distance and at a similar height to the Boiler House of Uskmouth Power Station. The smaller day silos would not be visible. The proposals would form a small intensification of the existing industrial character, within a skyline already dominated by pylons, power lines, the existing Uskmouth Power station, Liberty Steel Mill and wind turbines. Overall, the change would not be discordant with the existing character of the view and therefore of **Negligible** magnitude. This would result in **Minor adverse** effects on residents, which is **not significant**.

Operational Phase Year 15 (Summer)

8.258 Views of the upper parts of the four primary storage silos would be more obscured and filtered by the existing boundary planting, intervening field hedges and scrub, including the vegetation around the sewage works and the Uskmouth Power Station site, which will have matured further and be in full leaf. Overall the change as a result of the proposed development would be visible but not discordant with the existing character of the view and therefore of **Negligible** magnitude. This would result in **Minor adverse** effects at worse for a couple of upper floor receptor views from houses on the southern edge of this grouping including Old House and considered **not significant**.

Group R3: Little Cross Farm and nearby properties off West Nash Road

Operational Phase Year 1 (Winter)

8.259 The upper to middle parts of the four primary storage silos, finished in muted matt colours, would be visible, but not prominent, in views from lower and upper floor windows of approximately five properties, including Little Cross Farm. The Primary silos would appear to the left of the existing stack, just above the Severn Power Station, behind and of similar height to the existing Boiler House of Uskmouth Power Station. The smaller day silos would not be visible in these views. The change to the view would be a small intensification of the industrial character, but within a skyline already dominated by pylons, power lines, the existing power stations and wind turbines, overall, the proposed development would be more prominent than the current view of the Severn Power Station, although of a similar scale and character. The magnitude of impact would be **Low** resulting in **Minor adverse** effects, which is **not significant**.

Operational Phase Year 15 (Summer)

8.260 Views of the upper parts of the four primary storage silos would continue. The development would be less visible due to the existing planting and intervening field hedges and scrub, including the vegetation around the sewage works and the Uskmouth Power Station site, which will have matured further and be in full leaf. Overall, the change would be visible, but not discordant with the existing character of the view, leading to a **Low** magnitude of impact. Therefore, the effect would be **Minor adverse**, which is **not significant**.

Group R4: Moorcroft, west of Nash

Operational Phase Year 1 (Winter)

8.261 Upper and some middle parts of the four primary storage silos, finished in muted matt colours, would be visible, but not prominent in views. The Primary silos would appear to the left of the existing main stack at a similar height to that of the Severn Power Station behind and would be of a similar height to the existing Boiler House of Uskmouth Power Station. The smaller day silos would not be visible in these views. The proposed development would result in a small intensification of the industrial character within a skyline already dominated by pylons, power lines, the existing power stations, steel mill building and wind turbines. Overall the change would be visible, but no more prominent than the current view of the Severn Power Station and would not be discordant with the character of the existing view. The change would be of **Low** magnitude. This would result in **Moderate adverse** effects, which is **not significant**.

Operational Phase Year 15 (Summer)

Views of the upper parts of the four primary storage silos would be more obscured and filtered by the existing planting, intervening field hedges and scrub, including the vegetation around the Uskmouth Power Station site, which will have matured further and be in full leaf. Overall the addition of the new development, although partly visible, would not be discordant with the character of the existing view. The magnitude of impact would be **Low**. This would result in **Minor adverse** effects, which is **not significant**.

Public Rights of Way

8.262 Sensitivity: Walkers using PRoW are considered of **High** sensitivity. The following assessment of the visual impact on receptors using the local PRoW network uses the Newport City Council right of way reference system, which is shown on Figure 8.3a.

Wales Coast Path PRoW footpath west of the River Usk

8.263 To the west of the River Usk, locations of rights of way where walkers would potentially be most affected by views of the proposed development are the northern part of section 412/13/7 and stretches of 412/13/8 and 412/13/9. Viewpoints 7 and 13 are representative of views from these stretches footpaths which follow the elevated sea defence bund.

Operational Phase Year 1 (Winter)

8.264 Walkers would gain views of a small intensification and spread of new development to the right of the Uskmouth Power Station stack. The upper parts of the four proposed primary storage silos would be visible above the existing earth bund on the south-west side of the land holding adjacent to the coastline. The primary storage silos would appear at a similar height to the existing Uskmouth Power Station boiler building. Only the top of the two day silos (39 m high) would be visible from the northern parts of section 412/13/9 as walkers travel north on the banks of the River Usk. Overall walkers using the Coast Path would experience a **Medium** magnitude of impact. This would result in **Moderate adverse** effects on views from a relatively long section of the Coast Path. Whilst the change in view would not be significant at any individual location, when considered as a sequence of views experienced over a journey of more than 3 km, the combined sequential visual effects would be **significant** for walkers using the Wales Coast Path.

Operational Phase Year 15 (Summer)

8.265 There is little intervening vegetation in this view, consequently the magnitude of impact would be the same as year 1 winter (**Medium**) and the level of effect would also be **Moderate adverse**. As a sequence of views experienced over a relatively long section of footpath, the effect on walkers would be considered **significant**.

Wales Coast Path PRoW footpath east of the River Usk

8.266 On the east side of the River Usk the Wales Coast Path is routed in land to the east of the Liberty Steel Mill and Power Station Sites before returning to coastline at the RSPB Nature Reserve south-west of the application site. Walkers are likely to experience the greatest level of effects in the vicinity of representative viewpoints 5, at the western end of 401/12/1 and viewpoint 6, 401/19/1.

Operational Phase Year 1 (Winter)

8.267 Walkers using a 1 to 1.5 km section of the Coast Path 401/12/1 and the RSPB reserve would gain views of upper parts of the two day and four primary storage silos. The two day silos would just break the skyline, primarily above the reeds in the foreground, whereas the four Primary silos would be of similar height to the existing Boiler House and would sit below the overhead cables. There would be a small intensification and spread of the industrial infrastructure within a skyline already dominated by pylons, power lines, the existing power stations and wind turbines which form an established and dominant element of inland views. Walkers using 401/9/1 (approximately 180 m length) and 401/18/1 to the north and south of Nash respectively, would gain views of the upper parts of the four primary silos above the field boundary hedges and trees. Overall, walkers using these specific stretches of the Coast Path would experience a **Medium** magnitude of impact in the long term. This would result in **Moderate adverse** effects for receptors using a relatively long section of the Coast Path. Whilst the change in view would not be significant for any individual location, when considered as a sequence of views experienced over during a journey of more up to 1.5 km, the combined sequential visual effects would be **significant** for walkers using the Wales Coast Path.

Operational Phase Year 15 (Summer)

8.268 The four primary storage silos and two day silos would be slightly more obscured and heavily filtered by the reeds on the RSPB reserve and intervening scrub and hedgerow vegetation, which will have matured further and be in full leaf. The new development would be prominent, but not discordant within the context of extensive existing infrastructure. The character of the view would not be considerably changed. Overall, walkers using these specific stretches of the Coast Path would experience a **Low** magnitude of impact. This would result in **Minor adverse** effects for a walkers using a relatively long section of the Coast Path, which is **not significant**.

Other PRoW – east of the River Usk in the Caldicott Levels

Operational Phase Year 1 (Winter)

8.269 Walkers would gain open views from 401/9/2 of the middle to upper parts of the four primary storage silos, finished in muted matt colours. From other parts of the PRoW network there would be glimpses of the uppermost parts of the primary silos such as on 401/11/1. The primary silos would appear to the left of the stack just above the height of the Severn Power Station behind and would appear of similar height to the existing Boiler House of Uskmouth Power Station. The smaller day silos would not be visible in this view. The change to the view would be a small intensification of the industrial character but within a skyline already dominated by pylons, power lines, the existing power stations and wind turbines. Overall receptors using a small part of the PRoW network, specifically a 550 m stretch of 401/9/2, would experience a **Low** magnitude of impact. This would result in **Moderate adverse** effects, which is **not significant**.

Operational Phase Year 15 (Summer)

8.270 Views of the proposed development would be more obscured and filtered by the existing planting intervening field hedges and scrub, including the vegetation around the sewage works and the Uskmouth Power Station site, which will have matured further and be in full leaf. Overall walkers

would experience a **Low** magnitude of impact. This would result in **Minor adverse** effects, which is **not significant**.

Recreation

8.271 Sensitivity: Receptors engaged in recreational activities are considered of **Medium** sensitivity unless stated otherwise. Those recreational activities where views and landscape context form a major part of the enjoyment of the recreational activity/facility are considered to be of **High** sensitivity.

Uskmouth Sailing Club

8.272 Representative viewpoint 2 was selected as the location where the most open views of the proposed development would be gained.

8.273 The judgements for the operational year 1 winter and operational year 15 summer would be the same for the small grass area on the west side of the sailing club house. Other areas on the site would have a reduced effect because the proposals would be less visible and are from less sensitive locations. The magnitude of impact would be **Low** and the significance of effect would be **Minor adverse** for the operational year 1 winter phase, decreasing to **Negligible adverse** for the operational year 15 summer phase. Both levels of effect are **not significant**.

Newport RSPB Reserve

8.274 Several representative viewpoints are located within the RSPB Reserve namely viewpoints 3, 4 and 5. These are all within the reed bed complex. These visitors are considered to be of **High** sensitivity as the views and landscape context form an important part of their enjoyment. People using the visitor centre, which is located at a low level behind the sea defences within scrub and trees would be less visually affected than the reedbed areas.

8.275 The assessment of effects for most of the western part of the Reserve during the operational phase would be similar to the effects on viewpoints 3, 4 and 5. At these locations and in the rest of the western part of the Reserve, visitors would experience a **Low to Medium** magnitude of impact to views and therefore, **Moderate to Major adverse** effects (the latter at closer and more exposed locations to the development, such as viewpoint 4 in the operational phase in winter year 1) which is **not significant to significant**. By summer year 15 the intervening more mature vegetation which would also be in full leaf would mean that the effects are reduced to **Moderate** at worst and **not significant**. Visitors to the eastern part of the Reserve would experience slightly reduced levels of visual effects because the proposals would be at a greater distance with more intervening vegetation. Over the whole Reserve, the magnitude of impact would be **Low to Medium**. Therefore, the significance of effect on visitors over whole of the Reserve would be **Minor to Moderate adverse** and **not significant** for the operational phase at winter year 1, becoming less adverse at summer year 15.

Night-time Visual Effects

8.276 The visual receptors that are most likely to experience significant adverse effects during the night-time are the same which are likely to experience significant adverse daytime effects. These include visitors to the western part of the Newport Gwent Levels RSPB Reserve and walkers using long sections of the Wales Coast Path on the western banks of the River Usk and to the south-east of the application site.

8.277 The effect on walkers using the footpath at representative viewpoint 4 and for a short length of the path within the RSPB reserve would be Major adverse during the daytime. However, the reserve is closed during the hours of darkness and therefore these night-time effects are not considered further in this assessment.

8.278 The Wales Coast Path is likely to have a low level of use during night-time, reducing the likelihood for adverse effects on a large number of receptors. There is potential for significant sequential visual effects on walkers using the coast path due to an increase in night-time light sources visible over a long period of time during a journey.

8.279 The residential receptor most adversely affected would be R4, occupiers of Moorcroft, west of Nash. Residents in this location would experience moderate adverse effects, which is not significant.

8.280 An appropriate lighting scheme which seeks to minimise light sources and light spill within the landscape/townscape/seascape context has been provided for the development to mitigate the night-time visual effects on receptors within the study area.

Table 8.19: Summary of Effects on Visual Receptors

Visual Receptor/ Rep. Viewpoint	Sensitivity	Magnitude of Impact			Significance of Effect		
		Cons. Phase	Effect Year 1 (Winter)	Effect Year 15 with mitigation (Summer)	Cons. Phase	Effect Year 1 (Winter)	Effect Year 15 with mitigation (Summer)
Residential							
R1 Group R1: Nash Village	High	Negligible	Low	Negligible	Minor adverse	Minor adverse	Minor adverse
R2 Old House Nash Road and nearby properties off Nash Road near Julian's Reen	High	Negligible	Negligible	Negligible	Minor adverse	Minor adverse	Minor adverse
R3 Group R3: Little Cross Farm and nearby properties off West Nash Road	High	Negligible	Low	Low	Minor adverse	Minor adverse	Minor adverse
R4 Moorcroft, west of Nash	High	Low	Low	Low	Minor adverse	Moderate adverse	Minor adverse
Public Rights of Way							
Wales Coast Path PRoW Footpath west of the River Usk northern part of section 412/13/7 and stretches 412/13/8 and 412/13/9.	High	Low	Medium	Low	Minor adverse	Moderate adverse (Sequentially significant)	Moderate adverse (Sequentially significant)
Wales Coast Path PRoW Footpath east of the River Usk west section of 401/12/1	High	Low	Medium	Low	Minor adverse	Moderate adverse (Sequentially significant)	Minor adverse
Other PRoW east of the River Usk in	High	Low	Low	Low	Minor adverse	Moderate adverse	Minor adverse

Visual Receptor/ Rep. Viewpoint	Sensitivity	Magnitude of Impact			Significance of Effect		
		Cons. Phase	Effect Year 1 (Winter)	Effect Year 15 with mitigation (Summer)	Cons. Phase	Effect Year 1 (Winter)	Effect Year 15 with mitigation (Summer)
the Caldicott Levels							
Recreation							
Uskmouth Sailing Club	Medium	Negligible	Negligible	Negligible	Minor adverse	Minor adverse	Minor adverse
Newport Gwent Levels RSPB Reserve (overall)	High	Low	Medium	Low	Minor	Moderate	Minor
Newport Gwent Levels RSPB Reserve (western area)	High	Medium	Medium	Medium	Moderate	Major (Significant)	Moderate

Further Mitigation

8.281 No further landscape mitigation is proposed.

Future Monitoring

8.282 No future monitoring is required.

Accidents/Disasters

8.283 There are no potential operational accidents/disasters (that could realistically occur) which are relevant to landscape, townscape or visual resources, that require further mitigation.

Potential Changes to the Assessment as a Result of Climate Change

8.284 Future changes to baseline conditions due to climate change would generally not change any of the assessments for the operational phase set out above. However, if climate change were to adversely affect the health or vigour of some tree and shrub species which currently perform a screening function within views, there may be increased visibility of the proposed development, particularly compared with the predicted summer visual assessment judgements. However, it is likely that other more resilient species within the existing species mix would perform a similar screening function.

Assessment of Cumulative Effects

8.285 This section sets out the potential cumulative effects which may arise as a result of the proposed development, in combination with other consented and planned developments or allocations within the study area. A cumulative assessment considers the cumulative effects of multiple schemes upon the landscape fabric, landscape character and visual amenity. The schemes which are considered within this chapter are shown in Figure 4.1, and are listed below:

- LDP Allocation EM1 ii: East of Queensway Meadows. 27 ha B1, B2 and B8 uses.
- LDP Allocation EM1 iv: Solutia. 41 ha B1, B2 and B8 uses.

8.286 Schemes within a 5 km radius of the proposed development which have not been considered within this chapter of the ES include residential developments located within the urban townscape of Newport. There would no direct cumulative effect on the LANDMAP Visual and Sensory Aspect Area; Eastern Usk Industrial Area as these developments are located outside of this character area. There would also be very limited or no intervisibility with the majority of buildings and infrastructure at the proposed development and therefore no opportunity for significant adverse effects on visual receptors.

Cumulative Effects on Landscape and Townscape Character

8.287 The two cumulative schemes are located adjacent to one another approximately 1.5 km to the north-east of the Application Site. The schemes lie predominantly within the Caldicot Levels Visual and Sensory Aspect Area. The land comprises agricultural fields, scrub and woodland on the fringes of Newport. The allocated land for the cumulative schemes also lies within a small part of the Eastern Usk Industrial Visual and Sensory Aspect Area which comprises previously developed industrial land on the edge of Newport. This urban character area forms the host character area for the proposed development. There would be very limited direct cumulative effect on the Eastern Usk Industrial Visual and Sensory Aspect Area due to the poor condition and low sensitivity on the aspect area and the small scale and therefore negligible magnitude of impact through redevelopment of industrial areas. The cumulative effect on the character of the Eastern Usk Industrial Visual and Sensory Aspect Area would be no more than **Negligible adverse**.

8.288 The cumulative schemes are likely to have a significant adverse effect on the landscape of the Caldicot Levels due to the large-scale loss of farmland, scrub and woodland of medium/high quality. The direct effects of the cumulative schemes and indirect effects of the proposed development on the Caldicot Levels Visual and Sensory Aspect Area would be of medium magnitude on a character area of high sensitivity. The resulting level of cumulative effect would be **Substantial adverse**, which is significant. However, the proposed development would make a **Negligible** contribution to this cumulative effect.

Cumulative Effects on Designated Landscapes

8.289 The cumulative schemes are both located within the Caldicot Levels SLA, together with the Application Site. The cumulative schemes would result in the large-scale loss of farmland, scrub and woodland of medium/high quality. The proposed development would result in the redevelopment of a previously developed industrial site within an extensive industrial context that would have no direct effects on the important features, elements and characteristics of the landscape designation. The resulting level of cumulative effect would be **Substantial adverse**, which is significant. However, the proposed development would make no more than a **Negligible** contribution to this cumulative effect.

Cumulative Effects on Visual Resources

8.290 Cumulative visual effects have been assessed based on the 14 viewpoint locations previously identified. Static cumulative effects would occur where receptors look directly towards the proposed development and would also see cumulative schemes in the same angle of view. Additional successive cumulative effects would occur where the receptor needs to turn through 360 degrees to gain views of cumulative schemes in different angles of view.

8.291 Walkers using the Wales Coast Path to the west of the River Usk, west of the Application Site at viewpoints 7, 8 and 13 would all gain distant views of the office developments at the cumulative sites within the same angle of view as the new proposed development. The scale and nature of the cumulative schemes would add slightly to the intensity of visible development at Newport. The proposed development would be more prominent in the mid-distance. There would be a cumulative effect on views gained by walkers using the Wales Coast Path in these locations. The

sensitivity of the receptor is high and the magnitude of impact on the view would be medium and long term in nature, leading to a **Moderate adverse** level of cumulative effect. The proposed development would make a moderate contribution to this cumulative effect. When considered as a sequence of views gained by walkers for a long section of the footpath, the sequential cumulative visual effects would be significant.

8.292 Receptors at viewpoint 6 Nash Lane, viewpoint 9 Great Trastan Meadows (Solutia) Nature Reserve and viewpoint 11 Goldcliffe Moated Site Scheduled Monument would all experience successive cumulative effects where receptors would need to turn through 90 to 180 degrees to gain views of the cumulative schemes and the proposed development from the same location. The office developments at the cumulative sites would increase the visibility of the urban fringe of Newport across a foreground of rural landscape, increasing the presence of urban development in the panorama. The sensitivity of the receptor is medium to high in these locations and the magnitude of impact on the view would be small to negligible and long term in nature, leading to cumulative effects ranging from **Negligible** to **Minor adverse**. The proposed development would make a negligible to small contribution to this cumulative effect.

Inter-relationships

8.293 This chapter of the ES assesses the effects on landscape and seascape character and visual receptors as a result of the proposed development. There is an interrelationship with other environmental topics including historic environment and ecology. Whilst the assessment of effects on character includes land that contains heritage and ecological assets, effects on heritage assets and their context and settings are considered within Chapter 9: Historic Environment and the effects on flora and fauna within habitats is considered within Chapter 7: Ecology and Nature Conservation.

Summary of Effects

8.294 This chapter of the Environmental Statement presents the results of the Environmental Impact Assessment for the potential landscape, townscape, seascape and visual effects.

8.295 The proposals to convert the existing coal-fired Power Station to generate electricity from waste derived fuel pellets would retain the existing power station structures including the 130 m high stack, 46 m high brick boiler building and lower turbine house, other buildings and conveyor structures and low level ancillary infrastructure. In addition, the existing trees and scrub associated with perimeter earthworks would be retained around the site. The main new structures that have the greatest potential to be visible from the surrounding landscape, townscape and seascape are the four primary storage silos (45 m high) on the south-east side of the main boiler house building located on the former coal stockpiling area and the two day silos (33 m high) located on the south-west side of the new development.

Landscape, Townscape and Seascape Effects Summary

8.296 The proposed development would result in a direct effect on the LANDMAP Visual and Sensory Aspect Area; Eastern Usk Industrial Area. Although the scale of the proposed development is large, within the context of this extensive industrial area of power generating and steel mill facilities on the River Usk it is relatively modest. The proposed development could be accommodated within this Aspect Area without significant effects on key features or elements. Within the Uskmouth Power Station landholding boundary, the impact would be **Moderate adverse** which is not significant. At the larger scale, in relation to the whole Aspect Area, the significance of impact is considered **Minor adverse**.

8.297 Neighbouring and nearby Visual and Sensory Aspect Areas and LCAs are indirectly affected. The Nash Wetlands Aspect Area / LCA 2.14 Newport Wetlands would experience **Moderate adverse** effects, which is not significant. The relatively wild Estuary Saltmarsh Aspect Area, which is split

across the River Usk, would also experience **Moderate adverse** effects, albeit indirectly. Although the aspect areas / character areas surrounding the host aspect area are considered to be of high and outstanding value, their susceptibility to development of this type, mass and scale is low as defined by the methodology criteria; '*landscapes which have extensive existing reference or context to the type of development being proposed.'* In this context the existing backdrop and contextual character of the host aspect area is large scale industrial/energy infrastructure.

8.298 There would be no significant adverse effects on any other aspect area of the Historic, Cultural, Landscape Habitat or Geological themes of LANDMAP.

Visual Effects Summary

8.299 The existing Uskmouth Power Station currently exerts a strong visual influence over the Gwent Levels landscape, the seascape to the south and the River Usk. The level of visual influence of the existing structures diminishes to the north and north-west due to the intervening dockside and industrial processing development that flank the River Usk as it meanders northwards through the city of Newport. To the north-east the upper parts of the main existing structures of the stack and boiler house can be frequently seen from the surrounding residential area, Public Rights of Way (PRoW) network and glimpsed from the rural lane network.

8.300 The ZTVs for the proposals, shown in Figures 8.3a and 8.3b, indicate that views of the new development would be extensive, but would predominantly overlap with the existing ZTV of the Uskmouth Power Station. Subsequent fieldwork established that the new proposals would not be visible from an area as extensive as the ZTVs would suggest. This is due to a number of factors which have not been modelled such as hedgerows and tree belts. Nominal heights of 12 m for trees where woodlands and copses have been mapped and a general height for buildings of 9m have been modelled. The screening capacity of taller development, such as the Severn Power station immediately to the west of Uskmouth Power Station, is not fully factored into the ZTV modelling and therefore results in a greater level of implied visibility for the proposed development.

8.301 The greatest number of visual receptors that would be potentially affected by views of the proposals lie immediately to the south, south-east and east of Uskmouth Power Station. The majority of visual receptors would not be adversely affected in these areas. The levels of visual effect predicted during the construction phase, operational phase winter year 1 and operational phase summer year 15 would generally be moderate or less. Receptors that would experience this level of effect during the operational phase year 1 winter are:

- Visitors to the southwestern part of the RSPB reserve representative, represented by viewpoints 3 and 5.
- Walkers using the Wales Coast Path on the western side of the Usk in the vicinity of viewpoint 7 and 13 and east of the River Usk south of the application site in the Caldicot Levels.
- Occupiers of residential properties to the east of the proposed development at Moorcroft, west of the village of Nash.

8.302 Due to the length of the Wales Coast Path within the ZTV (approximately 4.5 km) walkers would experience a change in view as a result of the proposed development over a long part of a journey. As a result, walkers are likely to experience significant adverse sequential effects. The only other visual receptors that would experience a major adverse and significant visual effect are visitors to the western part of the RSPB in the vicinity of viewpoint 4 where there are gaps in the boundary scrub vegetation, allowing open views of the Primary Storage silos. This level of effect would occur during the operational phase year 1 winter only.

Conclusion

8.303 The proposed development consists of large scale buildings and infrastructure such as the primary and day silos. However, the energy facility would be located within the context of an extensive

industrial area of power generation and steel mill facilities on the River Usk. Due to its' relatively modest scale the proposed development could be accommodated on the edge of this urban character area without significant effects on key features or elements. The proposal utilises redundant space on the site, including repurposing the former coal stock piling area for the four primary silos. The landscape effect on the visual and sensory aspects both directly on the host Eastern Usk Industrial Area and indirectly on the neighbouring aspect areas, which have a high or outstanding value is not considered to be significant and would not lead to unacceptable harm to townscape or landscape character.

8.304 The assessment concludes that the proposed development would have limited significant effects on visual receptors within the study area. Walkers using two long sections of the Wales Coast Path and visitors within a small part of the RSPB Newport Wetlands National Nature Reserve would experience an accumulation of sequential effects that would be significant. Natural scrub and tree planting are proposed on the restored ash tip on the western side of the Uskmouth Power Station landholding to help mitigate the visual impact. Whilst there will be adverse visual impacts on visitors to the RSPB reserve these are generally not significant.

8.305 The cumulative commercial schemes at East of Queensway Meadows and Solutia are likely to have a significant adverse effect on the landscape of the Caldicot Levels due to the large-scale loss of farmland, scrub and woodland of medium/high quality. The direct effects of the cumulative schemes and indirect effects of the proposed development on the Caldicot Levels Visual and Sensory Aspect Area and SLA would be significant. Walkers using the Wales Coast Path to the west of the River Usk would all gain distant views of the office developments at the cumulative sites within the same angle of view as the new proposed development. When considered as a sequence of views gained by walkers for a long section of the footpath, the sequential cumulative visual effects would be significant.

8.306 The proposed development seeks to address local authority landscape related policies. In particular, the proposed development does not adversely affect green infrastructure objectives and aspirations set out in the Gwent Levels Green Infrastructure Strategy SPD. The proposed mitigation planting on the western side of the Uskmouth Power Station landholding will, in time, mature and extend the scrub and tree fringe around the eastern side of the mouth of the River Usk estuary.

References

Guidelines for Landscape and Visual Impact Assessment, second edition, Landscape Institute and Institute of Environmental Assessment.

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An Approach to Landscape Character Assessment Natural England (2014).

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Natural England, Scottish Natural Heritage and the CCW (2011). Landscape Character Assessment, Guidance for England, Scotland and Wales (consultation draft). Natural England, Scottish Natural Heritage and CCW.

Newport Local Development Plan 2011 – 2026, adopted January 2015; Newport City Council

The Gwent Levels - Green Infrastructure Strategy (April 2017) Chris Blandford Associates; Living Levels Conservation Action Plan; (partners include Newport County Council).

The Gwent Levels – Landscape Character Assessment (April 2017) Chris Blandford Associates; Living Levels Conservation Action Plan; (partners include Newport City Council).

Marine Character Areas (MCA) MCA 29 Severn Estuary Wales; Natural Resources Wales (2015) LUC.

Technical Guidance Note 06/19: Visual Representation of development proposals (replaces Advice Note 01/11) Landscape Institute (2019) All references listed throughout the text should be listed in the final section, following the referencing convention below (not using numbers etc.).

Highways Agency, Transport Scotland, Welsh Assembly Government and the Department for Regional Development Northern Ireland (2008) Assessment and Management of Environmental Effects. Design Manual for Roads and Bridges, Volume 11, Section 2, Part 5. HA 205/08.

Table 8.20: Summary of Likely Environmental Effects on Landscape, Seascape and Visual Resources

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact	Significance of effect	Significant / Not significant
Construction Phase: Visual						
Residential						
R1 Group R1: Nash Village	High	Visual	Medium Term	Negligible	Minor adverse	Not Significant
R2 Old House Nash Road and nearby properties off Nash Road near Julian's Reen	High	Visual	Medium Term	Negligible	Minor adverse	Not Significant
R3 Group R3: Little Cross Farm and nearby properties off West Nash Road	High	Visual	Medium Term	Negligible	Minor adverse	Not Significant
R4 Moorcroft, west of Nash	High	Visual	Medium Term	Low	Minor adverse	Not Significant
Public Rights of Way						
Wales Coast Path PRoW Footpath west of the River Usk northern part of section 412/13/7 and stretches 412/13/8 and 412/13/9.	High	Visual	Medium Term	Low	Minor adverse	Not Significant
Wales Coast Path PRoW Footpath east of the River Usk west section of 401/12/1	High	Visual	Medium Term	Low	Minor adverse	Not Significant
Other PRoW east of the River Usk in the Caldicott Levels	High	Visual	Medium Term	Low	Minor adverse	Not Significant
Recreation						
Uskmouth Sailing Club	Medium	Visual	Medium Term	Low	Negligible	Not Significant
Newport Gwent Levels RSPB Reserve (overall)	High	Visual	Medium Term	Low to Medium	Minor to Moderate adverse	Not Significant
Newport Gwent Levels RSPB Reserve (western area)	High	Visual	Medium Term	Low to Medium	Minor to Moderate adverse	Not Significant
Construction Phase: Character						
Eastern Usk Industrial	Low	Landscape	Medium Term	High to Low	Moderate to Minor adverse	Not Significant

Caldicot Level / LCA 2.13 Nash / Goldcliff Coastal Zone	Medium	Landscape	Medium Term	Negligible	Minor adverse	Not Significant
Nash Wetlands / LCA 2.14 Newport Wetlands	Medium	Landscape	Medium Term	Medium	Moderate adverse	Not Significant
Wentlooge Level / LCAA3.1 eastern St Brides	Medium	Landscape	Medium Term	Negligible	Minor adverse	Not Significant
Estuary Saltmarsh	Medium	Landscape	Medium Term	Medium	Moderate adverse	Not Significant
East Usk and Llanwern Industrial Aspect Area	Medium to Low	Landscape	Medium Term	Low	Minor adverse	Not Significant
Uskmouth Power Stations Landscape	Low	Landscape	Medium Term	Low	Minor beneficial	Not Significant
Dry (Relatively) Terrestrial Habitats/Mosaic	Low	Landscape	Medium Term	Low	Minor adverse	Not Significant
Newport (Barnardstown-Green Moor) Aspect Area	Low	Landscape	Medium Term	Low	Minor adverse	Not Significant
MCA29 Severn Estuary Seascape	Low	Seascape	Medium Term	Low to Negligible	Minor adverse	Not Significant
Operational Phase: Visual						
Residential						
R1 Group R1: Nash Village	High	Visual	Long Term	Low to Negligible	Minor adverse	Not Significant
R2 Old House Nash Road and nearby properties off Nash Road near Julian's Reen	High	Visual	Long Term	Negligible	Minor adverse	Not Significant
R3 Group R3: Little Cross Farm and nearby properties off West Nash Road	High	Visual	Long Term	Low	Minor adverse	Not Significant
R4 Moorcroft, west of Nash	High	Visual	Long Term	Low	Moderate to Minor adverse	Not Significant
Public Rights of Way						
Wales Coast Path PRoW Footpath west of the River Usk northern part of section 412/13/7 and stretches 412/13/8 and 412/13/9.	High	Visual	Long Term	Medium	Moderate adverse	Significant (as a combined sequential effect and cumulative sequential effect)
Wales Coast Path PRoW Footpath east of the River Usk west section of 401/12/1	High	Visual	Long Term	Medium to Low	Moderate adverse	Significant (as a combined sequential effect

						and cumulative sequential effect) to Not Significant
Other PRoW east of the River Usk in the Caldicott Levels	High	Visual	Long Term	Low	Moderate to Minor adverse	Not Significant
Recreation						
Uskmouth Sailing Club	Medium	Visual	Long Term	Negligible	Minor adverse	Not Significant
Newport Gwent Levels RSPB Reserve (overall)	High	Visual	Long Term	Low to Medium	Minor to Moderate adverse	Not Significant
Newport Gwent Levels RSPB Reserve (western area)	High	Visual	Long Term	Low to Medium	Moderate to Major adverse	Not Significant to Significant
Operational Phase: Character						
Eastern Usk Industrial	Low	Landscape	Long Term	High to Low	Moderate to Minor adverse	Not Significant
Caldicot Level / LCA 2.13 Nash / Goldcliff Coastal Zone	Medium	Landscape	Long Term	Negligible	Minor adverse	Not Significant
Nash Wetlands / LCA 2.14 Newport Wetlands	Medium	Landscape	Long Term	Medium	Moderate adverse	Not Significant
Wentlooge Level / LCAA3.1 eastern St Brides	Medium	Landscape	Long Term	Negligible	Minor adverse	Not Significant
Estuary Saltmarsh	Medium	Landscape	Long Term	Medium	Moderate adverse	Not Significant
East Usk and Llanwern Industrial Aspect Area	Medium to Low	Landscape	Long Term	Low	Minor adverse	Not Significant
Uskmouth Power Stations Landscape	Low	Landscape	Long Term	Low	Minor beneficial	Not Significant
Dry (Relatively) Terrestrial Habitats/Mosaic	Low	Landscape	Long Term	Low	Minor adverse	Not Significant
Newport (Barnardstown-Green Moor) Aspect Area	Low	Landscape	Long Term	Low	Minor adverse	Not Significant
MCA29 Severn Estuary Seascape	Low	Seascape	Long Term	Low to Negligible	Minor adverse	Not Significant
Operational Phase Cumulative Effects: Character						
Caldicot Levels Visual and Sensory Aspect Area/Special Landscape Area	High	Landscape	Long Term	Medium	Substantial adverse	Significant

			(However the proposed development makes a negligible contribution to the effect)

9 HISTORIC ENVIRONMENT

Introduction

9.1 This chapter of the ES assesses the effects of the Uskmouth Conversion Project on all aspects of the historic environment, including buried archaeological remains, historic buildings, historic areas and marine heritage.

9.2 In particular, this chapter:

- Sets out the existing and future environmental baseline conditions, established from desk studies and site visits;
- Presents the likely effects on all aspects of the historic environment arising from the project, based on the information gathered and the analysis and assessments undertaken;
- Identifies any assumptions and limitations encountered in compiling the baseline information; and
- Highlights any necessary monitoring and/or mitigation measures that could prevent, minimise, reduce or offset the likely effects identified in the EIA process.

Assessment Methodology

Legislation and Planning Policy Context

9.3 Legislative frameworks provide protection to the historic environment while planning policy guidance provides advice concerning how the historic environment should be addressed within the planning process.

9.4 Statutory protection for archaeology is principally enshrined in the *Ancient Monuments and Archaeological Areas Act* (1979) amended by the *National Heritage Acts* (1983 and 2002). Nationally important archaeological sites are listed in a Schedule of Monuments and are accorded statutory protection.

9.5 For other components of the historic environment, the *Planning (Listed Buildings and Conservation Areas) Act* (1990) and the *Town and County Planning Act* (1971) provide statutory protection to listed buildings and their settings and present measures to designate and preserve the character and appearance of Conservation Areas.

9.6 The *Historic Environment (Wales) Act* became law after receiving Royal Assent in March 2016. It gives more effective protection to listed buildings and scheduled monuments, improves the sustainable management of the historic environment, and introduces greater transparency and accountability into decisions than on the historic environment.

9.7 Historic Parks, Gardens and Landscapes are described on a Register maintained by Cadw (and others) for Welsh Government, but such designation does not afford statutory protection. However, the *Historic Environment (Wales) Act* (2016) included a provision for historic parks and gardens to be placed on a statutory register and this is due to come into force in 2020. This statutory register will not include historic landscapes.

9.8 The principal national planning policy is *Planning Policy Wales Edition 10* (PPW10) (Welsh Government, December 2018). Chapter 6 of PPW10 (Distinctive and Natural Places) establishes the Welsh Government objectives with regard to the protection of the historic environment.

9.9 PPW10 sets out the policies which apply to the consideration given to historic assets within the planning process, emphasising the need to understand, protect and enhance the special qualities of such assets.

9.10 Detailed guidance on the implementation of the policies on planning and the historic environment is provided in *Technical Advice Note 24: The Historic Environment* (TAN24) (Welsh Government, 2017). TAN24 includes specific guidance on how each aspect of the historic environment should be considered and protected within the planning process, but also contains the following statement '*Changes in the historic environment are inevitable. This can be the result of decay caused by natural processes, damage caused by wear and tear of use, and the need to respond to social, cultural, economic and technological changes*' (paragraph 1.8). In a section regarding climate change, the TAN identifies that '*The public benefit of taking action to reduce carbon emissions, or to adapt to the impact of climate change, should be weighed against any harm to the significance of heritage assets*' (paragraph 1.9).

9.11 The *Newport Local Development Plan 2011 – 26* (the LDP) was adopted by Newport City Council in January 2015. Policies relevant to this chapter of the ES include: *CE4 Historic Landscapes, Parks, Gardens and Battlefields*; *CE5 Locally Listed Buildings and Sites*; *CE6 Archaeology*; and *CE7 Conservation Areas*.

9.12 Further details of the relevant national and local planning policies can be found in Appendix 9.1 of this ES.

Relevant Guidance

9.13 Guidance on *Heritage Impact Assessment in Wales* has been published by Cadw (2017a) on behalf of Welsh Government. This document advises that a heritage assessment should '*take into account sufficient information to enable both the significance of the asset and the impact of change to be understood. It should be proportionate both to the significance of the historic asset and to the degree of change proposed*' (Page 5).

9.14 The overall assessment of impacts and effects presented within this chapter of the ES is in line with the former and current iterations of the *Design Manual for Roads and Bridges* (DMRB, Highways Agency *et al*. 2019a; b). It is acknowledged that the project is not a highways scheme, however DMRB provides a robust and tested methodology for the assessment of environmental effects, including advice on determining the magnitude of impacts and the significance of effects.

9.15 Additional guidance on how to identify and appraise the values associated with historic assets is presented in the document *Conservation Principles for the Sustainable Management of the Historic Environment in Wales* (Welsh Assembly Government, 2011). This document provides guidance on understanding heritage values and also includes a section advising on how to assess heritage significance.

9.16 According to the guidance published in *Conservation Principles*, heritage values fall into four inter-related groups:

- Evidential value – the potential of a place to yield evidence about past human activity;
- Historical value – this derives from the ways in which past people, events and aspects of life can be connected through a place to the present. This value tends to be illustrative (providing insights into past communities and their activities) or associative (association with a notable family, person, event or movement);
- Aesthetic value – this derives from the ways in which people draw sensory and intellectual stimulation from a place; and
- Communal value – this derives from the meanings of a place for the people who relate to it, or for whom it figures in their collective experience or memory.

9.17 In this document, setting was defined as '*The surroundings in which an historic asset is experienced, its local context, embracing present and past relationships to the adjacent landscape*' (Welsh Assembly Government, 2011). This definition has been updated thus in TAN24: '*The setting of a historic asset includes the surroundings in which it is understood, experienced and*

appreciated, embracing present and past relationships to the surrounding landscape. Its extent is not fixed and may change as the asset and its surroundings evolve. Setting is not itself a historic asset, though land within a setting may contain other historic assets' (Welsh Government, 2017, Annex D). The definition is repeated in recent guidance regarding the issue of the settings of historic assets in Wales (Cadw, 2017b), which makes the following points:

- Setting usually extends beyond the property boundary of an individual historic asset.
- Intangible factors such as function, sensory perceptions or historical, artistic, literary and scenic associations can be important in understanding settings, as well as physical elements within the surroundings of the asset.
- When development is proposed there is a need to assess the historic assets that may be affected and understand how their settings contribute to the significance of these assets.

9.18 The Cadw document (Cadw, 2017b) goes on to provide advice on a staged approach to decision-taking by outlining a four-stage approach:

- Identify which historic assets and their settings could be affected by a proposed development;
- Define and analyse the setting of each historic asset and assess whether, how and to what degree the setting makes a contribution to the significance of the asset;
- Evaluate the effects of the proposed development, whether beneficial or harmful, on that significance; and
- Consider options to mitigate or improve potential impacts on that significance.

9.19 Although assessments of changes within the settings of historic assets can involve non-visual issues such as noise, it is more usually the visual aspects of a development that form the major part of the assessment.

9.20 The existence of direct lines of sight between the historic asset and the proposed development is an important factor in judging the visual impact of the development. However, it is possible for changes within the setting to occur even when such a relationship does not exist. For example, views towards a listed building from a frequently visited location, such as a park or a public footpath, may be affected by the presence of a larger development, even if the development is not directly visible from the building itself.

9.21 The assessment then needs to balance the impact of these various considerations on the basis of informed professional judgment. Assessment of visual impacts can be undertaken in accordance with the procedures expressed in the *Guidelines for Landscape and Visual Impact Assessment* (3rd Edition) (Landscape Institute, 2013). If there is the potential for changes within the setting of historic assets due to noise or other impacts than these would be considered using appropriate procedures.

9.22 There should also be consideration of the sensitivity to change of the setting of a historic asset. This requires examination of the current setting with regard to identifying elements that contribute to the significance of the asset, elements that make a neutral contribution to the significance of the asset and elements that make a negative contribution to (i.e. detract from) the significance of the asset.

Study Areas

9.23 The Uskmouth Conversion Project (Redline) site boundary is shown in Figure 1.2 and is referred to as the site boundary.

9.24 The study area for historic environment data collection has comprised an area extending approximately 1 km from the edge of the site boundary.

9.25 For designated historic assets that could be affected by a change within their settings, the study area comprised an area extending approximately 3 km from the edge of the site boundary . The identification of such assets also takes into account the Zone of Theoretical Visibility established as part of the landscape and visual assessment (Chapter 8 of this ES).

Baseline Methodology

9.26 Data regarding known historic assets (designated and undesignated) were sought from a number of sources, including the Regional Historic Environment Record (HER) maintained by Glamorgan Gwent Archaeological Trust (GGAT), the National Monuments Record for Wales, the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) and the Gwent Archives (Ebbw Vale).

9.27 In addition to the above, the following guidance documents have been utilised within the programme of baseline data gathering:

- *Standard and guidance for historic environment desk-based assessment* (Chartered Institute for Archaeologists, 2017); and
- *Notes for Archaeologists undertaking Desk-Based Studies in South-East Wales* (Glamorgan Gwent Archaeological Trust, 2007).

9.28 A site visit was undertaken in January 2020 in order to review the physical nature of the land within the proposed works areas and to assess the current settings of historic assets that could be affected by the project.

Consultation

9.29 Table 9.1 below provides a summary of the consultation process undertaken to date in relation to the historic environment.

Table 9.1: Consultation Responses Relevant to this Chapter

Date	Consultee and Issues Raised	How/ Where Addressed
Date	Consultee and Issues Raised	How/ Where Addressed
January 2020	Newport City Council EIA Scoping Opinion No reference in the Scoping Opinion to any aspect of the historic environment	
July 2020 Pre-application response by CADW	Scheduled monument MM092 Goldcliff Moated House Site ('the SAM') is located inside 3km of the proposed development (see figure 9.1 of ES) and figure 8.4k the landscape and visual assessment shows that it will have views of the proposed development. However, the SAM is not mentioned in the text of section 9 or in the more detailed desk-based assessment included as Appendix 9.1 of the ES. The impact of the proposed development on the setting of the SAM will be a material consideration in the determination of this application (see Planning Policy Wales 2018 section 6.1.23). Section 9 of the ES is therefore needs to be updated before	Chapter 9 of the ES concludes that there would be no change in views from the Scheduled moated house site north of Goldcliff due to the intervening topography and vegetation and as a result there would be no change in effect. There is no statutory requirement to re-consult Cadw prior to the submission of the planning application to the LPA.

	the planning application is submitted to the LPA. Cadw should also be re-consulted on this statutory pre-planning application prior to the submission of the planning application. There may also be undesignated historic assets that could be affected by the proposed development and, if you have not already done so, we would advise that you consult the Historic Environment Record held by the Glamorgan-Gwent Archaeological Trust www.ggat.org.uk.

Assessment Criteria and Assignment of Significance

9.30 The significance of an effect is determined based on the sensitivity or value of a receptor and the magnitude of an impact. This section describes the criteria applied in this chapter to characterise the sensitivity of receptors and magnitude of potential impacts. The terms used to define sensitivity/value (of receptors) and magnitude (of impact) are based on and have been adapted from those used in the previous and current iterations of the DMRB methodology (Highways Agency et al., 2019a; b), which are described in further detail in Chapter 4: Environmental Assessment Methodology.

Receptor Sensitivity/Value

9.31 Table 9.2 presents the definitions of sensitivity or value which are applied to historic assets.

Table 9.2: Sensitivity/Value Criteria

Sensitivity	Typical Descriptors
Very High	World Heritage Sites, including nominated sites and structures or landscapes coherence, time-depth or other critical factor(s) inscribed as being of universal value. Other historic assets of recognised international importance, including historic landscapes.
High	Scheduled Ancient Monuments (including proposed sites). Undesignated historic assets of schedulable quality and importance. Grade I and II* listed buildings. Other listed buildings that can be shown to have a level of importance not adequately reflected in their listing. Undesignated structures of clear national importance. Grade I and II* registered parks and gardens of historic interest. Other registered parks and gardens of historic interest that can be shown to have a level of importance not adequately reflected in their listing. Undesignated parks and gardens of clear national importance. Conservation Areas which contain several Grade I and II* listed buildings along with other listed and unlisted historic buildings. Designated historic landscapes of outstanding or special interest. Undesignated historic landscapes of clear national importance. Well-preserved historic landscapes with exceptional coherence, time-depth or other critical factor(s).
Medium	Designated or undesignated historic assets that contribute to regional research objectives. Grade II listed buildings. Unlisted buildings that can be shown to have exceptional qualities. Grade II registered parks and gardens of historic interest. Undesignated parks and gardens of historic interest of regional importance.

	Conservation Areas which contain one or two Grade I and II* listed buildings, along with other listed and non-listed historic buildings. Undesignated historic landscapes of clear regional importance. Averagely well-preserved historic landscapes with reasonable coherence, time-depth or other critical factor(s).
Low	Undesignated historic assets of local importance. Locally listed buildings. Unlisted historic buildings of local importance. Robust undesignated historic landscapes. Historic landscapes with importance to local interest groups.
Negligible	Undesignated historic assets with little or no surviving archaeological interest. Buildings or no architectural or historic note. Landscapes with little or no historic interest.
Unknown	The importance of the historic asset has not been ascertained.

Magnitude of Impact

9.32 The magnitude of an impact is assessed without reference to the sensitivity or value of the historic asset. In terms of the judgement of the magnitude of impact, this based on the principle that preservation of the significance of the asset is preferred, and that total loss of significance (including loss resulting from substantial change within the setting) of the asset is least preferred.

9.33 Regarding buried archaeological remains, it is not always possible to assess the physical impart in terms of percentage loss, and therefore it can be important in such cases to try to assess the capacity of the historic asset to retain its character and significance following any impact. Impacts resulting from changes within the setting of buried archaeological remains may also be difficult to assess as they do not involve physical loss of the asset.

9.34 Table 9.3 presents the criteria used to assess the magnitude of impact on heritage assets.

Table 9.3: Impact Magnitude Criteria

Impact Magnitude	Typical Descriptors
High	Change to most or all key elements of the historic asset, or changes within the setting of the asset, such that the significance of the asset is lost or substantially harmed (Adverse).
	Change to most or all key elements of the historic asset, or changes within the setting of the asset, such that the significance of the asset is substantially enhanced (Beneficial).
Medium	Change to elements of the historic asset, or changes within the setting of the asset, such that the significance of the asset is harmed (Adverse).
	Change to elements of the historic asset, or changes within the setting of the asset, such that the significance of the asset is enhanced (Beneficial).
Low	Change to elements of the historic asset, or changes within the setting of the asset, such that the significance of the asset is slightly harmed (Adverse).
	Change to elements of the historic asset, or changes within the setting of the asset, such that the significance of the asset is slightly enhanced (Beneficial).
Negligible	Change to elements of the historic asset, or changes within the setting of the asset, such that the significance of the asset is barely affected (Adverse).
	Change to elements of the historic asset, or changes within the setting of the asset, such that the significance of the asset is barely affected (Beneficial).
No change	No changes to elements of the historic asset, or within the setting of the asset.

Significance of Effects

9.35 The significance of the effect upon the historic environment has been determined by considering the sensitivity or value of the receptor and the magnitude of the impact. The method employed for

this assessment is presented in Table 9.4. Where a range of significance levels are presented, the final assessment for each effect is based upon expert judgement.

9.36 In all cases, the evaluation of receptor sensitivity or value, impact magnitude and significance of effect has been informed by professional judgement and is underpinned by narrative to explain the conclusions reached.

Table 9.4: Assessment Matrix

Sensitivity	Magnitude of Impact				
	No Change	Negligible	Low	Medium	High
Negligible	No change	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	No change	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	No change	Negligible or Minor	Minor	Moderate	Moderate or Major
High	No change	Minor	Minor or Moderate	Moderate or Major	Major or Substantial
Very High	No change	Minor	Moderate or Major	Major or Substantial	Substantial

9.37 For the purpose of this assessment, any effects with a significance level of minor or less are not considered to be significant in terms of the EIA Regulations. Effects should be considered to be adverse unless explicitly stated otherwise.

9.38 A description of the significance levels is provided in the bullet points below:

- Substantial: Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process. These effects are generally, but not exclusively, associated with historic assets of international, national or regional importance that are likely to suffer a most damaging impact and loss of significance.
- Major: These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process.
- Moderate: These beneficial or adverse effects may be important, but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse effect on a particular historic asset or group of assets.
- Minor: These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project.
- Negligible: No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Limitations of the Assessment

9.39 All readily available data required for the assessment have been acquired and examined.

9.40 No purposive archaeological fieldwork (intrusive or non-intrusive) has been undertaken in connection with the project. This is because current and previous land uses preclude the use of standard fieldwork methodologies. A more bespoke methodology for archaeological examination is likely to be required, based on the detailed review of site geotechnical data along with the appraisal of construction impacts.

9.41 The information gathered to date is considered to provide sufficient information to form the basis of the assessment for EIA purposes.

Baseline Environment

9.42 A detailed description of the known and potential historic environment resources within the defined study areas is presented in Appendix 9.1 of this ES. A summary of this information is presented below, with the locations of identified historic assets indicated on Figures 9.1 and 9.2.

9.43 The Uskmouth Conversion Project and site boundary is located wholly within the Gwent Levels, which comprise former tidal mudflats that have been drained and reclaimed from the Roman period onwards, with some periods of inundation followed by recolonisation.

9.44 Artefacts of Roman date have been recovered from features and deposits at locations adjacent to the project site, suggesting widespread activity in the area which probably included some form of occupation or settlement. This landscape was subsequently reclaimed by the sea and a sequence of alluvial and/or tidal material was deposited, resulting in the Roman land surface being located at around 0.8 – 1.0 m below the early 20th century (pre-industrial) level.

9.45 In the medieval period the area was drained again and was recolonised, with small embanked 'infield' enclosures and potentially canalisation of natural channels. The resultant settlement pattern was one of small villages (such as at Nash) along with dispersed farmsteads and individual properties. Examples of these were previously located within or directly adjacent to the project site.

9.46 The earliest detailed mapping of the project site shows fields surrounded by a sea wall, with some tracks outside the sea wall which provided access to the tidal mudflats. By the late 19th century, several powder magazines had been established close to the shoreline, each one with its own landing stage, and mooring posts were present for the use of vessels laying up here awaiting high tide and access to the docks further upstream.

9.47 The East Usk Branch of the Great Western Railway was extended southwards through the project site in the early 20th century, and during the Second World War a number of military positions were established in the vicinity of the project site, including a Heavy Anti-Aircraft (HAA) battery. The Uskmouth A power station (just west of the project site) was constructed in the early 1950s, with the Uskmouth B power station (within the project site) added in the later part of the same decade.

9.48 There are no designated historic assets within the project site. The nearest listed building is the Church of St Mary at Nash, which is approximately 1.1 km east of the project site (Site **5**) and is listed at Grade I. Several Grade II listed farmhouses and agricultural buildings are present to the north-east (in and around Pye Corner – Sites **10-13**), whilst the Grade II listed West Usk Lighthouse is located to the south-west of the project site, on the opposite side of the River Usk (Site **14**). To the north, beyond Newport Docks, is the Grade I listed transporter bridge (Site **15**) with adjacent Edwardian hotel (listed Grade II – Site **16**) and a small Conservation Area (Site **17**). A moated house site to the north of Goldcliff is a Scheduled Monument and is approximately 2.9 km east of the project site.

9.49 The project site is located just outside the registered Gwent Levels Landscape of Outstanding Historic Interest in Wales, and immediately west of the identified Historic Landscape Character Area (HCLA) 01: Nash/Goldcliff coastal zone.

9.50 The project site is wholly within the Gwent (Caldicot) Levels Archaeologically Sensitive Area designated by Newport City Council.

Future Baseline Conditions

9.51 Changes to the baseline conditions in the future could include amendments to the list of designated assets, e.g. additional designations of scheduled monuments, listed buildings

(including locally listed buildings), Registered Parks and Gardens, Conservation Areas, or amendments to the extent and description of any of these asset types.

9.52 Additional changes could occur as a result of archaeological investigations undertaken with regard to other developments within the study area or as part of more extensive programmes of research in the area.

9.53 Work has been undertaken to consider the likely effects of climate change on the historic environment (Powell *et al*., 2012). This identified historic assets lying below the 1 metre contour as at risk from rising sea levels and more frequent storm surges.

Mitigation Measures Adopted as Part of the Project

9.54 No specific mitigation measures regarding the avoidance or reduction effects on the historic environment have been included within the Uskmouth Conversion Project design process.

9.55 A programme of archaeological investigation may be undertaken ahead of and/or during construction. Such work is not strictly 'mitigation' as it would not remove or reduce the impact of the Uskmouth Conversion Project construction phase on buried archaeological remains. However, this programme should be seen as 'offsetting' the impact and effect on historic assets on buried archaeological remains if any are found to be present and to be at risk from construction impacts. The programme of archaeological investigation would be submitted to NCC and the archaeological advisers to the planning authority for approval.

Assessment of Construction Effects

9.56 This section describes the impacts and effects that would occur during the Uskmouth Conversion Project, construction phase including the Proposed Development and Power Station Upgrade.

9.57 This includes impacts such as the infilling and/or demolition (total or partial) of historic assets, as well as effects resulting from changes within the settings of historic assets and with defined historic areas. The key effects are summarised below in Table 9.5.

9.58 The temporal variation of effects is identified using the following defined terms where appropriate:

- Short-term: A period of months, up to one year;
- Medium-term: A period of more than one year, up to five years; and
- Long-term: A period greater than five years.

9.59 The construction of the Uskmouth Conversion Project could lead to physical impacts on any buried archaeological remains that may be present within the project site. No such remains are known, however their presence cannot be ruled out and certainly features and deposits of Roman date have previously been found at locations adjacent to the project site. These is also some potential for the presence of features and deposits of medieval and post-medieval date, and for remains associated with military activity during the Second World War.

9.60 Buried archaeological remains of Roman (and also prehistoric) date could be up to medium value or sensitivity. Such remains are likely to be widespread and the physical impact would only be within small areas of the project site (where deeper foundations are required etc), so the magnitude of impact is likely to be low and the significance of effect would be permanent minor adverse. This is not a significant effect in EIA terms.

9.61 Buried archaeological remains of medieval, post-medieval and modern (including Second World War) date would be of low value or sensitivity. The physical impact would only be within small areas of the project site (where deeper foundations are required etc), so the magnitude of impact is likely to be low and the significance of effect would be permanent negligible or minor adverse. This is not a significant effect in EIA terms.

9.62 However, in the event that a discrete and rare type of structure or artefact is present within the project site (for example a waterlogged timber structure or vessel), this may be of high value or sensitivity, and the magnitude of impact may be as great as high. In that situation, the consequent significance of effect would be permanent major or even substantial adverse, which would be a significant effect in EIA terms.

9.63 As set out above and if considered appropriate, a programme of archaeological investigation would be agreed with the archaeological advisers to the planning authority. This would enable a better understanding of the presence, nature and date of any archaeological remains within those parts of the project site where construction activities are planned, and allow for the development of an appropriate strategy to avoid, reduce or offset any impacts that could occur as a result of construction.

9.64 Construction impacts resulting from visual change and also noise within the settings of historic assets are considered to be the same as those occurring during operation and are therefore set out in the following section of this chapter. It is acknowledged that construction noise could potentially exceed operational noise for limited key activities within the construction programme, but this would be temporary and for very short periods. Standard best practice measures would be implemented to ensure that construction noise impacts would be controlled and managed so as to avoid significant adverse effects.

Further Mitigation

9.65 No further mitigation is proposed regarding effects on the historic environment during construction.

Future Monitoring

9.66 No future monitoring is proposed regarding effects on the historic environment during construction of Proposed Development and Power Station Upgrade.

Accidents and/or Disasters

9.67 No potential construction-related accidents or disasters relevant to the historic environment have been identified.

Assessment of Operational Effects

9.68 The taller elements of the Uskmouth Conversion Project would be visible in views from and across the Grade I listed Church of St Mary at Nash (Site **5**). These elements would be seen in front of, adjacent to, and in association with, the buildings and stacks of the existing Uskmouth Power Station and other infrastructure including numerous pylons and overhead electrical cables, also the large wind turbines located within the southern part of Newport Docks. The image from Viewpoint 12 in the Landscape and Visual Assessment (Chapter 8 of this ES) is taken from the churchyard and shows the location of the project in relation to the existing setting of the church. The Uskmouth Conversion Project would not affect the current relationship that the church has with the churchyard or the village or any part of the surrounding farmland. Overall, it is considered that the magnitude of impact on this historic asset of high value or sensitivity as a result of the operation of the Uskmouth Conversion Project would be negligible and the subsequent significance of effect would be **minor adverse** (reversible). This is not a significant effect in EIA terms.

9.69 No part of the Uskmouth Conversion Project would be visible in views from and across the Grade II listed Fair Orchard house and adjacent barn and other agricultural buildings near to Pye Corner (Sites **10** and **11**), or the Grade II listed Pye Corner Farmhouse (Site **12**) and Tatton Farm (Site **13**), or the Scheduled moated house site to the north of Goldcliff. This is due to the current

vegetation along with the topography of the area. Consequently, the significance of effect in each case would be **no change**. This is not a significant effect in EIA terms.

9.70 The taller elements of the Uskmouth Conversion Project would be visible in views from and across the Grade II listed West Usk Lighthouse (Site **14**). These elements would be seen behind, adjacent to, and in association with, the buildings and stacks of the existing Uskmouth Power Station and other infrastructure including numerous pylons and overhead electrical cables, also the large wind turbines located within the southern part of Newport Docks. The image from Viewpoint 7 in the Landscape and Visual Assessment (Chapter 8 of this ES) is taken from the churchyard and shows the location of the project in relation to the existing setting of the former lighthouse. The project would not affect the current relationship that the church has with the river or the sea wall. Overall, it is considered that the magnitude of impact on this historic asset of medium value or sensitivity as a result of the operation of the Uskmouth Conversion Project would be negligible and the subsequent significance of effect would be **negligible adverse** (reversible). This is not a significant effect in EIA terms.

9.71 The taller elements of the Uskmouth Conversion Project would be visible in views from and across the Grade I listed Newport Transporter Bridge (Site **15**). These elements would be seen in adjacent to, and in association with, the buildings and stacks of the existing Uskmouth power stations and other infrastructure including numerous pylons and overhead electrical cables, also the large wind turbines located within the southern part of Newport Docks and other structures within the docks. The image from Viewpoint 14 in the Landscape and Visual Assessment (Chapter 8 of this ES) is taken from ground level adjacent to the transporter bridge and shows the location of the project in relation to the existing setting of the bridge. The Uskmouth Conversion Project would not affect the current relationship that the transporter bridge has with the river, or the dockyard, or the associated workers' housing in this area. Overall, it is considered that the magnitude of impact on this historic asset of high value or sensitivity as a result of the operation of the Uskmouth Conversion Project would be negligible and the subsequent significance of effect would be **minor adverse** (reversible). This is not a significant effect in EIA terms.

9.72 No part of the Uskmouth Conversion Project would be visible in views from and across the Grade II listed Waterloo Hotel (Site **16**) and the Waterloo Conservation Area (Site **17**). This is due to the existing built development at the entrance to Alexandra Docks and also within the docks. Consequently, the significance of effect in each case would be **no change**. This is not a significant effect in EIA terms.

9.73 The Uskmouth Conversion Project site boundary is within a landscape characterised by 20th and 21st century industrial use, including power station and associated transmission networks. It is adjacent to the Gwent Levels Landscape of Outstanding Historic Interest (LOHI) in Wales, however the descriptive text for the Historic Landscape Character Area (HLCA) closest to the project site acknowledges that this part of the HLCA is overshadowed by development at Uskmouth and Newport. The Uskmouth Conversion Project would be seen and experienced as part of that existing industrial development. Overall, it is considered that the magnitude of impact on the Gwent Levels LOHI (which is a historic asset of high value or sensitivity) as a result of the operation of the Uskmouth Conversion Project would be no change and the subsequent significance of effect would be **no change**. This is not a significant effect in EIA terms.

Further Mitigation

9.74 No further mitigation is proposed regarding effects on the historic environment during the operational stage of the Uskmouth Conversion Project.

Future Monitoring

9.75 No future monitoring is proposed regarding effects on the historic environment once the Uskmouth Conversion Project is operational.

Accidents/Disasters

9.76 No potential operational accidents or disasters relevant to the historic environment have been identified.

Potential Changes to the Assessment as a Result of Climate Change

9.77 Future changes to baseline conditions resulting from climate change would not lead to any changes to the significance of any operational effects of Uskmouth Conversion Project described above.

Assessment of Cumulative Effects

9.78 No projects have been identified which could result in cumulative effects on any of the historic assets assessed within this chapter of the ES.

Inter-relationships

9.79 The topic of Historic Environment has inter-relationships with other topics considered within this ES, most specifically with Chapter 8: Landscape and Visual Resources. However, the focus in Chapter 5 is on the likely effects of the project on the character of the current landscape whereas this chapter assess the likely effects on the character of the historic landscape.

Summary of Effects

9.80 The key effects are summarised below in Table 9.5. The assessment has found that the only potential significant adverse effect with regard to the historic environment would occur as a result of physical impact during construction on a discrete and rare type of structure or artefact (for example a waterlogged timber structure or vessel), although no such structures or artefacts are currently known to be present within the project site. The is also the potential for minor adverse effects on buried archaeological remains of all periods from prehistoric through to modern.

9.81 If considered appropriate, a programme of archaeological investigation would be submitted to NCC and the archaeological advisers to the planning authority for approval. This would enable a better understanding of the presence, nature and date of any archaeological remains within those parts of the project site where construction activities are planned, and allow for the development of an appropriate strategy to avoid, reduce or offset any impacts that could occur as a result of construction.

9.82 During the operational phase of the Uskmouth Conversion Project, there would be minor adverse effects on the Church of St Mary (Nash) and the Newport Transporter Bridge (both Grade I listed buildings), and a negligible adverse effect on the Grade II listed West Usk Lighthouse. In each case this is caused by a (reversible) change within their setting.

References

Cadw (2017a) Heritage Impact Assessment in Wales.

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Cadw, Countryside Commission for Wales, Welsh Assembly Government (2007) Guide to Good Practice on using the Register of Landscapes of Historic Interest in Wales in the planning and development process, 2nd edition.

Highways England, Transport Scotland, Welsh Government, Department for Infrastructure Northern Ireland (2019a) Design Manual for Roads and Bridges, LA104, Environmental assessment and monitoring.

Highways England, Transport Scotland, Welsh Government, Department for Infrastructure Northern Ireland (2019b) Design Manual for Roads and Bridges, LA106, Cultural heritage assessment.

Powell, J, Murphy, K, Ings, M and Chambers, F. M. (2012) A Strategic Approach for Assessing and Addressing the Potential Impact of Climate Change on the Historic Environment of Wales, Report to Historic Environment Group – Climate Change Subgroup. CCRI: Gloucester.

Welsh Assembly Government (2011) Conservation Principles for the Sustainable Management of the Historic Environment in Wales.

Welsh Government (2018) Planning Policy Wales, Edition 10.

Welsh Government (2017) Technical Advice Note 24: The Historic Environment.

Table 9.5: Summary of Likely Environmental Effects on the Historic Environment

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact	Significance of effect	Significant /Not Significant	Notes
Construction phase							
Buried Archaeological Remains (Prehistoric / Roman)	Up to Medium	Loss of or damage to archaeological features or deposits	Permanent	Low	Minor adverse	Not significant	Effect partially offset through programme of archaeological investigation.
Buried Archaeological Remains (Medieval / Post-medieval / Modern)	Low	Loss of or damage to archaeological features or deposits	Permanent	Low	Up to minor adverse	Not significant	Effect partially offset through programme of archaeological investigation.
Buried Archaeological Remains – waterlogged timber structure or vessel	High	Loss of or damage to archaeological features or deposits	Permanent	Up to high	Up to substantial adverse	Significant	Effect partially offset through programme of archaeological investigation.
Operational phase							
Grade I listed Church of St Mary, Nash	High	Change within setting leading to loss of significance	Long-term (reversible)	Negligible	Minor adverse	Not significant	
Fair Orchard house and adjacent agricultural buildings	Medium	Change within setting leading to loss of significance	Long-term (reversible)	No change	No change	Not significant	
Pye Corner Farmhouse	Medium	Change within setting leading to loss of significance	Long-term (reversible)	No change	No change	Not significant	
Tatton Farm	Medium	Change within setting leading to loss of significance	Long-term (reversible)	No change	No change	Not significant	
Scheduled moated house site north of Goldcliff	High	Change within setting leading to loss of significance	Long-term (reversible)	No change	No change	Not significant	
West Usk Lighthouse	Medium	Change within setting leading to loss of significance	Long-term (reversible)	Negligible	Negligible adverse	Not significant	

Newport Transporter Bridge	High	Change within setting leading to loss of significance	Long-term (reversible)	Negligible	Minor adverse	Not significant
Waterloo Hotel	Medium	Change within setting leading to loss of significance	Long-term (reversible)	No change	No change	Not significant
Waterloo Conservation Area	Medium	Change within setting leading to loss of significance	Long-term (reversible)	No change	No change	Not significant
Historic landscape character	High	Change within setting leading to loss of significance	Long-term (reversible)	No change	No change	Not significant

10 TRAFFIC AND TRANSPORT

Introduction

10.1 This chapter assesses the environmental effects of the proposed Uskmouth Conversion Project in terms of transport.

10.2 The chapter describes the assessment methodology, the transport policy context, the existing baseline conditions at the site and surroundings, the transport aspects of the construction and operation of the Uskmouth Conversion Project and any required transport mitigation measures to prevent, reduce or offset any significant adverse effects.

10.3 The assessment is underpinned by an appraisal of transport conditions along the local transport network in scenarios that consider the conditions both with and without the Uskmouth Conversion Project . The baseline conditions have been established through analysing the local transport network and via traffic surveys, while the traffic that would be generated related to the construction and operation of the Uskmouth Conversion Project has been evaluated by appraising the trip generation characteristics of the Uskmouth Conversion Project.

10.4 The analysis presented within this chapter is supported by a Transport Assessment (TA) which is included at **Appendix 10.1** of this Environmental Statement (ES), hereafter referred to as the appended TA.

Assessment Methodology

Planning Policy Context

10.5 A review of national and local policies and guidance that the Uskmouth Conversion Project s been considered against is provided in Section 2 of the appended TA attached at **Appendix 10.1.**

10.6 The following planning and guidance documents have been considered:

- Planning Policy Wales Edition 10 (2018);
- Technical Advice Note 18: Transport (2007);
- Sustainable Development Scheme 'One Wales: One Planet' (2009);
- Active Travel (Wales) Act (2013); and
- Newport City Council Local Transport Plan (January 2015).

10.7 Full details of these are set out in the appended TA at Appendix 10.1.

Relevant Guidance

10.8 The Traffic and Transport assessment has followed the methodology set out in Chapter 4: Environmental Assessment Methodology. Specific to this chapter, the following guidance documents have also been considered:

- Guidelines for the Environmental Assessment of Road Traffic (Institute of Environmental Management and Assessment (IEMA), 1993); and
- Design Manual for Roads and Bridges (DMRB), Volume 11 Environmental Impact Assessment (Highways Agency et al, 2008).

Study Area

10.9 Uskmouth Power Station is accessed from West Nash Road, beyond which traffic generated at the site travels along Nash Road, Meadows Road and the A4810. The A4810 provides a principal

road between the A48 and the M4 Junction 23A and is a dual carriageway road at its western end and a single carriageway road at its eastern end. The study area for this assessment considers West Nash Road, Nash Road, Meadows Road and the A4810.

Baseline Methodology

10.10 The baseline environment has been established by analysing the local transport network, undertaking new traffic surveys, obtaining recent traffic survey data and obtaining Personal Injury Accident (PIA) data along the adjoining highway network.

10.11 Traffic surveys were undertaken by an independent survey company to obtain background traffic flows at key junctions and highway links across the local highway network. The surveys comprised Manual Classified Counts (MCCs) at junctions, and Automatic Traffic Counters (ATCs) on sections of road between junctions. The ATC surveys were placed between Friday 18th October 2019 and Thursday 24th October 2019, and their locations are as follows:

- West Nash Road - west of Nash village;
- West Nash Road - east of Nash village;
- Nash Road – between West Nash Road and Meadows Road junctions;
- Meadows Road - South of Industrial Park;
- Meadows Road - North of Industrial Park;
- A4810 west of the Meadows Road Roundabout; and
- A4810 Queens Way east of the Glan Llyn Roundabout.

10.12 MCCs were undertaken at the A4810 / Meadows Road roundabout, Nash Road / Meadows Road priority junction, and Nash Road / West Nash Road priority junction on Tuesday 22nd October 2019 between 07:00 and 19:00.

10.13 Personal Injury Accident (PIA) data was obtained from *Crashmap* for the most recent five-year period for the surrounding highway network. The study area incorporated the access route to the site from the A4810, therefore included West Nash Road, Nash Road and Meadows Road to the A4810 junction.

Consultation

10.14 Details of relevant consultation with the Local Highway Authority (LHA) are set out in **Table 10.1.**

Table 10.1: Consultation Responses Relevant to this Chapter

Date	Consultee and Issues Raised	How/ Where Addressed
Date	Consultee and Issues Raised	How/ Where Addressed
1st July 2019	Pre-application advice from Traffic, Transport & Development Officer. Officer advised that a Transport Assessment should be prepared.	A Transport Assessment is prepared at Appendix 10.1
19th December 2019	Meeting with Senior Traffic, Transport and Development Officer and Principal Planning Officer. Traffic and Transport Officer recognised access route and generally satisfied if no net increase in previous HGV movements. Traffic and Transport Officer satisfied with scope of assessment.	Uskmouth Power Station and previous HGV movements set out in Chapter 10 with more detail in Section 6 of the appended TA.

Assessment Criteria and Assignment of Significance

10.15 In accordance with the 'Guidelines for the Environmental Assessment of Road Traffic' (IEMA, 1993), the significance of effects has been assessed by considering the interaction between the magnitude of the impact and the sensitivity of the receptor in the vicinity of transport corridors.

10.16 The construction assessment is based on a reasonable worse case construction scenario which considers the construction of the full 220 MW conversion over 18 months, including ground preparation for silo foundations and rail unloading facility. The development is anticipated to utilise standard construction methodologies. For assessment purposes, a peak construction year of 2022 has been assessed.

10.17 A future operational year of 2026 has been assumed for the operational assessment, within the appended TA. The Uskmouth Conversion Project is scheduled to commence operations in 2022; however, the Newport Local Development Plan (NLDP), adopted in January 2015, runs from 2011 to 2026. NLDP sets out the land allocations for housing, employment and educational sites which could be considered as part of the committed and cumulative assessment. Therefore, as 2026 marks the end of the Local Plan, a future operational year of 2026 has been assessed.

10.18 This assessment has compared the future baseline situations taking into account other schemes that are likely to affect the future baseline conditions, against scenarios which includes the proposed development.

10.19 The IEMA guidelines recommend two rules to be considered when assessing the impact of development traffic on a road link:

- Rule 1: Include highway links where traffic flows will increase by more than 30% (or the number of heavy goods vehicles (HGV) will increase by more than 30%); and
- Rule 2: Include any other specifically sensitive areas where total traffic flows have increased by 10% or more.

10.20 The above guidance is based upon research, knowledge and experience of environmental effects of traffic, with less than a 30% increase generally resulting in indiscernible changes in the environmental effects of traffic. At a simple level, the guidance considers that projected changes in total traffic flow of less than 10% creates no discernible environmental effect, hence the second threshold as set out in Rule 2.

10.21 In cases where the thresholds are exceeded, Column 3 in Table 2.1 of the IEMA guidelines set out a list of environmental effects which should be assessed for their magnitude of change.

10.22 Definitions of each of the potential effects identified in the IEMA guidelines are summarised below along with explanatory text relating to assessment criteria to determine the magnitude of impact. It is on this basis that the assessment in this chapter has been undertaken.

10.23 It is acknowledged at paragraph 2.4 of the IEMA guidelines that not all the effects listed in Column 3 of Table 2.1 would be applicable to every development. An analysis of the surrounding highway network has been undertaken to assist with the assessments.

Noise and Vibration

10.24 Potential effects relating to noise and vibration as a result of traffic are assessed in Chapter 11.

Air Pollution

10.25 Potential effects relating to air quality due to development related traffic are assessed in Chapter 12.

Dust and Dirt

10.26 All vehicle loads will be managed in accordance with the Department for Transport Code of Practice for Safety of Loads on Vehicles. Therefore, controlling all load related risks to UK good practice and controlling highway dust and dirt contamination to acceptable levels.

10.27 Problems with dust and dirt are unlikely to occur at distances greater than 50m from the highway (IEMA, March 1993). The site access road is hard surfaced and there is at least 300m of internal access road between the power station and the highway. Dust and dirt transported from the development site onto the highway is therefore not expected.

10.28 During construction, all, all vehicles will have load area covered or sealed where necessary to prevent dust or debris leaving the load area. All HGV's will be visually assessed and where necessary passed through wheel wash before leaving site.

10.29 During commercial operations, the vast majority of HGVs will be sealed road tanker design. Those that are not will have load areas covered or sealed where necessary to prevent dust or debris leaving the load area. All traffic will use site roads which are metaled road surfaces so wheels will not pick up dirt on site, avoiding the need for wheel washing.

Visual Effects

10.30 The visual effect of traffic is complex and subjective and includes both visual obstruction and visual intrusion. The IEMA guidelines states that obstruction refers to the blocking of views, by structures for example, and intrusion refers to the more subjective impact by traffic on an area of scenic beauty or of historical or conservation interest.

10.31 IEMA guidelines state that increases in the number of large or high-sided vehicles may have an intrusive impact in areas of scenic beauty and in historic or conservation areas and acknowledges that in the majority of situations the changes in traffic resulting from a development will have little effect.

10.32 Uskmouth Power Station was historically made up of two power plants: Uskmouth A (decommissioned in 1990's) and Uskmouth B coal-fired power stations. The proposed development would be implemented entirely within the site of the existing Uskmouth B coal-fired power station, referred to as Uskmouth Power Station.

10.33 Visual receptors in the local area include Great House, Moorcroft Farm and Ty-Portra, which are located approximately 650 m south east of the proposed development site along West Nash Road. There is also a dwelling, Arch Cottage, approximately 1km to the east of the site, and residential receptors are also located in Nash approximately 1.15 km east of the proposed development. Further residential receptors are located along Nash Road and Goldcliff Road approximately 1.66 km east of the development. The sailing club which is approximately 450 m to the north west is the closest recreational visual receptor group.

10.34 No Public Rights of Way (PRoW) run through the site. However, visual receptors may be present on a temporary basis on the Wales Coastal Path (route code: 401/16/1) which routes along approximately 30m of south eastern boundary of the proposed development. Other public rights of way in the vicinity of the proposed development site are footpath 401/8/2 located approximately 1.14 km east, footpath 401/9/2 located approximately 1.06 km east, and footpath 401/13/1 located approximately 1.42 km south east.

10.35 The visual effects of the Uskmouth Conversion Project as a whole are considered in Chapter 8. and this includes consideration to traffic generated by Uskmouth Conversion.

Severance

10.36 Severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery. The term is used to describe a complex series of factors that separate

people from places and other people. Severance can also result from difficulty in crossing a heavily trafficked road (IEMA, March 1993).

10.37 The guidance indicates that severance effects are considered 'slight', 'moderate' and 'substantial' with changes in traffic flows of 30%, 60% and 90% respectively.

10.38 Where relevant, effects on severance are considered within this chapter.

Driver Delay

10.39 Where roads affected by a development are at or near capacity, the traffic associated with such development can cause or add to vehicle delays. Some roads are typically at or near capacity during the weekday AM (typically 08:00 to 09:00) and PM (typically 17:00 to 18:00) peak hours. Other sources of delay for non-development traffic can include:

- At the site access where there will be additional turning movements;
- On the roads passing the site where there is likely to be additional traffic;
- At other key intersections along the road which might be affected by increased traffic; and
- At junctions where the ability to find gaps in the traffic may be reduced, thereby lengthening delays.

10.40 Where relevant, the effects on driver delay are considered within this chapter and the magnitude of the impact identified using professional judgement and the advice provided in the above guidance document.

Pedestrian Delay

10.41 Highly trafficked roads and changes to the volume or speed of traffic may affect the ability of people to cross roads. The IEMA guidelines advise that pedestrian delay is perceptible or considered significant beyond a lower delay threshold of 10 seconds, for a link with no crossing facilities. A 10 second pedestrian delay in crossing a road broadly equates to a link traffic flow (all vehicle movements) of approximately 1,400 vehicles per hour (IEMA, March 1993).

10.42 Where relevant, the effects on pedestrian delay are considered within this chapter and the magnitude of impact identified using professional judgement and the advice provided in the guidance document IEMA, March 1993.

Pedestrian Amenity

10.43 The term pedestrian amenity is broadly defined as the relative pleasantness of a pedestrian journey. It is considered to be affected by traffic flow, speed and composition as well as footway width and the separation/protection from traffic, and encompasses the overall relationship between pedestrians and traffic. There are no commonly agreed thresholds for quantifying the significance of changes in pedestrian amenity, although the IEMA guidelines suggest a tentative threshold for judging the significance of changes in pedestrian amenity where the traffic flow (or its HGV component) is halved or doubled.

10.44 Pedestrian amenity also includes fear and intimidation which is the most emotive and difficult effect to quantify and assess. There are no commonly agreed thresholds for quantifying the significance of changes in pedestrian amenity, although the IEMA guidelines refer to a useful study which could be referenced when considering any effect. These thresholds are replicated in Table 10.2.

Table 10.2: Example of Fear and Intimidation

Degree of Hazard	Average Traffic Flow over 18 hour day (veh/hour)	Total 18 hour heavy goods vehicle flow	Change in Average Speed over 18 hour day (mile/hour)
Extreme	1,800 +	3,000 +	20 +
Great	1,200–1,800	2,000–3,000	15-20
Moderate	600–1,200	1,000–2,000	10-15

10.45 Where relevant, the effects on pedestrian amenity are considered within this chapter and the magnitude of impact identified using the tentative threshold where the traffic flow (or its HGV component) is halved or doubled.

Accidents and Safety

10.46 It is possible to estimate the effects of increased traffic on accidents and safety from existing accident records, national statistics, the type and quantity of traffic generated, journey lengths and the characteristics of the routes in question.

10.47 Where relevant, the effects on accidents and safety are considered within this chapter and the magnitude of impact identified using professional judgement and the advice provided in the IEMA (March 1993) guidance document.

Hazardous Loads

10.48 Some developments may involve transporting hazardous loads by road such as special wastes, toxic materials and chemicals. All such hazardous material will be transported using specialist sealed bulk container vehicles in accordance with the relevant health and safety regulations

10.49 Where relevant, the effects of the transportation of hazardous material are considered within this chapter.

Receptor Sensitivity/Value

10.50 Paragraph 2.5 of the IEMA guidelines explains that locations which may be sensitive to changes in traffic conditions could be:

- people at home;
- people in work places;
- sensitive groups such as children, the elderly or the disabled;
- sensitive locations such as hospitals, churches, schools or historical buildings;
- people walking or cycling;
- open spaces;
- recreational sites;
- shopping areas;
- sites of ecological/nature conservation value; and
- sites of tourist/visitor attraction.

10.51 As a general guide, the determination of receptor sensitivity is based on the criteria of value, adaptability, and tolerance. In terms of transport, receptors include people that are living in, using facilities and using transport networks in the area.

10.52 Given that all persons are deemed to be of equal value, sensitivity to changes in transport conditions is generally focussed on vulnerable user groups who are less able to tolerate, adapt to or recover from changes. **Table 10.3** summarises the broad criteria for identifying receptor sensitivity.

Table 10.3: Definitions of Sensitivity

Sensitivity	Typical Descriptors
Very High	Very High: Those receptors with high sensitivity with site-specific reasons for being particularly sensitive to changes in traffic flow e.g. community with high incidence of mobility impairment requiring to cross roads to access essential facilities
High	High: Receptors of greatest sensitivity to traffic flows e.g. schools, colleges, playgrounds, accident black spots, urban / residential roads without footways that are used by pedestrians
Medium	Medium: Traffic flow sensitive receptors including e.g. congested junctions, doctors surgeries, hospitals, shopping areas with roadside frontage, roads with narrow footways, un-segregated cycle ways, community centres, parks, recreation facilities, retirement homes
Low	Low: Receptors with some sensitivity to traffic flow e.g. places of worship, public open space, nature conservation areas, listed buildings, tourist attractions and residential areas with adequate footway provision
Negligible	Receptors with low sensitivity to traffic flows and those sufficiently distant from affected roads and junctions

10.53 Highway links with descriptions of high or medium sensitivity will be considered against the Rule 2 threshold described above. Other links with descriptions of low or negligible sensitivity will be considered against the Rule 1 threshold. Where necessary, professional judgement has been applied in identifying the relevant category for each link.

Magnitude of Impact

10.54 The criteria for defining magnitude in this chapter are based upon the advice contained within the IEMA guidelines and as defined in **Table 10.4.**

Table 10.4: Definitions of Magnitude

Sensitivity	Typical Descriptors
High	Substantial or total loss of capability for movement along or across transport corridors, loss of access to key facilities and loss of highway safety. Severe delays to travellers (adverse).
	Large scale improvement in the capability for movement along and across transport corridors, major improvement in access to key facilities, in highway safety and in delays to travellers (beneficial).
Medium	Moderate loss of capability for movement along or across transport corridors, loss of access to key facilities and loss of highway safety. Severe delays to travellers (adverse).
	Moderate improvement in the capability for movement along and across transport corridors, major improvement in access to key facilities, in highway safety and in delays to travellers (beneficial).
Low	Some measurable loss of capability for movement along and across transport corridors, some measurable loss of access to key facilities and some measurable loss of highway safety. Some measurable increase in delays to travellers (adverse).
	Some measurable increase in the capability for movement along and across transport corridors, some measurable increase in access to key facilities and some measurable increase in highway safety. Some measurable increase in delays to travellers. Reduced risk of negative impacts occurring (beneficial).
Negligible	Very minor loss of capability for movement along and across transport corridors, very minor loss of access to key facilities and very minor loss of highway safety. Very minor increase in delays to travellers (adverse).

	Very minor increase in capability for movement along and across transport corridors, very minor increase in access to key facilities and very minor increase in highway safety. Very minor decreases in delays to travellers (beneficial).
No change	No loss of capability for movement along and across transport corridors, no change of access to key facilities and highway safety. No delays to travellers.

Significance of Effects

10.55 The significance of the effect upon traffic and transport is determined by correlating the magnitude of the impact and the sensitivity of the receptor, as shown in **Table 10.5**. Where a range of significance of effect is presented in **Table 10.5**, the final assessment for each effect is based upon expert judgement.

10.56 For the purposes of this assessment, any effects with a significance level of moderate or less will be concluded to be not significant in terms of the EIA Regulations.

Table 10.5: Assessment Matrix

Sensitivity	Magnitude of Impact				
	No Change	Negligible	Low	Medium	High
Negligible	No change	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	No change	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	No change	Negligible or Minor	Minor	Moderate	Moderate or Major
High	No change	Minor	Minor or Moderate	Moderate or Major	Major or Substantial
Very high	No change	Minor	Moderate or Major	Major or Substantial	Substantial

Limitations of the Assessment

10.57 The baseline data and survey data have been obtained from recognised sources and methodologies with locations and types of surveys discussed with NCC in advance. In this sense, there are only limited limitations to their use. The traffic survey data is considered representative of current conditions.

10.58 The development traffic flows are estimated using reasonable data and assumptions the assessments are undertaken in accordance with recognised guidance and best practice. As such, there are few limitations to the assessments.

Baseline Environment

10.59 The following paragraphs provide an overview of the surrounding highway network providing access to Uskmouth Power Station.

Highway Network

West Nash Road

10.60 Uskmouth Power Station is currently accessed from West Nash Road, a single carriageway road generally 6-6.5m in width. West Nash Road primarily has the typical characteristics of a rural road with a 60mph speed limit, no footways or street lighting, with grass verges and hedgerow on both sides of the carriageway.

10.61 As West Nash Road routes east through Nash and towards the priority junction with Nash Road / Goldcliff Road, it becomes a 30mph single carriageway road with a footway and street lighting.

10.62 West Nash Road routes to Nash Road via a priority junction which has recently been improved to accommodate HGVs. A bus stop and post box are located on West Nash Road approximately 15m back from the give-way line. To the immediate south of the junction is a residential dwelling and to the immediate north is Windmill Reen.

Nash Road

10.63 Nash Road routes north from West Nash Road to Meadows Road as a single carriageway road with a 40mph speed restriction, an intermittent footway on its eastern side, no street lighting, no parking restrictions and some frontage accesses. Broadly halfway between West Nash Road and Meadows Road, Nash Road narrows to a single track, however, there are suitable advance warning signs and there is clear forward visibility at both ends to enable vehicles to give way to one-another.

10.64 Nash Road continues north where it forms a priority junction with Meadows Road, where Nash Road continues north-west along the minor arm of the junction, where it routes to an industrial area, residential area, and high school and college campus. The speed limit of Nash Road reduces to 20mph within the vicinity of the school, with additional traffic calming measures in place such as speed bumps and road narrowings. Nash Road continues north to join the A48 Southern Distributor Road via a four-arm junction.

Meadows Road

10.65 Meadows Road routes broadly north to south between Nash Road and the A4810, with which it forms the southern arm of a four-arm roundabout. Meadows Road is a single carriageway road with a combined footway/cycleway along its eastern side, an intermittent footway along its western side, street lighting, no parking restrictions and a 40mph speed restriction. Meadows Road is an established HGV route providing access to the large industrial park between Meadows Road and the A4 Southern Distributor Road.

A4810 Queen's Way / Queensway Meadows

10.66 The A4810 routes broadly east-west between the M4 Junction 23A, and the A48. The A4810 is a dual carriageway road with footways, street lighting and a 40mph speed restriction. Approximately 5.5km east of the Meadows Road junction, the A4810 becomes a single carriageway road and continues to the grade-separated junction of the M4 junction 23A roundabout. Approximately 750m to the west, the A4810 Queensway Meadows joins the A48 Southern Distributor Road via a four-arm roundabout.

10.67 The A4810 is also a well-established HGV route, providing access to Meadows Road from the A48 Southern Distributor Road and in turn the M4 west, and from junction 23A of the M4 to the east.

A48 Southern Distributor Road

10.68 The A48 Southern Distributor Road is one of the key roads into Newport, routing from Junction 24 of the M4 to the east, routing west to the south of Newport where it joins the M4 at Junction 28.

10.69 The A48 Southern Distributor Road acts as the Newport southern bypass, and as such carries a large volume of traffic. The A48 routes broadly east-west between junctions 24 and 28 of the M4 and is a dual carriageway road between both junctions. It retains its street lighting and footway along its length.

Pedestrians

10.70 The above sets out the footway provision within the vicinity of the development , which provide links to the whole of the surrounding urban and residential areas.

Cycling

10.71 The nearest National Cycle Route is Route 4, a long distance route between London and Fishguard via Reading, Bath, Bristol, Newport, Swansea, Carmarthen, Tenby, Haverfordwest and St. Davids. Route 4 routes west to east through the south of Newport, with the traffic-free route on Corporation Road to the north of the site. As Route 4 routes south of Corporation Road, the combined foot / cycleway routes away from Corporation Road and routes along a Public Right of Way towards Nash Road.

Traffic Flows

10.72 Traffic surveys were undertaken by an independent survey company to obtain background traffic flows at key junctions and links across the local highway network. The surveys comprised Manual Classified Counts (MCCs) at junctions, and Automatic Traffic Counters (ATCs) on sections of road between junctions. The ATC surveys were placed between Friday 18th October 2019 and Thursday 24th October 2019, and their locations are as follows:

- West Nash Road - west of Nash village;
- West Nash Road - east of Nash village;
- Nash Road – between West Nash Road and Meadows Road junctions;
- Meadows Road - South of Industrial Park;
- Meadows Road - North of Industrial Park;
- A4810 west of the Meadows Road Roundabout; and
- A4810 Queens Way east of the Glan Llyn Roundabout.

10.73 MCCs were undertaken at the A4810 / Meadows Road roundabout, Nash Road / Meadows Road priority junction, and Nash Road / West Nash Road priority junction on Tuesday 22nd October 2019 between 07:00 and 19:00.

10.74 The MCCs and the ATCs undertaken on the public highway, validated well against one-another with regard to the total number of vehicles; however, it was observed that the ATCs were overcounting HGVs in comparison to those counted by the MCCs along West Nash Road, Nash Road, Meadows Road and the A4810.

10.75 ATCs classify vehicles based on a series of criteria which can vary between survey equipment and set up / settings; therefore, the percentage of HGVs was calculated from each MCC and the factor applied to the corresponding ATC to derive the number of HGVs for a weekday. An additional factor was then applied to derive the number of HGVs on a Saturday.

Road Safety

10.76 Personal Injury Accident (PIA) data was obtained from *Crashmap* for the most recent five-year period for the surrounding highway network. The study area incorporated the access route to the site from the A4810, therefore included West Nash Road, Nash Road and Meadows Road to the A4810 junction.

10.77 There were two injury accidents during the most recent five-year period, of which there was one slight injury accident and one serious injury accident. There were no fatal injury accidents. Both injury accidents occurred at different locations, as described below:

- One slight injury accident occurred on Meadows Road, approximately 250m south of the industrial estate access. The accident occurred in January 2017 and involved one vehicle where the driver lost control and collided with an item of street furniture; and
- One serious injury accident occurred at the Meadows Road / Clearwater Road junction. The accident occurred in April 2018 and involved three cycles, with one cyclist shunting another from the rear and resulting in a serious injury to one cyclist.

10.78 From the analysis undertaken, there are a low number of injury accidents and all occurred at different locations, which suggests there are no aspects with the local highway network that contribute to a road safety issue.

Receptors

10.79 Receptors to be considered within the impact assessment were selected based upon the access route to be taken by vehicle movements generated by Uskmouth Conversion Project.

10.80 **Table 10.6** highlights the qualification of the sensitivity assessment of each receptor group for the proposals and each link is shown on **Figure 2.**

Table 10.6: Sensitivity of Receptors

Link Sensitivity		
Link	**Sensitivity**	**Qualification**
West Nash Road – west of Nash village	Low	National Speed Limit (NSL) single carriageway road with no street lighting or footways, but with limited pedestrian demand. Speed limit drops to 30mph near Nash village. Provides access to some dwellings, RSPB Newport Wetlands, wastewater treatment facility and power station. Established HGV use.
West Nash Road – east of and inclusive of Nash village	Low	Narrow footway and street lighting on southern side of carriageway, commensurate with the limited pedestrian demand. 30mph speed limit, which continues to the Nash Road junction, with a bus stop and post box on the north side of the carriageway. Provides access to residential dwellings and a couple of residential roads and Nash village hall lies to the immediate south. Established HGV use.
Nash Road – between West Nash Road and Meadows Road junctions	Low	40mph single carriageway road from the West Nash Road junction. Narrow footway with no street lighting on the eastern side of the carriageway. Provides access to several residential dwellings at Julian's Reen, with footway provision; however, footway provision terminates here and there is limited pedestrian demand. There are few sensitive receptors as Nash Road routes north. Established HGV use
Meadows Road – south of industrial park	Low	Lit foot/cycleway on both sides of the carriageway set back from the main carriageway by grass verges. Provides direct access to the industrial estate. Established HGV use
Meadows Road – north of the industrial park	Low	Lit foot/cycleway on both sides of the carriageway, primarily set back from the main carriageway by grass verges. Bus stops are located on both sides of the carriageway with no pedestrian crossing between them. Provides direct access to the industrial estate. Established HGV use
A4810 west of the Meadows Road Roundabout	Low	Dropped kerbs at the junction travelling westbound providing an informal pedestrian crossing point. Provides access to retail park via a signalised priority junction.

		Established HGV use
A4810 Queens Way east of the Meadows Road junction	Negligible	Dual carriageway with negligible sensitive receptors. Combined foot/cycleway on north side of the carriageway. Established HGV use

10.81 On the basis of the above, all links are assessed against the Rule 1 threshold described above, with an assessment of highway links where traffic flows will increase by more than 30%, or the number of heavy goods vehicles (HGV) will increase by more than 30%.

Future Baseline Conditions

10.82 In accordance with the 'Guidelines for the Environmental Assessment of Road Traffic' (IEMA, 1993), the significance of effects have been assessed by considering the interaction between the magnitude of the impact and the sensitivity of the receptor. To ensure a robust assessment, this assessment has compared the future operational baseline year (2026), taking into account other schemes that are likely to affect the future baseline conditions, against a scenario which includes the Uskmouth Conversion Project.

10.83 This baseline position does not include for any power generation at Uskmouth Power Station and therefore the baseline position does not include for any HGV movement associated with such. This represents a robust assessment. If the baseline position was to include HGV movements associated with power generation at Uskmouth Power Station, then such HGV movement would be similar to those which are subject to this assessment and this application. Such a baseline scenario would mean that this application would result in no net change in HGV movements along the access route.

Future Assessment Years

10.84 The Uskmouth Conversion Project construction assessment is based on a reasonable worse case construction scenario which considers the construction of the full 220 MW conversion over 18 months including ground preparation for silo foundations and rail unloading facility. The development is anticipated to utilise standard construction methodologies. A peak construction year of 2022 has been assessed within the appended TA.

10.85 The future operational year of 2026 has been assumed for the Uskmouth Conversion Project operational assessment, within the appended TA. The operational Uskmouth Conversion Project is scheduled to commence operation in 2022, the Newport Local Development Plan (NLDP), adopted in January 2015, runs from 2011 to 2026. NLDP sets out the land allocations for housing, employment and educational sites which could be considered as part of the committed and cumulative assessment. Therefore, as 2026 marks the end of the Local Plan, a future year of 2026 has been assessed.

10.86 As part of the assessments, committed and cumulative development sites are also considered. Developments that already have planning consent have already been through the assessment process and have identified any highway and transport improvements that may or may not be necessary to mitigate their impact. There is no further opportunity for these developments to provide additional highway or transport mitigation and so these developments and their highway and transport schemes are treated as committed within any future year scenarios.

Construction

10.87 The Uskmouth Conversion Project construction phase is predicted to be over an 18 month period to 2021 / 2022. To ensure a robust assessment, the Transport Assessment considers a construction assessment year of 2022. For consistency, this Transport chapter also considers a construction assessment year of 2022. The future base traffic flows in 2022 were calculated based on the traffic surveys undertaken in October 2019 and extrapolated to forecast traffic conditions on the local

highway network during this future year of 2022, with the addition of committed traffic flows, details of which are provided below.

Operation

10.88 To ensure a robust assessment, the Transport Assessment considers a future Uskmouth Conversion Project operational assessment year of 2026, which is the end of the Local Plan period. For consistency, this Transport chapter also considers a future operational assessment year of 2026. The future base traffic flows in 2026 were calculated based on the traffic surveys undertaken in October 2019 and extrapolated to forecast traffic conditions on the local highway network during this future year of 2026, with the addition of committed traffic flows, details of which are provided below.

Committed and Cumulative Developments

10.89 As part of the assessments, committed and cumulative development sites are also considered.

10.90 Developments that already have planning consent have already been through that process and have identified any highway and transport improvements that may or may not be necessary to mitigate their impact. There is no further opportunity for these developments to provide additional highway or transport mitigation and so these developments and their highway and transport schemes are treated as committed within any future year scenarios.

10.91 For this reason, those developments (traffic flows and their highway and transport mitigation schemes) form part of a future transport baseline scenario for any other developments that follow. In doing that, the impact of development proposals that follow consented developments is able to be determined in the knowledge of what has already been consented in transport and highways terms along with the need for any additional highway and transport improvements that may be necessary.

10.92 Other developments that emerge at the same time are treated together and are cumulatively assessed against the baseline scenario described above to determine their cumulative impact and their cumulative highway and transport mitigation requirements (if required).

10.93 A detailed assessment has been undertaken of all planning applications in the surrounding area and allocated sites following advice from planners at NCC. From a transport perspective, their status (i.e. consented, awaiting determination or allocated), traffic generation, their study area and the study area of this ES Chapter have all been analysed to determine how they have been considered within this assessment. The detailed list is set out in the appended TA, attached at **Appendix 10.1.**

10.94 There are several land allocations within the vicinity of the Uskmouth Power Station site, including Meadows Road, which have not had any planning applications submitted, as summarised below:

- Land Allocation EM1(ii) submitted a screening opinion in August 2018 ((18/0601) for the erection of new concrete batching factory including hardstanding and associated infrastructure for manufacturing (Class B2), Storage and Distribution (Class B8); however, there has been no progression on this site;
- Land Allocation EM1(iv) submitted an EIA screening opinion in February 2013 (13/0172) in for the erection of a "Therminol 3" production facility which was constructed in 2017, and there has been no additional progress on the site; and
- H1(38) for 559 dwellings at Lysaghts Village was at 99% completion as set out in the Newport City Council Annual Monitoring Report 2018-2019; therefore it is assumed that all dwellings are now constructed and occupied and all vehicular traffic generated is accounted for in the traffic surveys undertaken for this assessment.

10.95 There is one site which has planning consent that would generate traffic onto the study area of this ES Chapter that needs to be considered as a committed development and form part of the future year baseline scenario, set out in **Table 10.7**.

Table 10.7: Committed Sites Considered on the Network

Committed Developments				
Type of Application	Location	Description	Planning Reference	Status
Mixed Use	Former Llanwern Steelworks / Llanwern Regeneration Site	Outline planning application for 4000 housing units and 1.5m sqft employment land use, with local centre, playing fields, public open spaces and primary school provision	06/0471	Under construction

Llanwern Regeneration Site

10.96 In March 2006, an outline planning application (06/0471) for 4,000 housing units and 1.5 million sqft (139,355 sqm) Gross Floor Area (GFA) employment land use, subdivided in to 15% office (Bl), 25% general Industry (B2) and 60% warehousing (B8) was submitted. The development proposals also incorporated a local centre, playing fields, public open spaces and primary school provision to meet the development generated needs.

10.97 The outline planning application assumed a construction period of 2007 to 2027, with a proposed completion rate of 200 dwellings per year. The employment uses on the site were to follow a similarly linear completion rate at 50,000sqft per annum, with the rate increasing during the final phase of the development ensuring that all construction activity falls within the identified 20 year construction period.

10.98 The Newport City Council Annual Monitoring Report 2018-2019 stated that, as of April 2019, 559 dwellings had been completed equating to 14% of the total to be constructed.

10.99 For the purposes of this assessment, it is assumed that as of 2020, 600 houses are currently constructed and occupied, based on the Newport City Council Annual Monitoring Report 2018-2019. The outline planning application assumed a construction rate of 200 dwellings per annum, which would equate to an additional 1400 dwellings being occupied and constructed between 2019 and 2026.

10.100 In total, there would be approximately 2000 dwellings constructed and occupied on the Llanwern Regeneration site as of 2026, equating to half of the scheme. With regard to employment land and other allocations within the site, for the purposes of the assessment it is also assumed that half of the regeneration scheme will have been built out by 2026. Based on the above, half of the Phase 4b development traffic flows derived from the outline planning applications Transport Assessment will be incorporated into the baseline traffic flows as a committed site. The hourly future year traffic flows are attached at the appended TA.

Baseline Traffic Flows

10.101 Traffic growth rates have been estimated using the Department for Transport (DfT) software TEMPro (version 7.2). The TEMPro software presents the output of the DfT's National Trip End Model which forms part of the National Transport Model (NTM). The DfT's Webtag guidance Unit 3.15.2 advises the use of NTM in preference to the National Road Traffic Forecasts (NRTF) as the NTM data is based on a more up-to-date model.

10.102 It should be noted that growth rates include allowances for background traffic growth as well as development growth and, in some instances, the application of growth rates and the addition of

traffic flows from committed developments and cumulative developments (i.e. emerging developments that do not yet have planning consent) can result in double counting of traffic flows.

10.103 Years 2022 (Uskmouth Conversion Project, construction) and 2026 (Uskmouth Conversion Project, operation) baseline traffic flows have been extrapolated from the October 2019 observed traffic flows using TEMPro, with the addition of committed developments. The resultant 2022 and 2026 baseline traffic flows are set out within the appended TA and a summary is in **Table 10.8.**

Table 10.8: 2022 and 2026 Baseline Traffic Flows

Baseline Traffic Flows				
Link	2022		2026	
	AADT Total	AADT HGVs	AADT Total	AADT HGVs
West Nash Road – west of Nash village	702	30	732	31
West Nash Road – east of and inclusive of Nash village	986	44	1027	46
Nash Road – between West Nash Road and Meadows Road junctions	1879	47	1958	49
Meadows Road – south of industrial park	2180	95	2272	99
Meadows Road – north of the industrial park	6269	521	6354	543
A4810 west of the Meadows Road Roundabout	21352	1504	25622	1566
A4810 Queens Way east of the Meadows Road junction	15626	1389	19579	1446

Previous Site Operations

10.104 The Uskmouth coal-fired power station previously generated HGV movements comprising of the export of ash from the coal combustion and the importing of operational consumables (reagents). These HGV movements were all generated along the only available public highway for entry and egress to and from Uskmouth Power Station which is along West Nash Road, Nash Road and Meadows Road. If power generation at Uskmouth Power Station was included in the future year baseline scenario, then these HGV movements would be included in the baseline scenario, thus this application would result in no net change in HGV movements.

10.105 There are no records available on the delivery of reagents and the number of daily HGV movements that were generated in association with this.

10.106 The total number of vehicle movements is the combination of all one-way directional vehicle movements (i.e. all arrivals plus all departures) therefore one HGV arriving and then departing would undertake two vehicle movements or, two HGV movements equates to 1 HGV arrival and 1 HGV departure.

10.107 Previous ash export data has been obtained from coal fired Uskmouth Power Station and analysed, as set out in **Table 10.9**.

10.108 It should be noted that in both the previous coal fired operational vehicle movements and the estimated vehicle movements for the Uskmouth Conversion Project (construction and operation), there are odd numbers for the daily vehicle movements. This is because the movements are rounded to represent an average day whereby some days may have slightly lower vehicle movements and some days might have slightly higher vehicle movements. Taking an average day may result in odd numbers whereby the total vehicle movements may not be an exact product of equal arrivals and departures, this is due to rounding.

Table 10.9: Previous Ash Daily HGV Movements

Previous Ash Daily HGV Movements	2010	2011	2012	2013	2014
Number of occasions when HGV movements exceed 62 in a single day	0	0	5	44	12
Max. number of daily HGV movements on any one day	48	34	78	120	114
Number of days when HGV movements were greater than zero	178	36	171	225	31
Average number of daily HGV movements on days when HGVs movements were greater than zero	12	19	23	36	49
Average number of daily HGV movements across the year	8	3	15	31	6

Note: HGV vehicle movements are total one-way directional vehicle movements (i.e. all arrivals plus all departures). Therefore, one HGV arriving and then departing would undertake two vehicle movements

10.109 It is noted that the 2011 data only included Ash movements during November and December and there were no Ash movements between January and October.

10.110 In terms of staff, RPS understands that there were 83 staff employed at the Uskmouth Power Station during coal-fired operations.

10.111 Based upon the above, it is clear that all HGV movements were previously generated along West Nash Road, Nash Road and Meadows Road during the lifetime of the Uskmouth Power Station coal-fired power The Uskmouth Power Station has not generated electricity on coal since a technical fault in April 2017. However, significant investment has been made to remove damaged equipment, maintain the existing assets and progress the Front End Engineering Design (FEED) to enable the future conversion and return to service of Uskmouth Power Station.

10.112 The number of daily HGV Ash movements during coal operations has varied over the years. There were occasions when there were more daily HGV movements during coal operations than would be generated by the proposed operational Uskmouth Conversion Project. Indeed, there were 66 occasions between 2010 and 2014 when the Uskmouth coal-fired power station generated more daily HGV movements that the operational Uskmouth Conversion Project would be expected generate. The maximum number of daily HGV movements during coal-fired operations was 120, which occurred in 2013.

10.113 Based upon all weekdays when ash was exported between 2010 and 2014, there was an average of 13 HGV movements per day. However, as set out above, there is a large variance to this with upper levels exceeding those to be generated by the operational Uskmouth Conversion Project.

10.114 It should be noted that these previous HGV movements are only those associated with the export of ash. HGV movements associated with reagents and other deliveries need to be added to these, however, there are no records available to do so. The above Ash movements therefore represents a reduced representation of the previous HGV movements generated by the operation of the coal fired Uskmouth Power Station.

10.115 In order to present a robust traffic assessment, the TA assesses a worse case scenario as opposed to net change in development traffic flows against previous coal fired Uskmouth Power Station operational year traffic flows. The EIA assessment of construction and operation of Uskmouth Conversion Project HGV movements, assesses extrapolated traffic movements for 2022 and 2026 and then includes traffic flows predicted for construction and operation respectively to provide a worse case scenario, rather than assessing the net change. It should be noted that coal fired Uskmouth Power Station has previously generated HGV movements along West Nash Road and Nash Road without any highway capacity issues.

Mitigation Measures Adopted as Part of the Project

10.116 The operational Uskmouth Conversion Project seeks to replicate previous operational transport patterns, with all fuel pellets delivered by rail (coal delivery by rail). Rail delivery of fuel pellets to Uskmouth Power Station will drastically reduce the number of HGV movements generated. Uskmouth Power Station intends to adopt a 7-day working regime to replicate where necessary previous Uskmouth Power Station operational coal fired activity, this is consistent with all operational power stations. Vehicular access to Uskmouth Power Station will continue to be along the existing public highway access to Uskmouth Power Station utilised during previous and current operational activity.

10.117 It is anticipated that employee and contractor car parking will be provided within the existing parking areas and separated from the main construction and operational areas associated with HGV movements.

Assessment of Construction Effects

HGV Movements

10.118 The construction assessment for Uskmouth Conversion Project is based on a reasonable worst case scenario which considers the construction traffic associated with; the Proposed Development and Power Station Upgrade over 18 months. Construction traffic estimates have been made on this basis for a construction period of 18 months, this maximises the number of daily HGV movements and ensures a robust assessment.

10.119 A vehicle movement is a one-way directional movement by a vehicle. The total number of vehicle movements is the combination of all one-way directional vehicle movements. One HGV arriving and then departing would undertake two vehicle movements, one being the arrival and then one being the departure. This equates to two vehicle movements or, two HGV movements equates to 1 HGV arrival and 1 HGV departure.

It is expected that peak construction period will be during months 9 and 10 of an 18 month construction period, it is estimated there will be a maximum of 30 HGV movements per day generated by the construction of Uskmouth Power Station, as summarised in **Table 10.10** below:

Table 10.10: Anticipated peak logistical movements for construction

HGV Movements – Construction	
	Peak movements per day
HGV Movements for the Boiler Conversion	10
Concrete	18
Installations	2
Peak Daily HGV Movements	**30**

Note: HGV vehicle movements are total one-way directional vehicle movements (i.e. all arrivals plus all departures). Therefore, one HGV arriving and then departing would undertake two vehicle movements

10.120 Over the course of the 18-month construction period, there would be an average of 15 HGV movements per day; however, there may be exceptional circumstances arising that require construction vehicles outside of the normal construction hours. The Uskmouth Conversion Project intends to construct the storage silos using slip-form technique, this construction is conducted continuously for the duration of the concrete pouring. The conversion contractor will specify further detail and timings. This will be a one-off occurrence over a matter of days during the construction period, which is accordingly classified as a one-off occasion.

HGV Temporal Distribution

10.121 Based upon the above, it is estimated that the peak construction of Uskmouth Power Station will generate a maximum of 30 daily HGV movements. Indicative working will be undertaken within standard working hours would be 07:00 to 19:00 hours Monday to Friday, 07:00 to 13:00 hours on Saturday and at no time on Sundays or on public or bank holidays. Work outside these hours would be kept to a minimum, the local planning authority would be notified of any requirement to deviate from these indicative working hours.

10.122 The hourly HGV movements are shown in **Table 10.11.** Vehicle movements are representative of an average day.

Table 10.11: Peak Hourly HGV Construction Traffic Flows

HGV Construction Vehicle Movements			
Hour Beginning	**Arrivals Movements**	**Departures Movements**	**Total Movements**
07:00	0	0	0
08:00	2	2	3*
09:00	2	2	3*
10:00	2	2	3*
11:00	2	2	3*
12:00	2	2	3*
13:00	2	2	3*
14:00	2	2	3*
15:00	2	2	3*
16:00	2	2	3*
17:00	2	2	3*
18:00	0	0	0
Total	**15***	**15***	**30***

*Totals may not sum due to rounding
Note: HGV vehicle movements are total one-way directional vehicle movements (i.e. all arrivals plus all departures). Therefore, one HGV arriving and then departing would undertake two vehicle movements

HGV Distribution and Assignment

10.123 It is expected that HGVs would route to and from the M4. For the purposes of construction, it is assumed that 50% route via the M4 east and the remaining 50% route via the M4 west.

10.124 All HGVs routing east on the M4 will route along the A4810 travelling east to junction 23A of the M4, and all HGVs travelling west on the M4 will route west of the A4810 / Meadows Road roundabout to the A48.

Staff Movements

10.125 A peak of up to 157 staff vehicles are anticipated to be on site during the peak construction period, which coincides with the peak HGV movements through the 18-month construction period, occurring in months 9 and 10 of the 18-month construction period.

Staff Movements Temporal Distribution

10.126 Hour-by-hour staff vehicle movements are attached within the appended TA and summarised in **Table 10.12** and are representative of an average day.

Table 10.12: Peak Hourly Staff Traffic Flows

Peak Construction Staff Vehicle Movements			
Hour Beginning	Arrivals	Departures	Total Movements
07:00	157	0	157
08:00	0	0	0
09:00	0	0	0
10:00	0	0	0
11:00	0	0	0
12:00	0	0	0
13:00	0	0	0
14:00	0	0	0
15:00	0	0	0
16:00	0	0	0
17:00	0	0	0
18:00	0	157	157
Total	**157**	**157**	**314**

Note : HGV vehicle movements are total one-way directional vehicle movements (i.e all arrivals plus all departures). Therefore one HGV arriving and then departing would undertake two vehicle movements

Staff Distribution and Assignment

10.127 Census 2011 Journey to Work data has formed the basis of the assumptions of construction staff vehicle routeing. The analysis of the census data used to estimate the distribution of staff is set out within the appended TA and summarised in **Table 10.13.**

Table 10.13: Staff Distribution

Staff Distribution – Construction			
Mode	Goldcliff Road South	A4810 East	A4810 West
Distribution	0.0%	27.2%	72.8%

10.128 Staff movements have been assigned onto the network in accordance with the above distribution and the resultant movement of staff cars along links throughout the day are set out in the appended TA.

Total Peak Construction Traffic Flows

10.129 The resultant 2022 baseline plus peak construction traffic flows along links throughout the day are set out in the appended TA. Peak Uskmouth Conversion Project construction traffic flows are summarised in **Table 10.14.**

Table 10.14: Peak Daily Construction Traffic Flows

Summary of Peak Daily Construction Vehicle Movements		
Link	**Total Movements**	**HGV Movements**
West Nash Road – west of Nash village	344	30
West Nash Road – east of Nash village	344	30
Nash Road – between West Nash Road and Meadows Road junctions	344	30
Meadows Road – south of industrial park	344	30
Meadows Road – north of the industrial park	344	30
A4810 west of the Meadows Road Roundabout	244	15
A4810 Queens Way east of the Meadows Road junction	100	15

Note: HGV vehicle movements are total one-way directional vehicle movements (i.e. all arrivals plus all departures). Therefore, one HGV arriving and then departing would undertake two vehicle movements.

Impact of Construction Traffic Flows

10.130 Peak Uskmouth Conversion Project construction traffic flows have been assessed against the 2022 baseline Annual Average Daily Traffic (AADT) flows. Full details of these are set out in the appended TA and a summary is set out in **Table 10.15.**

Table 10.15: Summary of Peak Uskmouth Conversion Project - Construction Impact

Summary of Peak Construction Impact		
Link	**AADT Total**	**AADT HGVs**
West Nash Road – west of Nash village	49.0%	101.4%
West Nash Road – east of and inclusive of Nash village	34.9%	67.5%
Nash Road – between West Nash Road and Meadows Road junctions	18.3%	64.1%
Meadows Road – south of industrial park	15.8%	31.7%
Meadows Road – north of the industrial park	5.5%	5.8%
A4810 west of the Meadows Road Roundabout	1.1%	1.0%
A4810 Queens Way east of the Meadows Road junction	0.6%	1.1%

Note: HGV vehicle movements are total one-way directional vehicle movements (i.e. all arrivals plus all departures). Therefore, one HGV arriving and then departing would undertake two vehicle movements.

10.131 As can be seen from **Table 10.15** and the appended TA, the daily percentage increases in total traffic flows along the highway as a result of the peak construction traffic flows are no more than 49.0%, occurring on West Nash Road which has the lowest baseline traffic flows of the links included within this assessment.

10.132 The increases in daily total traffic flows only exceed the Rule 1 threshold (30%) set out in the IEMA guidelines, on West Nash Road. All other increases in daily total traffic flows are below the Rule 1 threshold set out in the IEMA guidelines.

10.133 In terms of increases in HGVs, there are instances where the Rule 1 threshold is exceeded where the number of HGV increase by more than 30%. These occur along the length of West Nash

Road, Nash Road between West Nash Road and Meadows Road, and Meadows Road to the south of the industrial estate.

10.134 All other increases in daily HGV traffic flows are below the Rule 1 threshold set out in the IEMA guidelines.

10.135 The increases in traffic along the A4810 East, the A4810 west and Meadows Road north of the industrial estate are all below the Rule 1 threshold and are therefore screened out of the construction assessment.

10.136 Therefore, in accordance with the IEMA guidelines the sensitivity of receptors along the A4810 East are considered to be negligible and the magnitude of impact is deemed to be negligible. The effect will, therefore, be of negligible significance, which is not significant in EIA terms.

10.137 In accordance with the IEMA guidelines, the sensitivity of receptors along the A4810 West are considered to be low and the magnitude of impact is deemed to be negligible. The effect will, therefore, be of minor significance, which is not significant in EIA terms.

10.138 In accordance with the IEMA guidelines, the sensitivity of receptors along Meadows Road north of the industrial estate are considered to be low and the magnitude of impact is deemed to be negligible. The effect will, therefore, be of minor significance, which is not significant in EIA terms.

10.139 On the basis of the above and in accordance with the IEMA guidelines, assessment will be undertaken of the effects of the Uskmouth Conversion Project construction traffic flows upon sensitive receptors along West Nash Road, Nash Road and Meadows Road to the south of the industrial estate. These are set out below.

Severance - Construction

10.140 The IEMA guidelines indicate that severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery.

10.141 West Nash Road, Nash Road and Meadows Road to the south of the industrial estate are not considered to be major traffic arteries. Indeed, the IEMA guidelines also indicate that severance can also result from difficulty in crossing a heavily trafficked road and that the level of traffic at which crossing a road is considered to be perceptible is 1,400 vehicle movements per hour.

10.142 The maximum hourly traffic flows along West Nash Road, Nash Road and Meadows Road to the south of the industrial estate with the addition of the peak construction traffic are 209, 256 and 269 vehicle movements respectively. These traffic flows are significantly below this level.

10.143 Furthermore, although there are communities along West Nash Road, Nash Road and Meadows Road to the south of the industrial estate, that are located on one side of the road and therefore there is limited opportunity for severance to be perceived within said communities.

10.144 For major traffic arteries with communities on both sides of the road, the IEMA guidelines consider the effects of severance to be 'slight', 'moderate' and 'substantial' with changes in traffic flows of 30%, 60% and 90% respectively.

10.145 Daily increases in traffic by the peak construction traffic along West Nash Road, Nash Road and Meadows Road to the south of the industrial estate are 49.0%, 18.3% and 15.8% respectively.

10.146 Given the above, it is considered that the combination of the layout of the communities, together with the traffic flows being sufficiently low both with and without the peak construction traffic, that there would be no perception of severance and that any changes in perceptions of severance as a result of the peak construction traffic would be negligible.

10.147 In accordance with the IEMA guidelines, the sensitivity of receptors along West Nash Road, Nash Road and Meadows Road to the south of the industrial estate are all considered to be low and the magnitude of impact upon severance is deemed to be negligible. The effect on severance along

West Nash Road, Nash Road and Meadows Road to the south of the industrial estate will therefore be of negligible significance, which is not significant in EIA terms.

Driver Delay – Construction

10.148 Any significant effects of delay to other road users are typically apparent during the identified peak hours when congestion may occur. The appended TA undertakes operational assessments of key junctions on the highway network along West Nash Road, Nash Road and Meadows Road. The 2022 baseline scenario, predicts that key junctions would operate well within capacity and that there would be no capacity issues (which incur driver delay). They predict that driver delay is negligible along West Nash Road, Nash Road and Meadows Road.

10.149 With the addition of the peak construction traffic to the 2022 construction baseline scenario, the TA predict that the key junctions on the highway network along West Nash Road, Nash Road and Meadows Road would remain operating well within capacity and that there would be no capacity issues (which incur driver delay) during construction .

10.150 The TA therefore predict that driver delay would be negligible in the 2022 baseline scenario and would remain so even with the addition of the peak construction traffic.

10.151 In accordance with the IEMA guidelines, the sensitivity of receptors along West Nash Road, Nash Road and Meadows Road to the south of the industrial estate is considered to be low and the magnitude of impact upon driver delay is deemed to be negligible. The effect on driver delay along West Nash Road, Nash Road and Meadows Road to the south of the industrial estate will therefore be of negligible significance which is not significant in EIA terms.

Pedestrian Delay – Construction

10.152 The IEMA guidelines advise that pedestrian delay is perceptible or considered significant beyond a lower delay threshold of 10 seconds for a link with no crossing facilities. A 10 second pedestrian delay in crossing a road broadly equates to a link traffic flow of approximately 1,400 vehicles per hour.

10.153 Meadows Road to the south of the industrial estate has combined footway / cycleways on both sides of the carriageway. As set out in the appended TA, the 18:00 to 19:00 hourly traffic flow along Meadows Road to the south of the industrial park in the 2022 baseline scenario is 112 vehicle movements, equating to an average pedestrian delay of 0.8 seconds. Following the increase in traffic from the peak construction traffic, the maximum hourly traffic flow would be 269 vehicle movements, equating to an average pedestrian delay of 1.6 seconds and a change in average pedestrian delay of 0.8 seconds. The traffic flows with the peak construction traffic flows are significantly below the perceptible delay threshold. In accordance with the IEMA guidelines, the perception of pedestrian delay would be negligible, and it would remain negligible with the addition of peak construction traffic.

10.154 Nash Road has a footway on its eastern side, but no such facilities on its western side. All pedestrians along Nash Road are therefore on its eastern side and there is no crossing demand onto its western side. Notwithstanding, the peak hourly traffic flow along Nash Road in the 2022 baseline scenario occurs between 18:00 and 19:00 with 91 vehicle movements, equating to a pedestrian delay of 0.36 seconds. Following the increase in the traffic from the peak construction traffic, the maximum hourly flow would equate to 256 vehicle movements, equating to a pedestrian delay of 1.83 seconds and a change in pedestrian delay of 1.47 seconds. The traffic flows with the peak construction traffic flows are significantly below the delay threshold. In accordance with the IEMA guidelines, the perception of pedestrian delay would be negligible, and it would remain negligible even with the addition of peak construction traffic.

10.155 There is a footway on the southern side of West Nash Road but no such facilities on its northern side; however, there is a bus stop and post box located approximately 15m from the West Nash Road / Nash Road priority junction. As set out in the appended TA, the hourly traffic flow along

West Nash Road to the east of Nash village between 18:00 and 19:00, in the 2022 baseline scenario, is 35 vehicle movements, equating to a pedestrian delay of 0.33 seconds. Following the increase in the traffic from the peak construction traffic, the maximum hourly flow would equate to 92 vehicle movements, equating to a pedestrian delay of 1.8 seconds and a change in pedestrian delay of 1.44 seconds. The traffic flows with the peak construction traffic flows are significantly below the delay threshold. In accordance with the IEMA guidelines, the perception of pedestrian delay would be negligible, and it would remain negligible with the addition of peak construction traffic.

10.156 In accordance with the IEMA guidelines, the sensitivity of receptors along West Nash Road, Nash Road and Meadows Road to the south of the industrial estate is considered to be low and the magnitude of impact upon pedestrian delay is deemed to be negligible. The effect on pedestrian delay along West Nash Road, Nash Road and Meadows Road to the south of the industrial estate will therefore be of negligible significance which is not significant in EIA terms.

Pedestrian Amenity

10.157 As set out above, the IEMA guidelines suggest a tentative threshold for judging the significance of changes in pedestrian amenity where the traffic flow, or its HGV component, is halved or doubled. It also refers to fear and intimidation, whereby moderate (the lowest category of fear and intimidation which does not directly relate to the terminology of the magnitude of impact in Table 10.4) fear and intimidation could be experienced when there are between 1,000 and 2,000 HGVs over an 18-hour day.

10.158 As set out in the appended TA, the increases in total traffic flows along Meadows Road to the south of the industrial park as a result of the peak construction traffic are 15.8% with an increase in HGVs of 31.7%, and as such the traffic flow, or its HGV component, is not doubled. Total traffic flows over an 18-hour day with the peak construction traffic is 112 HGV movements, which is significantly below the threshold of 1,000 HGV movements over an 18-hour day at which a 'moderate' level of fear and intimidation (the lowest level which does not directly relate to the terminology of the magnitude of impact in Table 10.4) could occur. As such, the threshold for which a 'moderate' level of fear and intimidation may occur will not be exceeded. The impact of the peak construction traffic upon pedestrian amenity along Meadows Road to the south of the industrial park is therefore negligible.

10.159 As set out in the appended TA, the increases in total traffic flows along Nash Road as a result of the peak construction traffic are 18.3% with HGV increases of 64.1%, therefore the HGV component is not doubled. Total traffic flows over an 18-hour day with the peak construction traffic is 73 HGV movements, which is significantly below the threshold of 1,000 HGV movements over an 18-hour day at which a 'moderate' level of fear and intimidation (the lowest level which does not directly relate to the terminology of the magnitude of impact in Table 10.4). As such, the threshold for which a 'moderate' level of fear and intimidation may occur will not be exceeded. The impact of the peak construction traffic upon pedestrian amenity along Nash Road is therefore negligible.

10.160 The increase in daily traffic along West Nash Road as a result of the peak construction traffic equates to a maximum 49.0% increase in total traffic, and a maximum 101.4% increase in HGV movements. However, the 2019 HGV component of the baseline traffic flows is very low and, with the addition of the peak construction traffic, equates to 56 HGV movements per 18-hour day on West Nash Road, which is significantly below the threshold of 1,000 HGV movements over an 18-hour day at which a 'moderate' level of fear and intimidation (the lowest level which does not directly relate to the terminology of the magnitude of impact in Table 10.4) could occur. Considering these elements, the impact of the peak construction traffic upon pedestrian amenity along West Nash Road is therefore low.

10.161 In accordance with the IEMA guidelines, the sensitivity of receptors along Nash Road and Meadows Road to the south of the industrial estate is considered to be low and the magnitude of

impact upon pedestrian amenity is deemed to be negligible. The effect on pedestrian amenity due to predicted construction traffic along Nash Road and Meadows Road to the south of the industrial estate will therefore be of negligible significance which is not significant in EIA terms.

10.162 In accordance with the IEMA guidelines, the sensitivity of receptors along West Nash Road is considered to be low and the magnitude of impact upon pedestrian amenity is deemed to be low. The effect on pedestrian amenity due to predicted construction traffic along West Nash Road will therefore be of minor significance which is not significant in EIA terms.

Accidents and Safety – Construction

10.163 Personal Injury Accident (PIA) statistics have been obtained for the highway network for the latest available five year period, an analysis of which is set out in paragraph 10.66 and concludes there are no current road safety issues. The traffic generated by the Uskmouth Conversion Project construction would be similar to those which are already on the network. There would be no significant change in the character of the network and therefore it is considered that traffic related to Uskmouth Conversion Project construction would not alter the injury accident rate.

10.164 In accordance with the IEMA guidelines, the sensitivity of receptors along Meadows Road to the south of the industrial estate is considered to be low, and the magnitude of impact upon accidents and safety is deemed to be low. The effect on accidents and safety along Meadows Road to the south of the industrial estate will, therefore, be of negligible significance, which is not significant in EIA terms.

10.165 In accordance with the IEMA guidelines, the sensitivity of receptors along Nash Road is considered to be low and the magnitude of impact upon accidents and safety is deemed to be low. The effect on accidents and safety along Nash Road will, therefore, be of negligible significance, which is not significant in EIA terms.

10.166 In accordance with the IEMA guidelines, the sensitivity of receptors along West Nash Road is considered to be low and the magnitude of impact upon accidents and safety is deemed to be low. The effect on accidents and safety along West Nash Road will, therefore, be of negligible significance, which is not significant in EIA terms.

Hazardous Loads – Construction

10.167 There are no hazardous materials expected to be transported during Uskmouth Conversion Project construction.

10.168 In accordance with the IEMA guidelines, the sensitivity of receptors along West Nash Road, Nash Road and Meadows Road to the south of the industrial estate is considered to be low and the magnitude of impact upon hazardous loads is deemed to be no change. The effect on hazardous loads along West Nash Road, Nash Road and Meadows Road to the south of the industrial estate will therefore be no change, which is not significant in EIA terms.

Further Mitigation

10.169 No further mitigation is required as a result of the construction effects determined above.

Future Monitoring

10.170 No further monitoring is required as a result of the construction effects determined above.

Accidents and/or Disasters

10.171 From a traffic and transport perspective, the movement of construction vehicles along the highway are governed by legislation in the same way that all other vehicles on the highway are governed.

10.172 The potential for accidents and / or disasters is therefore the same as any other vehicle on the highway and there is no need for any specific mitigation in this regard.

Assessment of Operational Effects

HGV Movements – Operation

10.173 The operational Uskmouth Conversion Project seeks to replicate previous transport patterns, with all fuel pellets delivered by rail which replicates the previous coal deliveries by rail. Road delivery of fuel pellets would not be required under normal circumstances; however, in exceptional circumstances road deliveries may be required following a major outage incident on the rail line. Previously, rail deliveries of coal have been very reliable, with zero un-planned rail network outages over the last 20 years that prevented coal rail deliveries to the site.

10.174 It is expected that Network Rail will undertake routine planned rail track system maintenance on a weekly basis for a period less than 12 hours.

Fuel pellet stocks held in the proposed storage silos will be managed to ensure enough fuel is available to cover rail outages of up to 24 hours. Thus reducing the likelihood of fuel pellet deliveries by road.

10.175 Lime will be utilised in the flue-gas treatment (FGT) process. Based on fuel Net CV of 18MJ/Kg and 90% Load Factor it is anticipated that approximately 52,000 tonnes per annum of lime will be delivered to the site. It should be noted that this is a worst case projection that is likely to reduce significantly when EPC Detailed Design is completed. The lime used in the FGT system is removed from site within the Air Pollution Control residue (APCr) composed of fly ash and FGT reaction products.

10.176 The operational Uskmouth Conversion Project , FGT system may utilise; ammonium sulphate, urea and activated carbon in addition to lime; it is estimated that approximately 6,500 tonnes per annum of Urea and 2,500 tonnes per annum of Ammonium Sulphate (at 90% load) would be required in the flue gas treatment process for each combustion unit. It should be noted that the numbers given are indicative only the final design of the FGT processes, required equipment modification and reagent usage will be determined during the EPC Detailed Design.

10.177 For technical and economic reasons, Uskmouth Power Station continues to investigate co-firing the fuel pellets with up to 1% biomass pellets. In the event that the fuel pellet and biomass co-firing scenario proceeds, an estimated 10,000tpa of biomass fuel may be required. Biomass fuel would be delivered by road to meet the circa 1% need. It should be noted that previous coal plant operations utilised biomass between 5% and 10% of total fuel combusted. Therefore proposed biomass deliveries to operational Uskmouth Conversion Project will be significantly reduced in comparison to previous biomass co-firing with coal. This co-firing scenario is anticipated to generate up to 1036 HGV movements of biomass per annum. Even though the Uskmouth Conversion Project FEED will continue to investigate co-firing with biomass, it is likely to be commercially advantageous to fire with pellets only, therefore, the import of biomass is unlikely. Notwithstanding, the assessments have been undertaken assuming biomass is imported to represent a worst case transport scenario.

10.178 A vehicle movement is a one-way directional movement by a vehicle. The total number of vehicle movements is the combination of all one-way directional vehicle movements. One HGV arriving and then departing would undertake two vehicle movements, one being the arrival and then one being the departure. This equates to two vehicle movements or, two HGV movements equates to one HGV arrival and one HGV departure.

Predicted HGV Total Movements Per Day including biomass is 60 HGV's per day.

Predicted HGV Total Movements Per Day and without biomass reduces to 58 HGV's per day.

Estimates of the potential HGV movements are calculated within the appended TA and

summarised in **Table 10.16.** The movements represent an average day; therefore, vehicle movements are not an exact product of equal arrivals and departures.

Table 10.16: Anticipated logistical movements (Two Converted Units)

HGV Total Movements			
Load	**Deliveries**	**Exports**	**Movements per day**
HGV Movements of Energy Pellet Fuel Per Day	0	0	0
HGV Movements of Ash & Limestone Per Day	27	27	54*
HGV Other Movements Per Day	3	3	5*
HGV Movements Per Day (Excluding Fuel Biomass)	**29**	**29**	**59***
HGV Movements of Fuel Biomass Per Day (assessed for 1st Year of Operation Only)	1	1	3*
HGV Movements Per Day (Including Fuel Biomass)	**30**	**30**	**60***

*Totals may not sum due to rounding

Note: HGV vehicle movements are total one-way directional vehicle movements (i.e all arrivals plus all departures). Therefore, one HGV arriving and then departing would undertake two vehicle movements.

10.179 The estimates of daily HGV movements have been based upon a worst case assumption of fuel Net Calorific Value (NCV) of 18MJ/Kg. This value is below the fuel specification lower boundary of 19MJ/Kg. Since this assumption was made, further large scale fuel pellet production has been completed which produced a significantly higher fuel NCV of 22MJ/Kg. As a result of this, fewer daily HGV movements are expected to be finally confirmed on completion of EPC detailed design. The assessments undertaken are based upon 60 HGV movements per day (including biomass in year 1), however, with the revised CV, this is likely to be 20% to 30% lower. Notwithstanding, 60 HGV movements per day (including biomass in year 1) has been assessed.

HGV Temporal Distribution – Operation

10.180 Based upon the above in the first year of operation, Uskmouth Conversion Project is predicted to generate 60 daily Total HGV movements, seven days a week (including biomass deliveries). Even though the Uskmouth Power Station will continue to investigate co-firing with biomass, it is likely to be commercially advantageous to fire with pellets only, therefore, the import of biomass is unlikely. Notwithstanding, the assessments have been undertaken assuming biomass is imported.

10.181 From year two onwards, operational Uskmouth Conversion Project is predicted to generate 58 daily HGV movements, seven days a week (without biomass deliveries). As set out above, the daily HGV movements represent an average day; therefore, vehicle movements are not an exact product of equal arrivals and departures. HGVs will operate between 08:00 and 18:00 Monday to Sunday, and the hourly HGV movements are shown in **Table 10.17.**

Table 10.17: Hourly HGV Traffic Flows – Operation

HGV Total Movements) operation						
	Year 1			Year 2 onwards		
Hour Beginning	**Weekday**	**Saturday**	**Sunday**	**Weekday**	**Saturday**	**Sunday**
07:00	0	0	0	0	0	0

08:00	6	6	6	6	6	6
09:00	6	6	6	6	6	6
10:00	6	6	6	6	6	6
11:00	6	6	6	6	6	6
12:00	6	6	6	5	5	5
13:00	6	6	6	5	5	5
14:00	6	6	6	6	6	6
15:00	6	6	6	6	6	6
16:00	6	6	6	6	6	6
17:00	6	6	6	6	6	6
18:00	0	0	0	0	0	0
Total	**60***	**60***	**60***	**58***	**58***	**58***

*Totals may not sum due to rounding
Note : HGV vehicle movements are total one-way directional vehicle movements (i.e all arrivals plus all departures). Therefore one HGV arriving and then departing would undertake two vehicle movements

HGV Distribution and Assignment - Operation

10.182 Combustion of the fuel pellets is expected to produce around 15% ash by mass, similar in quantity to the ash production at the coal fired power station. The ash is composed of approx. 80% fly ash and 20% furnace bottom ash, (referred to as bottom ash).

10.183 Ash is a by-product of the combustion of fuel pellets, the main solid residues produced are fly ash and bottom ash.

10.184 The majority of the ash produced (around 80%) is referred to as fly ash. Fly ash is captured within the bag filter system along with residue from the FGT system. The bag filter system is located within the main chimney stack. The fly ash and FGT system residue, known as Air Pollution Control Residue (APCr) is collected in a hopper and pneumatically conveyed into sealed road tankers for off-site disposal. Uskmouth Power Station will endeavour where possible to recycle APCr.

10.185 Around 20% of the ash produced is referred to as Bottom Ash and is discharged from the boiler into the bottom ash handling system onto a series of conveyors for transportation to bottom ash storage, then into sealed road tankers for off-site disposal. Bottom Ash is commonly recycled and used by the aggregate industry.

10.186 The majority of HGV movements generated from the operational Uskmouth Conversion Project are attributed to the removal of ash, equating to approximately 53 HGV movements per day. It is expected that HGVs would route to and from the M4.

10.187 Bottom Ash (BA) is generated from the combustion process. This is a by-product of the incineration process and is classified as non-hazardous waste and BA is recognised as a resource which can be recycled into safe and useable aggregate products. What remains is a mixture of ash and secondary aggregate which is used in construction. The secondary aggregate is commonly used as bulk fill, asphalt, cement bound materials, lightweight blocks (breeze blocks).

10.188 BA needs to be processed before it can be recycled as materials for construction. There are presently no contracts in place to transport BA for recycling. However, there are several recycling and asphalt construction facilities located in Gloucestershire and Somerset, with more options

further afield. Based on the location of available recycling facilities, for the purposes of the assessment it is assumed that the majority of HGVs will route to / from the M4 east.

10.189 It is expected that all HGVs would route to and from the M4. Based on the location of available recycling facilities, it is assumed that the majority of HGVs will route to the M4 east of Newport.

10.190 For the purposes of this assessment, it is assumed that 75% of HGVs route to the east on the M4, with the remaining 25% routing west. All HGVs routing east on the M4 will route along the A4810 travelling east to junction 23A of the M4, and all HGVs travelling west on the M4 will route west of the A4810 / Meadows Road roundabout to the A48.

Staff Movements – Operation

10.191 The new operational organisation will have approximately 50 – 100 staff. It is anticipated Uskmouth Power Station would utilise four operational shifts with an estimated 7 operational personnel per shift on twelve-hour days and nights, four on and four off. Uskmouth Power Station will utilise daytime office staff, some of which have worked at Uskmouth Power Station during coal fired operation.

10.192 A typical day comprises two 12-hour shifts from 07:00 to 19:00, and 19:00 to 07:00. For the purposes of this assessment 7 operational staff have been assumed to be additional Uskmouth Power Station staff in addition to the existing daytime staff employed at the site during the period that the traffic survey was completed and are already accounted for within the survey data.

10.193 The census data set out within the appended TA demonstrates that some staff will travel via sustainable means; but for the purposes of the assessment, to enable a robust assessment it is assumed all staff travel to the site via single occupancy vehicle.

Temporal Distribution of Staff Vehicle Movements - Operation

10.194 Hour-by-hour staff vehicle movements are attached within the appended TA and summarised in **Table 10.18.**

Table 10.18: Hourly Staff Vehicle Movements – Operation

Staff Total Movements			
Hour Beginning	Weekday	Saturday	Sunday
06:00	7	7	7
07:00	7	7	7
08:00	0	0	0
09:00	0	0	0
10:00	0	0	0
11:00	0	0	0
12:00	0	0	0
13:00	0	0	0
14:00	0	0	0
15:00	0	0	0
16:00	0	0	0

17:00	0	0	0
18:00	7	7	7
19:00	7	7	7
Total	**28***	**28**	**28**

Note: HGV vehicle movements are total one-way directional vehicle movements (i.e. all arrivals plus all departures). Therefore, one HGV arriving and then departing would undertake two vehicle movements.

Staff Distribution and Assignment – Operation

10.195 Census 2011 Journey to Work data has formed the basis of the assumptions of staff vehicle routeing. The analysis of the census data used estimate the distribution of staff is set out within the appended TA and summarised in **Table 10.19.**

Table 10.19: Staff Distribution – Operation

Staff Distribution Operation			
Mode	**Goldcliff Road South**	**A4810 East**	**A4810 West**
Distribution	0.0%	27.2%	72.8%

10.196 Staff movements have been assigned onto the network in accordance with the above distribution and the resultant movement of staff cars along links throughout the day are set out in the appended TA.

Total Development Traffic Flows

10.197 Operational Uskmouth Conversion Project development traffic flows are summarised in **Table 10.20** and the resultant 2026 baseline plus operational development traffic flows along links throughout the day are set out in the appended TA. In 2026, Operational Uskmouth Conversion Project is predicted to generate 58 HGV movements per day, without biomass traffic movements, however within the TA, 60 HGV movements per day (with biomass) has been assessed against the future baseline scenario to provide a robust assessment.

Table 10.20: Daily Development Vehicle Movements – Operation

Summary of Daily Development Vehicle Movements - Operation		
Link	**Total**	**HGVs**
West Nash Road – west of Nash village	88	60
West Nash Road – east of Nash village	88	60
Nash Road – between West Nash Road and Meadows Road junctions	88	60
Meadows Road – south of industrial park	88	60
Meadows Road – north of the industrial park	88	60
A4810 west of the Meadows Road Roundabout	35	15
A4810 Queens Way east of the Meadows Road junction	53	45

Note: HGV vehicle movements are total one-way directional vehicle movements (i.e. all arrivals plus all departures). Therefore, one HGV arriving and then departing would undertake two vehicle movements.

Impact of Development Traffic Flows – Operation

10.198 As above, Uskmouth Conversion Project operational development traffic flows have been assessed against the 2026 baseline traffic flows for a robust assessment. Full details of Annual Average Daily Traffic (AADT) are set out in the appended TA and a summary is set out in **Table 10.21.**

Table 10.21: Summary of Uskmouth Conversion Project Impact – Operation

Summary of Impact -Operation		
Link	AADT Total	AADT HGVs
West Nash Road – west of Nash village	12.30%	200.60%
West Nash Road – east of and inclusive of Nash village	8.70%	133.60%
Nash Road – between West Nash Road and Meadows Road junctions	4.60%	126.70%
Meadows Road – south of industrial park	4.00%	62.70%
Meadows Road – north of the industrial park	1.40%	11.40%
A4810 west of the Meadows Road Roundabout	0.10%	1.00%
A4810 Queens Way east of the Meadows Road junction	0.30%	3.20%

10.199 As can be seen from **Table 10.21** and the appended TA, none of the daily increases in total traffic flows exceed the Rule 1 threshold (30%) set out in the IEMA guidelines as a result of the operation of Uskmouth Conversion Project . The maximum daily percentage increases in total traffic flows is predicted on West Nash Road at 12.3%.

10.200 In terms of increases in HGVs, there are instances where the Rule 1 threshold is exceeded. These occur along the length of West Nash Road, Nash Road between West Nash Road and Meadows Road and Meadows Road south of the industrial park.

10.201 All other increases in daily HGV traffic flows are below the Rule 1 threshold set out in the IEMA guidelines.

10.202 The increases in traffic along the A4810 East, the A4810 west and Meadows Road north of the industrial estate are all below the Rule 1 threshold and are therefore screened out of the assessment.

10.203 In accordance with the IEMA guidelines, the sensitivity of receptors along the A4810 West are considered to be low and the magnitude of impact is deemed to be negligible. The effect will, therefore, be of minor significance, which is not significant in EIA terms.

10.204 In accordance with the IEMA guidelines, the sensitivity of receptors along Meadows Road north of the industrial estate are considered to be low and the magnitude of impact is deemed to be negligible. The effect will, therefore, be of minor significance, which is not significant in EIA terms.

10.205 On the basis of the above and in accordance with the IEMA guidelines, assessment will be undertaken of the effects of the Uskmouth Conversion Project traffic flows upon sensitive receptors along West Nash Road, Nash Road and Meadows Road to the south of the industrial estate. These are set out below.

Severance – Operation

10.206 The IEMA guidelines indicate that severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery.

10.207 West Nash Road, Nash Road and Meadows Road to the south of the industrial estate are not considered to be major traffic arteries. Indeed, the IEMA guidelines also indicate that severance can also result from difficulty in crossing a heavily trafficked road and that the level of traffic at which crossing a road is considered to be perceptible is 1,400 vehicle movements per hour.

10.208 The maximum hourly traffic flows along West Nash Road, Nash Road and Meadows Road to the south of the industrial estate with the addition of the Uskmouth Conversion Project operational traffic are 121, 180 and 219 vehicle movements respectively. These traffic flows are significantly below the severance perception level.

10.209 Furthermore, although there are communities along West Nash Road, Nash Road and Meadows Road to the south of the industrial estate, they are only on one side of the road and therefore there is limited opportunity for severance to be perceived within said communities.

10.210 For major traffic arteries with communities on both sides of the road, the IEMA guidelines consider the effects of severance to be 'slight', 'moderate' and 'substantial' with changes in traffic flows of 30%, 60% and 90% respectively.

10.211 Daily increases in traffic by the Uskmouth Conversion Project operational traffic along West Nash Road, Nash Road and Meadows Road to the south of the industrial estate are 12.3%, 4.6% and 4.0% respectively.

10.212 Given the above, it is considered that the combination of the layout of the communities together with the baseline traffic flows being sufficiently low with and without the Uskmouth Conversion Project operational traffic that there would be no perception of severance and that any changes in perceptions of severance as a result of the Uskmouth Conversion Project operation traffic would be negligible.

10.213 In accordance with the IEMA guidelines, the sensitivity of receptors along West Nash Road, Nash Road and Meadows Road to the south of the industrial estate are all considered to be low and the magnitude of impact upon severance is deemed to be negligible. The effect on severance along West Nash Road, Nash Road and Meadows Road to the south of the industrial estate due to Uskmouth Conversion Project operational traffic will therefore be of negligible significance, which is not significant in EIA terms

Driver Delay – Operation

10.214 Any significant effects of delay to other road users are typically apparent during the identified peak hours when congestion may occur. The appended TA undertakes operational assessments of key junctions on the highway network along West Nash Road, Nash Road and Meadows Road. For the 2026 baseline scenario, they predict that key junctions would operate well within capacity and that there would be no capacity issues (which incur driver delay), and that driver delay is negligible along West Nash Road, Nash Road and Meadows Road.

10.215 With the addition of the Uskmouth Conversion Project operational traffic, the operational assessments predict that the key junctions on the highway network along West Nash Road, Nash Road and Meadows Road would remain operating well within capacity and that there would be no capacity issues (which incur driver delay).

10.216 The operational assessments predict that driver delay would be negligible in the 2026 baseline scenario and would remain so even with the addition of the Uskmouth Conversion Project operational traffic.

10.217 In accordance with the IEMA guidelines, the sensitivity of receptors along West Nash Road, Nash Road and Meadows Road to the south of the industrial estate is considered to be low and the magnitude of impact upon driver delay is deemed to be negligible. The effect on driver delay along West Nash Road, Nash Road and Meadows Road to the south of the industrial estate during Uskmouth Conversion Project operation will therefore be of negligible significance which is not significant in EIA terms.

Pedestrian Delay – Operation

10.218 The IEMA guidelines advise that pedestrian delay is perceptible or considered significant beyond a lower delay threshold of 10 seconds, for a link with no crossing facilities. A 10 second pedestrian

delay in crossing a road broadly equates to a link traffic flow of approximately 1,400 vehicles per hour.

10.219 Meadows Road to the south of the industrial estate has combined footway / cycleways on both sides of the carriageway. As set out in the appended TA, the maximum hourly traffic flow along Meadows Road to the south of the industrial park in the 2026 baseline scenario is 212 vehicle movements, equating to an average pedestrian delay of 1.5 seconds. Following the increase in traffic from operational Uskmouth Conversion Project, the maximum hourly traffic flow would be 218 vehicle movements, equating to an average pedestrian delay of 1.6 seconds and a change in average pedestrian delay of 0.1 seconds. The traffic flows are significantly below the delay threshold. In accordance with the IEMA guidelines, the perception of pedestrian delay would be negligible and it would stay negligible with the addition of Uskmouth Conversion Project operational traffic.

10.220 Nash Road has a footway on its eastern side, but no such facilities on its western side. All pedestrians along Nash Road are therefore on its eastern side and there is no crossing demand onto its western side. Notwithstanding, the peak hourly traffic flow along Nash Road in the 2026 baseline scenario occurs between 15:00 and 16:00 with 174 vehicle movements, equating to a pedestrian delay of 1.24 seconds. Following the increase in traffic from the operational Uskmouth Conversion Project , the maximum hourly flow would equate to 180 vehicle movements, equating to a pedestrian delay of 1.29 seconds and a change in pedestrian delay of 0.05 seconds. The traffic flows with operational Uskmouth Conversion Project traffic flows are significantly below the delay threshold. In accordance with the IEMA guidelines, the perception of pedestrian delay would be negligible and it would stay negligible with the addition of peak construction traffic.

10.221 There is a footway on the southern side of West Nash Road but no such facilities on its northern side; however, there is a bus stop and post box located approximately 15 metres from the West Nash Road / Nash Road priority junction. As set out in the appended TA, the maximum hourly traffic flow along West Nash Road to the east of Nash village in the 2026 baseline scenario is 115 vehicle movements, equating to an average pedestrian delay of 0.82 seconds. Following the increase in the traffic from operational Uskmouth Conversion Project, the maximum hourly flow would equate to 121 vehicle movements, equating to an average pedestrian delay of 0.86 seconds and a change in average pedestrian delay of 0.04 seconds. In accordance with the IEMA guidelines, the perception of pedestrian delay would be negligible and it would remain negligible even with the addition of operational Uskmouth Conversion Project traffic.

10.222 In accordance with the IEMA guidelines, the sensitivity of receptors along West Nash Road, Nash Road and Meadows Road to the south of the industrial estate is considered to be low and the magnitude of impact upon pedestrian delay is deemed to be negligible. The effect on pedestrian delay along West Nash Road, Nash Road and Meadows Road to the south of the industrial estate will therefore be of negligible significance which is not significant in EIA terms.

Pedestrian Amenity – Operation

10.223 As set out above, the IEMA guidelines suggest a tentative threshold for judging the significance of changes in pedestrian amenity where the traffic flow, or its HGV component, is halved or doubled. It also refers to fear and intimidation, whereby moderate (the lowest category of fear and intimidation which does not directly relate to the terminology of the magnitude of impact in Table 10.4) fear and intimidation could be experienced when there are between 1,000 and 2,000 HGVs over an 18-hour day.

10.224 As set out in the appended TA, the increases in total traffic flows along Meadows Road to the south of the industrial park as a result of the Uskmouth Conversion Project operational traffic are 4% with an increase in HGVs of 62.7%, and as such the traffic flow, or its HGV component, is not doubled. Traffic flows over an 18-hour day during Uskmouth Power Station operation is 148 HGV movements, which is significantly below the threshold of 1,000 HGV movements over an 18-hour

day at which a 'moderate' level of fear and intimidation (the lowest level which does not directly relate to the terminology of the magnitude of impact in Table 10.4) could occur. As such, the threshold for which a 'moderate' level of fear and intimidation may occur will not be exceeded. The impact of the operational Uskmouth Conversion Project traffic upon pedestrian amenity along Meadows Road to the south of the industrial park is therefore negligible.

10.225 The increase in daily traffic along Nash Road as a result of the Uskmouth Conversion Project operational traffic equates to a maximum 4.6% increase in total traffic, and a maximum 126.7% increase in HGV movements. However, the HGV component of the 2019 baseline traffic flows is very low and, with the addition of the Uskmouth Conversion Project operational traffic, equates to 106 HGV movements per 18-hour day, which is significantly below the threshold of 1,000 HGV movements over an 18-hour day at which a 'moderate' level of fear and intimidation (the lowest level which does not directly relate to the terminology of the magnitude of impact in Table 10.4) could occur. Considering these elements, the impact of the Uskmouth Conversion Project operational traffic upon pedestrian amenity along Nash Road is therefore low.

10.226 The increase in daily traffic along West Nash Road as a result of the Uskmouth Conversion Project operational traffic equates to a maximum 12.3% increase in total traffic, and a maximum 200.6% increase in HGV movements. However, the HGV component of the 2019 baseline traffic flows is very low and, with the addition of the Uskmouth Conversion Project operational traffic, equates to 89 HGV movements per 18-hour day on West Nash Road, which is significantly below the threshold of 1,000 HGV movements over an 18-hour day at which a 'moderate' level of fear and intimidation (the lowest level which does not directly relate to the terminology of the magnitude of impact in Table 10.4) could occur. Considering these elements, the impact of the Uskmouth Conversion Project operational traffic upon pedestrian amenity along West Nash Road is therefore low.

10.227 In accordance with the IEMA guidelines, the sensitivity of receptors along Meadows Road to the south of the industrial estate is considered to be low and the magnitude of impact upon pedestrian amenity is deemed to be negligible. The effect on pedestrian amenity along Meadows Road to the south of the industrial estate will therefore be of negligible significance which is not significant in EIA terms.

10.228 In accordance with the IEMA guidelines, the sensitivity of receptors along West Nash Road and Nash Road is considered to be low and the magnitude of impact upon pedestrian amenity is deemed to be low. The effect on pedestrian amenity along West Nash Road and Nash Road will therefore be of minor significance which is not significant in EIA terms.

Accidents and Safety – Operation

10.229 PIA statistics have been obtained for the highway network for the latest available five year period, an analysis of which is set out above and concludes there are no current road safety issues. The traffic generated by the operational Uskmouth Conversion Project would be similar to those which are already on the network. There would be no significant change in the character of the network and therefore it is considered that the Uskmouth Conversion Project would not alter the injury accident rate.

10.230 In accordance with the IEMA guidelines, the sensitivity of receptors along Meadows Road to the south of the industrial estate is considered to be low, and the magnitude of impact upon accidents and safety is deemed to be low. The effect on accidents and safety along Meadows Road to the south of the industrial estate will, therefore, be of negligible significance, which is not significant in EIA terms.

10.231 In accordance with the IEMA guidelines, the sensitivity of receptors along Nash Road is considered to be low and the magnitude of impact upon accidents and safety is deemed to be low. The effect on accidents and safety along Nash Road will, therefore, be of negligible significance, which is not significant in EIA terms.

10.232 In accordance with the IEMA guidelines, the sensitivity of receptors along West Nash Road is considered to be low and the magnitude of impact upon accidents and safety is deemed to be low. The effect on accidents and safety along West Nash Road will, therefore, be of negligible significance, which is not significant in EIA terms.

Hazardous Loads -Operation

10.233 Any hazardous material will be transported using specialist vehicles in accordance with the relevant health and safety regulations.

10.234 In accordance with the IEMA guidelines, the sensitivity of receptors along Meadows Road to the south of the industrial estate is considered to be low and the magnitude of impact is deemed to be low. The effect on hazardous loads will, therefore, be of minor significance, which is not significant in EIA terms.

10.235 In accordance with the IEMA guidelines, the sensitivity of receptors along Nash Road is considered to be low and the magnitude of impact is deemed to be low. The effect on hazardous loads will, therefore, be of minor significance, which is not significant in EIA terms.

10.236 In accordance with the IEMA guidelines, the sensitivity of receptors along West Nash Road is considered to be low and the magnitude of impact is deemed to be low. The effect on hazardous loads will, therefore, be of minor significance, which is not significant in EIA terms.

Further Mitigation – Operation

10.237 No further mitigation is required as a result of the Uskmouth Conversion Project operational effects determined above.

Future Monitoring - Operation

10.238 No further monitoring is required as a result of the Uskmouth Conversion Project operational effects determined above.

Accidents/Disasters – Operation

10.239 From a traffic and transport perspective, the movement of Uskmouth Conversion Project operational vehicles along the highway would all be governed by legislation in the same way that all other vehicles on the highway are governed.

10.240 The potential for accidents and / or disasters is therefore the same as any other vehicle on the highway and there is no need for any specific mitigation in this regard.

Potential Changes to the Assessment as a Result of Climate Change

10.241 In traffic and transport terms and in specific relation to this Transport Chapter, changes to the assessment as a result of how climate change may affect movement (for example traffic flows, pedestrian movement or cyclist movement) and how climate change may alter the sensitivity of receptors.

10.242 In terms of sensitivity, receptors that are sensitive to changes in traffic flows should not be altered by climate change and neither would their assessment of sensitivity (i.e. negligible, low, medium or high), so the receptors identified would remain relevant.

10.243 People could be considered able to adapt to the effects of climate change in the sense that if a movement is needed by a particular mode of transport, then it is reasonable to assume that movement would still occur regardless of climate change (e.g. a person would still walk to a local shop or a person would still drive to and from work).

10.244 On this basis, it is considered that climate change is unlikely to affect future baseline conditions to such an extent that it would affect the conclusions reached in this chapter.

Assessment of Cumulative Effects

10.245 There are no cumulative sites which have been considered as part of this assessment. During this assessment a search was conducted on planning applications on nearby employment and housing land allocations set out within the Local Plan. No relevant planning applications were identified and, therefore were not considered as part of the committed applications.

Table 10.22: Summary of Likely Environmental Effects on Traffic and Transport

Receptor	Sensitivity of receptor	Description of Impact	Short / medium / long term	Magnitude of impact	Significance of effect	Significant/ Not significant	Notes
Construction Phase							
West Nash Road – west of Nash village	Low	Severance, driver delay, pedestrian delay, pedestrian amenity, accidents and safety and hazardous loads	Medium term	Negligible / low	Negligible / minor	Not significant	
West Nash Road – east of and inclusive of Nash village	Low	Severance, driver delay, pedestrian delay, pedestrian amenity, accidents and safety and hazardous loads	Medium term	Negligible / low	Negligible / minor	Not significant	
Nash Road – between West Nash Road and Meadows Road junctions	Low	Severance, driver delay, pedestrian delay, pedestrian amenity, accidents and safety and hazardous loads	Medium term	Negligible	Negligible	Not significant	
Meadows Road – south of industrial park	Low	Severance, driver delay, pedestrian delay, pedestrian amenity, accidents and safety and hazardous loads	Medium term	Negligible	Negligible	Not significant	
Meadows Road – north of the industrial park	Low	Severance, driver delay, pedestrian delay, pedestrian amenity, accidents and safety and hazardous loads	Medium term	Negligible	Negligible	Not significant	
A4810 west of the Meadows Road Roundabout	Low	Severance, driver delay, pedestrian delay, pedestrian amenity, accidents and safety and hazardous loads	Medium term	Negligible	Negligible	Not significant	
A4810 Queens Way east of the Meadows Road junction	Negligible	Severance, driver delay, pedestrian delay, pedestrian amenity, accidents and safety and hazardous loads	Medium term	Negligible	Negligible	Not significant	
Operational Phase							
West Nash Road – west of Nash village	Low	Severance, driver delay, pedestrian delay, pedestrian amenity, accidents and safety and hazardous loads	Long term	Negligible / low	Negligible / minor	Not significant	
West Nash Road – east of and inclusive of Nash village	Low	Severance, driver delay, pedestrian delay, pedestrian amenity, accidents and safety and hazardous loads	Long term	Negligible / low	Negligible / minor	Not significant	
Nash Road – between West Nash Road and Meadows Road junctions	Low	Severance, driver delay, pedestrian delay, pedestrian amenity, accidents and safety and hazardous loads	Long term	Negligible	Negligible	Not significant	

Meadows Road – south of industrial park	Low	Severance, driver delay, pedestrian delay, pedestrian amenity, accidents and safety and hazardous loads	Long term	Negligible	Negligible	Not significant
Meadows Road – north of the industrial park	Low	Severance, driver delay, pedestrian delay, pedestrian amenity, accidents and safety and hazardous loads	Long term	Negligible	Negligible	Not significant
A4810 west of the Meadows Road Roundabout	Low	Severance, driver delay, pedestrian delay, pedestrian amenity, accidents and safety and hazardous loads	Long term	Negligible	Negligible	Not significant
A4810 Queens Way east of the Meadows Road junction	Negligible	Severance, driver delay, pedestrian delay, pedestrian amenity, accidents and safety and hazardous loads	Long term	Negligible	Negligible	Not significant

11 NOISE AND VIBRATION

Introduction

11.1 This chapter presents the assessment of noise and vibration effects that could arise from the construction, operation and decommissioning of the Uskmouth Conversion Project . The chapter describes: the assessment methodology; the baseline conditions at the site and surroundings; the likely environmental noise and vibration effects; and the mitigation measures required to reduce and minimise any adverse effects.

11.2 The scope of the assessment includes noise from the construction phase of including the construction of the Proposed Development and the Power Station Upgrade, , on-site construction works and construction traffic. It also assesses, operational noise and noise from operational traffic for the Uskmouth Conversion Project.

11.3 Due to the distances between the Uskmouth Conversion Project and the nearest NSRs, vibration effects during both construction and operation of the Uskmouth Conversion Project are not expected to be significant and have been scoped out of the assessment.

Assessment Methodology

11.4 This section sets out the legislation, planning policy context and planning guidance that is relevant to the noise and vibration assessment; the assessment methodologies and baseline forecasting methods employed and provides a summary of the consultation that has been undertaken. Further details of the relevant policy and guidance documentation are provided in Appendix 11.1.

Planning Policy Context

11.5 The following policy has been referred to within the assessment of noise and vibration effects:

- Planning Policy Wales (PPW) Edition 10;
- Planning Guidance (Wales) Technical Guidance Advice Note (WalesTAN) 11, Noise;
- Updated to Technical Advice Note (TAN) 11: Noise; and
- Newport Local Development Plan (NLDP).

Relevant Guidance

11.6 The following legislation and guidance have been referred to within the assessment of noise and vibration effects:

- Part III of the Control of Pollution Act 1974 (CoPA);
- The Environmental Protection Act 1990 (EPA);
- BS 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites - Part 1: Noise';
- BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound';
- Design Manual for Roads and Bridges, Sustainability & Environment Appraisal, LA 111, Noise and vibration, Revision 1, 2020; and
- Department of Transport, Calculation of Road Traffic Noise, HMSO, 1988.

Study Area

11.7 A study area of just over 1 km from the (redline) site boundary has been considered in the assessment. Beyond this area, noise and vibration impacts are considered unlikely. The following noise sensitive receptors (NSRs) have been identified within this study area:

- Great House, located approx. 600 m to the south-east;
- Lowlands and Moorcroft Farm, located approx. 800 m to the east;
- Ty-Portra, located approx. 800 m to the east;
- Arch Cottage, located approx. 1,100 m to the east; and
- Church House, Nash, located approx. 1,100 m to the east.

Baseline Approach

11.8 This assessment has been conducted on the existing baseline environmental conditions that prevail at the time of writing. This approach is considered to represent a reasonable worst case assessment since little activity is currently audible at the Power Station. Nevertheless, it is the developer's intention that power generation continues even without the Uskmouth Conversion Project as described in Chapter 3 of this ES.

11.9 Because this assessed baseline does not include for any power generation at Uskmouth Power Station it also does not include for any train or HGV movements associated with such. Again, this represents a robust assessment. If the baseline position was to include train and HGV movements associated with power generation at Uskmouth Power Station, then such activity would be similar to those which are subject to this assessment and this application. Such a baseline scenario would mean that this application would effectively result in no net change from that predicted for the Uskmouth Conversion Project.

Baseline Methodology

11.10 Representative baseline sound levels have been determined through a long term unattended sound level survey undertaken within the rear garden of Lowlands and Moorcroft Farm between 12:45 hours on Friday 4th September to 11:30 hours on Tuesday 11th September 2019.

11.11 Sound level measurements were carried out using a 'Class 1' Rion NL-52 sound level meter (SLM) in accordance with BS 7445-2:1991, with the microphone mounted on a pole at 1.2 m above local ground level.

11.12 Data were logged of the broadband, A-weighted sound pressure level in 100 ms samples with the required periods extracted in post-processing; in this instance 15-minute periods. The sound level meter was calibrated before use and the calibration checked after use and it was observed that no significant drift had occurred during the survey period.

11.13 Weather data were monitored during the survey using a meteorological mast to monitor wind speeds and a rain gauge to monitor rainfall.

Consultation

11.14 A summary of the consultation with stakeholders and consultees is provided in Table 11.1 below. A formal request for a Scoping Opinion was submitted to Newport City Council (NCC) in December 2019, which included a section regarding the noise and vibration assessment. The consultation responses are provided in Table 11.1 below.

Table 11.1: Consultation Responses Relevant to this Chapter

Date	Consultee and Issues Raised	How / Where Addressed

January 2020	Noise and vibration from construction traffic is capable of being significant in the context of the delivery route via Nash Road and this was a significant concern in relation to the construction of the Dong Energy facility adjacent to this site under a permission issued by the Department of Trade & Industry. These matters should not be scoped out of any Environmental Statement for the Proposed Development.	This is addressed under 'Assessment of Construction Effects – Construction Traffic'.

Assessment Criteria and Assignment of Significance

11.15 Table 11.2 summarises the descriptions of receptor sensitivity for the Proposed Development.

Table 11.2: Example Definitions of Sensitivity or Value

Sensitivity	Typical Descriptors
Very High	Very high importance and rarity, international scale and very limited potential for substitution.
High	High importance and rarity, national scale, and limited potential for substitution.
Medium	High or medium importance and rarity, regional scale, limited potential for substitution.
Low	Low or medium importance and rarity, local scale.
Negligible	Very low importance and rarity, local scale.

11.16 The assessment criteria for determining the magnitude of impacts adopted within the following sections combine with receptors defined as being of medium sensitivity, unless particular circumstances dictate otherwise. This reflects typical sensitivity for any class of receptor. Consequently, as no atypical circumstances have been identified, the receptors are deemed to be of medium sensitivity.

Magnitude of Impact

11.17 The criteria for determining the magnitude of impact vary for the construction and operational phases and are dependent upon the nature of the source. Therefore, there is not one fixed set of criteria that apply in all circumstances. The general criteria in Table 11.3 have been applied throughout the assessment, although more specific guidance has been applied to various parts of the assessment as outlined in the sections below.

Table 11.3: General Definitions of Magnitude of Impact

Sensitivity	Descriptors
High	A major shift away from baseline conditions. A change large enough to be noticeable and very disruptive, depending on baseline conditions and the context. The noise/vibration causes a material change in behaviour and/or attitude. 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.
Medium	A moderate shift away from baseline conditions. A change large enough to be noticeable and may be disruptive, depending on baseline conditions and the context. Noise/vibration can be heard/felt and causes small changes in behaviour and/or attitude. Affects the acoustic character of the area such that there is a perceived change in the quality of life.

Low	A minor shift away from baseline conditions. A change large enough to be noticeable and may be intrusive, depending on baseline conditions and the context. Noise/vibration can be heard/felt 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.
Negligible	Very little change from baseline conditions. A change small enough such that it is unnoticeable or unlikely to be intrusive, depending on baseline conditions and the context.
No change	No change to baseline conditions.

Construction Noise

11.18 Noise effects have been assessed with reference to BS 5228-1:2009+A1:2014. The Standard provides guidance, information and procedures on the control of noise from construction sites and promotes a 'Best Practicable Means' (BPM) approach to control noise.

11.19 Adverse effects due to construction noise associated with this type of development tend to be relatively limited. Construction noise has, therefore, been addressed qualitatively on the basis of professional judgement and experience of similar schemes. Potential effects have been determined based on the semantic scale provided in Table 11.3.

Noise from Construction Traffic

11.20 The noise changes identified in Table 11.4 below have been used to determine the magnitude of noise effects associated with construction traffic on the local road network and from temporary diversion routes resulting from construction of the Proposed Development. These are based on the guidance in DMRB, LA111, Noise and Vibration (Highways England), for the classification of magnitude of noise effects in the long term. It is noted that construction traffic is a short-term effect. However, as this is not for a new highway, it has been considered appropriate to use the criteria for long term effects from road traffic in this context.

Table 11.4: Magnitude of Impact for Construction Traffic Noise in the Long Term

Predicted Change In $L_{Aeq,T}$ or $L_{A10,T}$	Magnitude of Impact
0 dB	No change
Increase of 0.1 to 2.9 dB	Negligible
Increase of 3 to 4.9 dB	Low
Increase of 5 to 9.9 dB	Medium
Increase of more than 10 dB	High

11.21 The magnitude of effect is considered to be 'Very Low' at Noise and Vibration Sensitive Receptor (NVSRs) if noise levels are sufficiently low such that they do not have the potential to cause or contribute to some harmful or otherwise unwanted effect. Similarly, a small change in noise level where noise levels are already high would result in a greater magnitude of effect than those above. Consequently, the absolute levels of road traffic noise have also been considered in terms of guidance contained within the WHO 'Guidelines for Community Noise' and the Noise Insulation Regulations (NIR).

11.22 The NIR provides a $L_{A10,18h}$ level above which insulation would be offered, assuming other factors are satisfied. This level applies to permanent traffic or construction traffic where the road is being altered or built and, therefore, the need to provide noise insulation does not apply here. However, they have been used to evaluate significance. For daytime traffic, the combined traffic noise level from the new or altered highway together with other traffic in the vicinity must not be less than 68 dB $L_{A10,18hr}$ and the contribution to the increase in the relevant noise level from the new or altered highway must be at least 1 dB. This corresponds to a free-field level of 63 dB $L_{Aeq,16h}$. Therefore, a change in traffic noise levels of greater than 3 dB would result in a 'medium' magnitude of effect, and a change of 5 dB would result in a 'high' magnitude of effect if the combined traffic noise level exceeds 63 dB $L_{Aeq,16h}$.

11.23 The WHO 'Guidelines for Community Noise' provides guidance on noise levels for typical situations. For daytime external noise levels, it is considered that:

'To protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady, continuous noise should not exceed 55 dB L_{Aeq} on balconies, terraces, and outdoor living areas. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound level should not exceed 50 dB L_{Aeq}. Where it is practical and feasible, the lower outdoor sound level should be considered the maximum desirable sound level for new development.'

11.24 Based on this guidance, noise effects from road traffic are only considered to be significant if the traffic noise level exceeds a level of 50 dB $L_{Aeq,16hr}$. Below this level, the magnitude of effect is at most 'very low' from this source alone.

11.25 New guidance was issued by the WHO in 2018. The guidelines are intended to provide recommendations for protecting human health from exposure to environmental noise originating from various sources: transportation noise (road traffic, railway and aircraft), wind turbine noise and leisure noise. For traffic noise, the guidelines recommend reducing noise levels produced by road traffic noise to below 53 dB L_{den} and 45 dB L_{night}.

11.26 The WHO guidelines utilise the L_{den} and L_{night} parameters which are annual average noise levels excluding the effect of the façade. Averaging variations in traffic flow and meteorological effects over a period of a year the annual average noise level would be lower than the noise level under conditions favourable to sound propagation or during the peak traffic assessed as part of this study.

11.27 The use of yearly average parameters is a fundamental aspect of the WHO guidance. The thresholds are based on potential health effects at population level due to long term exposure to noise. It follows that it is unlikely that exposure to higher levels of noise over a shorter period of time would result in the same health impacts. In addition, it cannot be assumed that thresholds applicable at population level for the purpose of making strategic decisions on long term transportation policy can be applied directly to assessing the potential significance of noise on a single property due to a project of limited duration.

11.28 Furthermore, the WHO guideline values give the lowest threshold noise levels below which the occurrence rates of particular effects can be assumed to be negligible. Exceedances of the WHO guideline values do not necessarily imply significant noise impact and, indeed, it may be that significant impacts do not occur until much higher degrees of noise exposure are reached.

Operational Noise

11.29 Sound immissions from the operational Uskmouth Conversion Project have been predicted at the nearest NSRs identified under 'Study Area'. Predictions have been carried out using SoundPLAN Version 8.1 sound modelling software utilising the propagation method contained in ISO 9613-2:1996 'Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation'. The model predicts sound levels under light down-wind conditions based on

hemispherical sound propagation with corrections for atmospheric absorption, ground effects, screening and directivity.

11.30 Acoustic data have been obtained from information provided by the project team and RPS' experience of other similar sites. The Uskmouth coal-fired Power Station has not generated electricity on coal since a technical fault in April 2017. It has been considered appropriate to assess the site as one proposal with both the existing and new sources of sound. A summary of the model input data has been provided in Appendix 11.2.

11.31 The following assumptions have been incorporated into the noise model:

- the topography of the site and the surrounding area has been obtained from site surveyed topographical data and Ordnance Survey (OS) open data (Terrain 50);
- the effect of screening from solid structures (buildings) has been incorporated into the modelling process by importing OS Open Data 'Settlement Area' shape file data into the model; and
- the ground type in the model has been set to soft (G=1).

11.32 Noise effects due to the operation of the Uskmouth Conversion Project have been assessed according to the guidance in BS 4142:2014+A1:2019. This Standard primarily provides a numerical method by which to determine the significance of sound of an industrial nature (i.e. the 'specific sound' from the Uskmouth Conversion Project) at residential NSRs. The specific sound level may then be corrected for the character of the sound (e.g. perceptibility of tones and/or impulses), if appropriate, and it is then termed the 'rating level', whether or not a rating penalty is applied. The 'residual sound' is defined as the ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.

11.33 BS 4142:2014+A1:2019 requires that the background sound levels adopted for the assessment be representative of the period/s being assessed. The Standard recommends that the background sound level should be derived from continuous measurements of normally not less than 15-minute intervals, which can be contiguous or disaggregated. However, the Standard states that there is no 'single' background sound level that can be derived from such measurements. It is particularly difficult to determine what is 'representative' of the night-time period because it can be subject to a wide variation in background sound levels between the shoulder night periods.

11.34 The approach that has been adopted for the Uskmouth Conversion Projectis to determine the background and residual sound levels in 15-minute periods and take the 25th percentile for each period. Further information regarding the determination of ambient and background sound levels is provided under 'Baseline Conditions'.

11.35 The specific sound levels have been determined separately in terms of the $L_{Aeq,T}$ index for operations during the daytime (07:00 hrs to 19:00 hrs), evening (19:00 hrs to 23:00 hrs) and night-time (23:00 hrs to 07:00 hrs) periods. It is noted that these hours vary from those provided in BS 4142:2014+A1:2019 as they split the daytime period between daytime and evening. This allows for separate consideration of the evening period, which is generally considered to be more sensitive.

11.36 Road deliveries to the site are likely to be during daytime working hours; however, operation of the conveyors is required on 24 hour basis. Plant and processes within buildings may operate continuously and have therefore been included in all three assessment periods. Details of operational periods of plant are included in Appendix 11.2.

11.37 At each NSR, the rating level has been determined from the predicted specific sound level. Where RPS has considered it to be appropriate, a rating penalty has been applied for tonality, impulsivity and/or intermittent specific sounds as described in the commentary to paragraph 9.2 of BS 4142:2014+A1:2019. This has been applied with consideration for the main sound sources from

the development that contribute to the level and character of the specific sound at each NSR location.

11.38 As per the requirements of the Standard, an initial estimate of the impact of the specific sound has been obtained by subtracting the measured background sound level from the rating level of the specific sound. Table 11.5 provides the initial evaluation of impact following this method.

Table 11.5: General Definitions of Magnitude of Noise Impact

Magnitude	Descriptors
High	Difference between Rating Level and Background Level of more than +10 dB.
Medium	Difference between Rating Level and Background Level of +5 to +10 dB.
Low	Difference between Rating Level and Background Level of 0 dB to +5 dB.
Negligible	Difference between Rating Level and Background Level of less than 0 dB.
No change	Difference between Rating Level and Background Level of less than - 10 dB.

11.39 Following the initial evaluation of impact, the context of the sound has also been considered, which is a key requirement of the Standard. In evaluation of the context, the following factors have been considered:

- the absolute level of the sound;
- the character and level of the residual sound compared to the character and level of the specific sound; and
- the sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions.

11.40 The evaluation of the magnitude of noise impacts at receptors has been amended following consideration of the above contextual factors.

Noise from Operational Traffic

11.41 Noise from operational traffic on the highway has been considered using the same methodology as applied to construction traffic described above.

Significance of Effects

11.42 The assessment of significance is based on the matrix provided in Table 11.6.

Table 11.6: Assessment Matrix

Sensitivity	Magnitude of Impact				
	No Change	Negligible	Low	Medium	High
Negligible	No change	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	No change	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	No change	Negligible or Minor	Minor	Moderate	Moderate or Major

High	No change	Minor	Minor or Moderate	Moderate or Major	Major or Substantial
Very high	No change	Minor	Moderate or Major	Major or Substantial	Substantial

11.43 Where the matrix offers more than one significance option, professional judgement has been used to decide which option is most appropriate.

11.44 Effects that are moderate, major or substantial are considered to be significant with respect to the EIA Regulations. Negligible and minor effects are not significant.

Limitations of the Assessment

Baseline Noise Monitoring

11.45 For surveys, there are limitations associated with: the instrumentation itself; and the use of instrumentation, i.e. the measurements. Uncertainty due to instrumentation error has been significantly reduced with the introduction of modern instrumentation and is reduced further by ensuring that all instrumentation is calibrated before and after each measurement period and is within accepted formal calibration intervals. Every effort has been made to reduce the uncertainty of the baseline sound level measurements, by carrying out the baseline sound level survey over a period of several days and allowing analysis of how representative the baseline data is given the naturally varying noise levels at the site.

Noise Modelling and Calculations

11.46 For noise modelling and calculations, there are limitations in the source data used and the sound propagation model or calculation method.

11.47 Operational sound emissions from the Uskmouth Conversion Project have been determined from information provided by the project team and RPS' experience of other similar sites. Therefore, these data are estimates of realistically achievable sound levels although the final plant installed within the application site may vary from that which has been modelled.

11.48 Sound immissions at NSRs have been calculated using the prediction methodology in ISO 9613-2:1996. ISO 9613-2 is widely used for the prediction of industrial noise. For source heights up to 30 m and prediction distances between 100 m and 1000 m, ISO 9613-2:1996 claims accuracy of +/-3 dB.

Assessment of Effects

11.49 The acoustics standards and guidance adopted for the assessment of effects are based on the subjective response of the majority of the population. This is considered to be the best that can be achieved in a population of varying subjective responses, which are dependent upon a wide range of factors.

11.50 On the basis of the above, it is considered that limitations to the assessment have been minimised and that the results provide a robust estimate of the likely noise effects of the development.

Baseline Environment

11.51 The site is in a generally rural/industrial fringe location with other industrial activity around the Uskmouth Conversion Project site However, the nearest NSRs are all to the east of the site, where the majority of industrial activities are in the main not audible. Observations were made of the acoustic environment at the time of setting up and collecting the sound level meter at Lowlands and Moorcroft Farm. The main sound source at the survey site was local road traffic on West Nash Road. There was also some sound from farm machinery, as well as sound from non-anthropogenic sources such as wind in trees and birdsong. The wastewater treatment works to the east of the

application site was not audible. However, this may be audible during quieter periods such as the night-time.

11.52 Weather conditions during the survey were mainly dry with some periods of rain, which were removed from the dataset. Wind speeds were mainly low and were below 5 m/s throughout the survey, with the prevailing wind direction being south-westerly. Therefore, no data have been removed from the dataset due to wind.

11.53 An analysis has been carried out of the measured baseline sound levels in 15-minute periods. These analyses are provided in Table 11.7. Data are rounded to the nearest whole number. Further survey details, photographs and a location plan of the survey, and graphical plots of the survey data are provided in Appendix 11.3.

Table 11.7: 15-minute Baseline Sound Level Data (whole period)

Value	Daytime (07:00 to 19:00 hours)		Evening (19:00 to 23:00 hours)		Night-time (23:00 to 07:00 hours)	
	Residual Sound Level (dB $L_{Aeq,T}$)	Background Sound Level (dB $L_{A90,T}$)	Residual Sound Level (dB $L_{Aeq,T}$)	Background Sound Level (dB $L_{A90,T}$)	Residual Sound Level (dB $L_{Aeq,T}$)	Background Sound Level (dB $L_{A90,T}$)
Range	42 - 69	30 - 49	40 - 54	33 - 46	39 - 61	34 - 46
25th Percentile	49	40	43	40	42	40
Median	51	43	45	42	43	41
75th Percentile	52	44	46	43	45	43
Average	52	41	45	42	46	41
Standard deviation	3	4	2	2	4	2

Future Baseline Conditions

11.54 The 2017 EIA Regulations require consideration of how climate change would influence the future baseline. There is no established relationship between climate change and the noise and/or vibration baseline, so this is not considered relevant to this chapter.

Mitigation Measures Adopted as Part of the Project

Demolition and Construction Phase Mitigation

11.55 Demolition (no demolition is planned for Uskmouth Conversion Project) and construction works would follow Best Practicable Means (BPM) outlined in Section 72 of the Control of Pollution Act 1974 (as amended) (HMSO 1974) to minimise noise and vibration effects. Contractors would be required to adopt and implement BPM measures identified. A Construction Environmental Management Plan (CEMP) will be submitted to NCC prior to commencement of construction activities and following the appointment of a contractor.

11.56 The following measures will be adopted in the CEMP, based upon the guidance contained in BS 5228-1:2009+A1:2014 and BS 5228-2:2009+A1:2014:

- **Communication:** Occupiers of residential and business properties that are likely to be affected by the works will be notified in advance of the works. A Construction Liaison Officer would be appointed to take primary responsibility for the day-to-day implementation of the CEMP during the construction phase and to act as the first point of contact on environmental

matters for NCC, other external bodies and the general public. Information regarding the nature and duration of the works and named contact details for key members of staff will be displayed on a noticeboard near to the site.

- **Standard Construction Hours:** Working hours would be as specified in Chapter 2 Project Description i.e. 07:00 to 19:00 hours Monday to Friday, and 07:00 to 13:00 hours on Saturday and at no time on Sundays or on public or bank holidays. In the event that works are required outside of these hours to permit construction activities, e.g. slip form of storage silos. This would be agreed with NCC prior to commencement of the activity. In such instances, the contractor would apply to NCC for written consent prior to work commencing by submitting a Section 61 application in line with the Control of Pollution Act.
- **Access Routes:** Access to the site would be via the existing public highway through the manned security gate on West Nash Road. A Construction Traffic Management Plan (CTMP) will be agreed with NCC prior to the commencement of any construction works. Full details of construction access routes are provided in Chapter 10 Traffic and Transport.
- **Equipment:** Quieter alternative methods, plant and equipment would be used, where reasonably practicable.
- **Worksite:** Plant, equipment, site offices, storage areas and worksites would be positioned away from existing NSRs, where reasonably practicable.
- **Maintenance:** All vehicles, plant and equipment would be maintained and operated in an appropriate manner, to ensure that extraneous noise from mechanical vibration, creaking and squeaking is kept to a minimum.
- **Piling:** The piling types and methods will be determined by design and will be confirmed by the conversion contractor and agreed in consultation with NCC prior to work commencing.

Operational Phase Mitigation

11.57 The site will be subject to an NRW Environmental Permit Regulations (EPR) and therefore will need to demonstrate that Best Available Techniques (BAT) have been adopted for reducing environmental effects, including noise. No specific mitigation for noise has been adopted as the initial assessment of environmental effects indicated that the operational noise levels would be low.

Assessment of Construction Effects

On Site Construction Effects

11.58 Details of the construction of the Uskmouth Conversion Project are provided in Chapter 2 Project Description.

11.59 Noise emissions are likely to be highest at the early stages of construction works, i.e. site/ground preparation and civils works, and decrease during the plant and building erection and fit-out stages.

11.60 For the majority of the construction period, plant on-site would comprise various diesel mechanised construction plant including excavators (with various tool attachments depending upon the task being undertaken), dump trucks, telehandlers, mobile cranes and delivery lorries.

11.61 Construction of hardstanding areas, roads and building foundations would require concrete mixers and pumps, as well as concrete rollers and vibrators. However, these works would be limited, as much of the infrastructure for the site is already in place.

11.62 It is anticipated the construction technique of piling would be used to support the silos. The position and number of piles required to support the infra structures are to be determined by design and will be confirmed by the conversion contractor. The method for any piling activities is to be determined

by design and will be confirmed by the conversion contractor and agreed in consultation with NCC prior to work commencing. This piling activity is likely to be short duration.

11.63 From the 'Study Area' section of this chapter, the closest existing NSR to the site is Great House, which is located approx. 600 m to the south-east, with other NSRs being located further to the east or south-east.

11.64 Table 11.7 of this chapter confirms that baseline ambient noise levels are relatively low in the area. Therefore, there is potential for noise from construction activities to be noticeable at the nearest NSRs. However, noise generating works would be intermittent and, therefore, on average, would likely be felt as a minor shift from baseline conditions, and are unlikely to result in any changes to behaviour or attitude of the residents of affected properties. Furthermore, noise from construction activities would be controlled through mitigation which would be enforced through the CEMP.

11.65 In summary, it is unlikely that construction works will generate noise levels at NSRs that are disturbing or that affect activities commonly occurring in residential areas. Noise levels are likely to be noticeable for limited and short durations when significant works such as piling are being undertaken. Construction activities will take place to a predetermined schedule following the BPM measures stated within the mitigation section above. There would be no change to the evening, night-time or weekend baseline noise conditions, as most construction activities will be outside of these more sensitive periods, it is likely that a separate consent would be sought for 24 hour construction activities, e.g. slip form concrete.

11.66 With reference to Table 11.6, the magnitude of noise impacts, prior to mitigation, would be at most low. The sensitivity of receptors is medium. Therefore, there is likely to be a direct, temporary, medium-term noise effect on NSRs of minor adverse significance prior to the implementation of mitigation measures.

Off-Site Construction Traffic

11.67 Noise effects from traffic on the local road network have been assessed for all road links that are included within the traffic routes provided in Chapter 10 Traffic and Transport.

11.68 Baseline traffic data have been provided for the base year (2022); and baseline and construction traffic have been provided for the opening year (2022). An evaluation has been made of the noise effect from construction traffic by comparing these two scenarios.

11.69 A summary of the calculations and assessment is provided in Table 11.8.

Table 11.8: BS 4142:2014+A1:2019 Assessment for Night-time

ID	Road Section	2022 Baseline 18-hr AAWT (06:00 - 00:00 hr)				2022 Base + Construction Traffic 18-hr AAWT (06:00 – 00:00 hr)				Noise Change (dB)
		Flow	% HGV	Speed (km/h)	$L_{A10,18hr}$ (dB)	Flow	% HGV	Speed (km/h)	$L_{A10,18hr}$ (dB)	
Link 2	West Nash Road - west of Nash village	722	4.4%	97	61	1066	5.8%	97	63	2
Link 3	West Nash Road - east of Nash village	1019	4.2%	48	58	1363	5.4%	48	59	2
Link 4	Nash Road	1867	2.8%	64	62	2211	3.7%	64	63	1
Link 5	Meadows Road - South of Industrial Park	2399	4.3%	64	63	2743	4.8%	64	64	1
Link 6	Meadows Road - North of Industrial Park	7068	9.0%	64	69	7412	9.0%	64	69	0

Link 7	A4810 west of the Meadows Road Roundabout	22781	7.6%	64	74	23025	7.6%	64	74	0
Link 8	A4810 Queens Way east of the Glan Llyn Roundabout	16865	9.1%	48	71	16966	9.1%	48	71	0

11.70 The assessment indicates that the noise change on all of the road links would be less than 3 dB, and therefore of negligible magnitude. The receptors are of medium sensitivity, and the significance of effects would be negligible.

Further Mitigation

11.71 Reasonable mitigation for noise and vibration from construction effects has been provided by applying BPM as outlined within the mitigation measures adopted as part of the project. With this mitigation in place, construction noise and vibration effects are expected to be minor adverse and of a temporary nature. On this basis, it is not expected that there will be a need for further mitigation measures to be employed.

Future Monitoring

11.72 Noise and vibration monitoring could be carried out during construction works in accordance with the 2017 EIA Regulations where there is a requirement to determine that the effects occurring are no worse than those predicted. This could either comprise short-term measurements or monitoring over a longer period via a remote access noise monitor with set noise thresholds. Procedures for noise monitoring would be discussed and agreed with NCC and provided in the CEMP. Monitoring may also be carried out to address any complaints that may occur. However, given the distance between the development and the nearest NSRs, monitoring during construction is not considered necessary.

Accidents and/or Disasters

11.73 Some accidents and disasters may cause an instantaneous increase in noise levels. However, the likelihood of an accident or disaster occurring that would result in a noise or vibration effect is very low.

Assessment of Operational Effects

On site Activities

11.74 Tables 11.9, 11.10 and 11.11 provide the initial estimates of the noise impact at the nearest NSRs due to the operation of the facility in accordance with BS 4142:2014+A1:2019 for the daytime, evening and night-time periods, respectively. The predicted specific sound levels are also presented graphically in Figure 11.1 for the daytime and Figure 11.2 for the evening and night-time period.

11.75 With reference to BS 4142:2014+A1:2019, a character correction may need to be applied to the specific sound level depending on the acoustic characteristics of the sound. In RPS' experience of similar sites, noise from the development is likely to be of a broadband nature and would not be impulsive or readily distinctive. With some exceptions under emergency circumstances, the plant is likely to operate on a continual basis and not regularly switch on/off. In addition, the predicted specific sound levels are well below the background sound levels. Therefore, in this instance, it is not considered appropriate to apply any corrections for the acoustic character of the plant.

Table 11.9: BS 4142:2014+A1:2019 Assessment for Daytime

Noise Sensitive Receptor	Background Sound Level, $L_{A90,T}$ dB	Residual Sound Level, $L_{Aeq,T}$ dB	Specific Sound Level, $L_{Aeq,T}$ dB	Character Correction	Rating Level, $L_{Ar,Tr}$ dB	Rating Level minus Background Sound Level dB	Total Ambient Sound Level (Specific Plus Residual), $L_{Aeq,T}$ dB	Change in Ambient Sound Level dB
Arch Cottage	40	49	26	0	26	-14	49	0
Church House, Nash	40	49	27	0	27	-14	49	0
Great House	40	49	34	0	34	-6	49	0
Lowlands / Moorcroft Farm	40	49	31	0	31	-9	49	0
Ty-Portra	40	49	30	0	30	-10	49	0

Table 11.10: BS 4142:2014+A1:2019 Assessment for Evening

Noise Sensitive Receptor	Background Sound Level, $L_{A90,T}$ dB	Residual Sound Level, $L_{Aeq,T}$ dB	Specific Sound Level, $L_{Aeq,T}$ dB	Character Correction	Rating Level, $L_{Ar,Tr}$ dB	Rating Level minus Background Sound Level dB	Total Ambient Sound Level (Specific Plus Residual), $L_{Aeq,T}$ dB	Change in Ambient Sound Level dB
Arch Cottage	40	43	28	0	28	-13	43	0
Church House, Nash	40	43	28	0	28	-12	43	0
Great House	40	43	35	0	35	-6	44	1
Lowlands / Moorcroft Farm	40	43	32	0	32	-8	44	0
Ty-Portra	40	43	32	0	32	-9	44	0

Table 11.11: BS 4142:2014+A1:2019 Assessment for Night-time

Noise Sensitive Receptor	Background Sound Level, $L_{A90,T}$ dB	Residual Sound Level, $L_{Aeq,T}$ dB	Specific Sound Level, $L_{Aeq,T}$ dB	Character Correction	Rating Level, $L_{Ar,Tr}$ dB	Rating Level minus Background Sound Level dB	Total Ambient Sound Level (Specific Plus Residual), $L_{Aeq,T}$ dB	Change in Ambient Sound Level dB
Arch Cottage	40	42	28	0	28	-12	42	0
Church House, Nash	40	42	28	0	28	-11	42	0
Great House	40	42	35	0	35	-5	43	1
Lowlands / Moorcroft Farm	40	42	32	0	32	-7	42	0
Ty-Portra	40	42	32	0	32	-8	42	0

11.76 BS 4142:2014+A1:2019 states the following with regards to the difference between the rating and background sound level:

- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source 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 on the context.

11.77 From Tables 11.9, 11.10 and 11.11, the rating levels are well below the background sound levels across all periods of the daytime, evening and night-time, with the highest level difference being -5 dB at Great House during the night-time period. On this basis, it is likely that the noise impact would be low or even negligible, depending on the context.

11.78 The specific sound levels range from 26 to 34 dB $L_{Aeq,T}$ during the daytime and 28 to 35 dB $L_{Aeq,T}$ during the evening and night-time. These levels are well below the criteria for speech intelligibility and moderate annoyance during the daytime and sleep disturbance during the night-time provided in the WHO GCN. In the majority of locations, the specific sound levels are sufficiently below residual sound levels that they would not cause an increase to the overall ambient sound levels. At Great House, an increase in the ambient of 1 dB is estimated during the evening and night-time periods. However, as the overall sound level is well below the threshold at which sleep disturbance would occur, this increase is not significant. There are other industrial activities in the vicinity, some of which were audible at the baseline sound monitoring location. Noise emissions from the development are therefore not dissimilar to other existing sources of sound in the area.

11.79 Therefore, with consideration of the context, the noise impact of the operational phase of the development is considered to be negligible. The sensitivity of receptors is medium. Therefore, there is likely to be a direct, long term noise effect on NSRs of negligible adverse significance prior to the implementation of mitigation measures.

Noise from Off-Site Operational Traffic

11.80 Noise effects from traffic on the local road network have been assessed for all road links that are included within the traffic routes provided in Chapter 10 Traffic and Transport.

11.81 Baseline traffic data have been provided for the base year (2022); and baseline and operational traffic have been provided for the opening year (2026). An evaluation has been made of the noise effect from operational traffic by comparing these two scenarios.

11.82 A summary of the calculations and assessment is provided in Table 11.12.

Table 11.12: BS 4142:2014+A1:2019 Assessment for Night-time

ID	Road Section	2022 Baseline 18-hr AAWT (06:00 – 00:00 hr)				2022 Baseline + Operational Traffic 18-hr AAWT (06:00 – 00:00 hr)				Noise Change (dB)
		Flow	% HGV	Speed (km/h)	$L_{A10,18hr}$ (dB)	Flow	% HGV	Speed (km/h)	$L_{A10,18hr}$ (dB)	
Link 2	West Nash Road - west of Nash village	722	4.4%	97	61	812	15.2%	97	63	2
Link 3	West Nash Road - east of Nash village	1019	4.2%	48	58	1109	12.2%	48	60	2
Link 4	Nash Road	1867	2.8%	64	62	1957	7.3%	64	63	1
Link 5	Meadows Road - South of Industrial Park	2399	4.3%	64	63	2489	7.8%	64	64	1
Link 6	Meadows Road - North of Industrial Park	7068	9.0%	64	69	7158	10.2%	64	69	0
Link 7	A4810 west of the Meadows Road Roundabout	22781	7.6%	64	74	22826	7.8%	64	74	0
Link 8	A4810 Queens Way east of the Glan Llyn Roundabout	16865	9.1%	48	71	16910	9.4%	48	71	0

11.83 The assessment indicates that the noise change on all of the road links would be less than 3 dB, which is of negligible magnitude. The receptors are of medium sensitivity, and the significance of effects would be negligible.

Further Mitigation

11.84 As the significance of operational noise effects from the operational phase of the Uskmouth Conversion Project would be negligible, no specific mitigation measures for noise are expected to be required, although as a matter of best practice, Best Available Techniques (BAT) would still need to be applied as per the requirements of the Environmental Permit Regulations.

Future Monitoring

11.85 Noise and vibration monitoring could be carried out during the early stages of operation of the development in accordance with the 2017 EIA Regulations where there is a requirement to determine that the effects occurring are no worse than those predicted. This could either comprise short-term measurements or monitoring over a longer period via a remote access noise monitor with set noise thresholds. Procedures for noise monitoring would be discussed and agreed with NCC following consent. Monitoring may also be carried out to address any complaints that may occur. However, given the distance between the development and the nearest NSRs, monitoring during operation is not considered necessary.

Accidents/Disasters

11.86 Some operational accidents and disasters may cause an instantaneous increase in noise levels. However, the likelihood of an accident or disaster occurring that would result in a noise or vibration effect is very low.

Potential Changes to the Assessment as a Result of Climate Change

11.87 There is no published research into the effects of climate change on noise levels. Furthermore, all noise assessments are based on standardised meteorological conditions, with noise monitoring carried out in specific conditions. On this basis, there would be no changes to the noise and vibration assessment as a result of climate change.

Assessment of Cumulative Effects

11.88 In order for a cumulative noise impact to occur, a development would need to cause an impact at common receptors that is of at least minor significance. Cumulative effects are therefore unlikely to occur with any development that is further than 1 km from a common NSR. We are not aware of any major committed developments or developments in planning that fall within this distance. Therefore, cumulative noise and vibration effects are considered to be unlikely.

Inter-relationships

11.89 Noise and vibration effects on ecological receptors are provided in Chapter 7 Ecology.

11.90 There is potential for noise and vibration effects on residential amenity to combine with other effects such as Landscape and Visual (Chapter 8); Traffic and Transport (Chapter 10); Air Quality (Chapter 12) and Population and Health (Chapter 14).

Summary of Effects

11.91 This assessment has considered noise and vibration effects during the construction and operational phases of the Uskmouth Conversion Project .

11.92 Due to the separation distance between the site and receptors, vibration effects are considered to be negligible and have been excluded from the scope of both the construction and operational assessment.

11.93 During the construction phase, there is likely to be a direct, temporary, medium term residual noise effect on NSRs of negligible to minor adverse significance.

11.94 During the operational phase, there is likely to be a direct, long term residual noise effect on NSRs of negligible adverse significance.

11.95 Subject to suitable controls during the construction phase, the Proposed Development would not, in noise and vibration terms, conflict with national or local policies.

References

11.96 All references listed throughout the chapter are listed below:

Welsh Government. Planning Policy Wales (2018) Edition 10.

Technical Advice Note (TAN) 11 (1997): Noise.

Updated to Technical Advice Note (TAN) 11: Noise.

Pembrokeshire County Council (2013) Local Development Plan. Planning Pembrokeshire's Future.

The Stationery Office Limited (1974) Control of Pollution Act, Chapter 40, Part III

The Stationery Office Limited (1990) Environmental Protection Act, Chapter 43, Part III

British Standard 5228-1:2009+A1:2014 (2014) Code of practice for noise and vibration control on construction and open sites - Part 1: Noise.

British Standard 4142:2014+A1:2019 (2019) Methods for rating and assessing industrial and commercial sound.

British Standard 7445-2 (1991) Description and measurement of environmental noise - Part 2: Guide to the acquisition of data pertinent to land use.

The Town and Country Planning (2017) Environmental Impact Assessment Regulations.

Table 11.13: Summary of the Likely Environmental Effects of Noise and Vibration

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact	Significance of effect	Significant / Not significant
Construction phase						
Residential properties within 1 km of the site boundary	Medium	Noise	Medium-term	Negligible to Low	Negligible to Minor Adverse	Not significant
Residential properties within 1 km of the site boundary	Medium	Vibration	Medium-term	No effect / Negligible	No effect / Negligible	Not significant
Operational phase						
Residential properties within 1 km of the site boundary	Medium	Noise	Long term	Negligible	Negligible	Not significant
Residential properties within 1 km of the site boundary	Medium	Vibration	Long term	No effect	No effect	Not significant

12 AIR QUALITY

Introduction

12.1 This chapter assesses the likely significant air quality effects resulting from the Uskmouth Conversion Project

12.2 The potential air quality effects from the Uskmouth Conversion Project construction and future operation are considered to be:

- Construction effects – potential dust effects from construction activities; emissions from on-site construction plant and potential effects associated with emissions from construction vehicles on the local road network; and
- Operational effects – potential air quality effects from the thermal treatment stack; potential fugitive dust, odour and bio-aerosol effects.

Assessment Methodology

Planning Policy Context

12.3 The following planning policy documents are relevant to this assessment:

- Planning Policy Wales Edition 10 (Welsh Government, 2018); and
- Newport Local Development Plan 2011 - 2026 (Newport City Council (NCC), 2015).

12.4 Details of these policies and how they relate to this chapter are provided in Appendix 12.1.

Relevant Guidance and Legislation

BAT Conclusions - Emissions Levels

12.5 The plant would be designed and operated in accordance with the '*Commission Implementing Decision (EU) 2019/2010 of 12 November 2019 establishing the best available techniques (BAT) conclusion, under Directive 2010/75/EU of the European Parliament and of the Council for waste incineration'* (European Commission, 2019), hereafter referred to as BAT conclusions. The BAT conclusions establish emission levels associated with best available techniques (BAT-AEL).

Ambient Air Quality Criteria

12.6 There are several EU Air Quality Directives and UK Air Quality Standards (Wales) Regulations (Department for Environment, Food and Rural Affairs (Defra), 2010) that will apply to the operation of the Uskmouth Conversion Project. These provide a series of statutory air quality limit values, target values and objectives.

12.7 Some pollutants BAT-AELs but do not have statutory ambient air quality standards prescribed under current legislation. For these pollutants, several non-statutory ambient air quality objectives and guidelines exist that have been applied within this assessment.

Air Quality Directive and Air Quality Standards Regulations

12.8 The 2008 Ambient Air Quality Directive (Council Directive 2008/50/EC) (European Parliament, 2008) aims to protect human health and the environment by avoiding, reducing or preventing harmful concentrations of air pollutants; it sets legally binding concentration-based limit values, as well as target values. There are also information and alert thresholds for reporting purposes.

These are to be achieved for the main air pollutants: particulate matter (PM_{10} and $PM_{2.5}$[4]), nitrogen dioxide (NO_2), sulphur dioxide (SO_2), ozone (O_3), carbon monoxide (CO), lead (Pb) and benzene. This Directive replaced most of the previous EU air quality legislation and in Wales was transposed into domestic law by the Air Quality Standards (Wales) Regulations 2010 (Defra, 2010), which in addition incorporates the 4th Air Quality Daughter Directive (2004/107/EC) that sets targets for ambient air concentrations of certain toxic heavy metals (arsenic, cadmium and nickel) and polycyclic aromatic hydrocarbons (PAH). Member states must comply with the limit values (which are legally binding on the Secretary of State) and the government and devolved administrations operate various national ambient air quality monitoring networks to measure compliance and develop plans to meet the limit values. The statutory ambient limit values are listed in Table 12.1.

Table 12.1: Statutory Air Quality Limit Values

Pollutant	Averaging Period	Limit Values	Not to be Exceeded More Than
Nitrogen Dioxide (NO_2)	1 hour	200 µg.m^{-3}	18 times pcy*
	Annual	40 µg.m^{-3}	-
Particulate Matter (PM_{10})	24 hour	50 µg.m^{-3}	35 times pcy
	Annual	40 µg.m^{-3}	-
Particulate Matter ($PM_{2.5}$)	Annual	25 µg.m^{-3}	-
Carbon Monoxide	Maximum daily running 8 hour mean	10,000 µg.m^{-3}	-
Sulphur Dioxide (SO_2)	15 minute	266 µg.m^{-3}	35 times pcy
	1 hour	350 µg.m^{-3}	24 times pcy
	24 hour	125 µg.m^{-3}	3 times pcy
Lead (Pb)	Annual	0.25 µg.m^{-3}	-
Arsenic (As)	Annual	0.006 µg.m^{-3}	-
Cadmium (Cd)	Annual	0.005 µg.m^{-3}	-
Nickel (Ni)	Annual	0.02 µg.m^{-3}	-

* per calendar year

Non-Statutory Air Quality Objectives and Guidelines

12.9 The Environment Act 1995 established the requirement for the government and the devolved administrations to produce a National Air Quality Strategy (AQS) for improving ambient air quality, the first being published in 1997 and having been revised several times since, with the latest published in 2007 (Defra, 2007). The AQS sets UK air quality standards and objectives for the pollutants in the Air Quality Standards (Wales) Regulations plus 1,3-butadiene and recognises that action at national, regional and local level may be needed, depending on the scale and nature of the air quality problem. There is no legal requirement to meet objectives set within the UK AQS except where equivalent limit values are set within the EU directives referenced above.

12.10 The 1995 Environment Act also established the UK system of Local Air Quality Management (LAQM), which requires local authorities to go through a process of review and assessment of air quality in their areas, identifying places where objectives are not likely to be met, then

[4] PM_{10} = Particulate matter with a diameter up to 10 µm. $PM_{2.5}$ = Particulate matter with a diameter up to 2.5 µm.

declaring Air Quality Management Areas (AQMA) and putting in place Air Quality Action Plans to improve air quality. These plans also contribute, at local level, to the achievement of EU limit values.

12.11 Non-statutory ambient air quality objectives and guidelines also exist within the World Health Organisation Guidelines (WHO, 2005) and the Expert Panel on Air Quality Standards Guidelines (Defra, 2005). The non-statutory ambient objectives and guidelines are presented in Table 12.2.

Table 12.2: Non-Statutory Air Quality Objectives and Guidelines

Pollutant	Averaging Period	Guideline
Particulate Matter ($PM_{2.5}$)	Annual	25 µg.m^{-3}
PAHs (as B[a]P equivalent)	Annual	0.00025 µg.m^{-3}
Sulphur Dioxide (SO_2)	Annual (a)	50 µg.m^{-3}
Hydrogen Chloride (HCl)	1 hour (b)	750 µg.m^{-3}
Hydrogen Fluoride (HF)	1 hour (b)	160 µg.m^{-3}

(a) World Health Organisation guidelines

(b) EPAQS recommended guideline values

Environmental Assessment Levels

12.12 Natural Resources Wales (NRW) uses the Environment Agency's (EA) online guidance entitled '*Environmental management – guidance, Air emissions risk assessment for your environmental permit'* (Defra & EA, 2016) provides further assessment criteria in the form of Environmental Assessment Levels (EAL).

12.13 Table 12.3 presents all available EALs for ambient concentrations of the pollutants relevant to this assessment.

Table 12.3: Environmental Assessment Levels (EALs)

Pollutant	Long-term EAL, µg.m-3	Short-term EAL, µg.m-3
Nitrogen dioxide (NO_2)	40 (a)	200
Carbon monoxide (CO)	-	10,000
Sulphur dioxide (SO_2)	50	267
Particulates (PM_{10})	40 (a)	50
Particulates ($PM_{2.5}$)	25	-
Hydrogen chloride (HCl)	-	750
Hydrogen fluoride (HF)	16 (monthly average)	160
Arsenic (As)	0.003	-
Antimony (Sb)	5	150
Cadmium (Cd)	0.005	-
Chromium (Cr)	5	150
Chromium VI (oxidation state in the PM_{10} fraction)	0.0002	-
Cobalt (Co)	0.2 (a)	6 (a)
Copper (Cu)	10	200
Lead (Pb)	0.25	-
Manganese (Mn)	0.15	1500
Mercury (Hg)	0.25	7.5
Nickel (Ni)	0.02	-
Thallium (Tl)	1 (a)	30 (a)

Vanadium (V)	5	1
PAHs (as B[a]P equivalent)	0.00025	-
Ammonia (NH_3)	5	-

In Table 12.3, (a) refers to EALs obtained from the EA's earlier Horizontal Guidance Note EPR H1 (Environment Agency, 2010) as no levels are provided in the current guidance.

12.14 For the purpose of this assessment, the statutory ambient air quality limit and target values (as presented in Table 12.4) are assumed to take precedent over objectives, guidelines and the EALs. In addition, for those pollutants which do not have any statutory air quality standards, this assessment assumes the lower of either the EAL or the non-statutory air quality objective or guideline where they exist.

Table 12.4: Environmental Assessment Levels (EALs) Used in this Assessment

Pollutant	Averaging Period	EAL, µg.m-3
PM_{10}	24 hour (90.41st percentile)	50
	24 hour (annual mean)	40
$PM_{2.5}$	24 hour (annual mean)	25
HCl	1 hour (maximum)	750
HF	1 hour (maximum)	160
SO_2	15 minute (99.90th percentile)	266
	1 hour (99.73th percentile)	350
	24 hour (99.18th percentile)	125
	1 hour (annual mean)	50
NO_2	1 hour (99.79th percentile)	200
	1 hour (annual mean)	40
CO	8 hour (maximum daily running)	10,000
Cd	1 hour (annual mean)	0.005
Tl	1 hour (maximum)	30
	1 hour (annual mean)	1
Hg	1 hour (maximum)	7.5
	1 hour (annual mean)	0.25
Sb	1 hour (maximum)	150
	1 hour (annual mean)	5
As	1 hour (annual mean)	0.003
Cr	1 hour (maximum)	150
	1 hour (annual mean)	5
Co	1 hour (maximum)	6
	1 hour (annual mean)	0.2
Cu	1 hour (maximum)	200
	1 hour (annual mean)	10
Pb	1 hour (annual mean)	0.25
Mn	1 hour (maximum)	1500
	1 hour (annual mean)	0.15
Ni	1 hour (annual mean)	0.02
V	1 hour (maximum)	5
	1 hour (annual mean)	1
Dioxins & Furans	1 hour (annual mean)	-
PAHs	1 hour (annual mean)	0.00025
Polychlorinated Biphenyls (PCB)	1 hour (annual mean)	0.2

Environmental Permitting

12.15 The project will be regulated under the Environmental Permitting Regulations (England and Wales) Regulations 2016 (the EPR), which implements the *Council Directive 2010/75/EU of the European Parliament and of the Council on industrial emissions* (European Union, 2010), known as the Industrial Emissions Directive or the IED. The EPR define activities that require the operator to obtain an Environmental Permit from Natural Resources Wales (NRW).

12.16 EPR is a regulatory system to control the environmental and health impacts across all environmental media (using an integrated approach) of certain listed industrial activities, via a single permitting process. To gain a permit, operators have to demonstrate in their applications, in a systematic way, that the techniques they are using or are proposing to use for their installation are the best available techniques (BAT) to prevent or minimise the effects of the activity on air, land and water taking account of relevant local factors. The permitting process also places a duty on the regulating body, NRW in this case, to ensure that the requirements of the IED are included for permitted sites to which these apply.

12.17 It is a mandatory requirement of EPR that NRW ensures that no single industrial installation regulated is the sole cause of a breach of a UK air quality objective. Additionally, NRW has committed to guarantee that no installation will contribute significantly to a breach of a UK air quality objective (Defra, 2016).

12.18 To do this NRW will ensure that BAT is used to deliver the maximum improvements to air quality where UK air quality objectives are in danger of being breached.

Study Area

12.19 The assessment study area differs between the construction and operational phases. The study areas in each case are described in detail within the methodology that follows, referencing the relevant guidance documents.

12.20 In overview, the study area for the construction phase dust impacts is up to 350 m from the (redline) site boundary and roads up to 500 m from the site entrance. For stack emissions, the study area is up to 15 km from the stack for ecological receptors and human-health receptors.

Baseline Approach

12.21 This chapter assesses the effects of emissions associated with operating the converted power station at the limits set out in Table 12.7. It uses baseline data from monitoring undertaken over several years as set out in Appendix 12.2, adding the calculated concentration from emissions to this baseline. As the baseline is taken from measured data, it is not projected forwards, but air quality is generally improving over time and into the future.

12.22 The assessed baseline does not include the full effect of power generation at Uskmouth Power Station, as the power station has not been operational at capacity in recent years, but if it were to continue in operation, emissions would be expected to be greater than those which are subject to this assessment, as it would have a higher capacity. The impact of the Uskmouth Conversion Project against a future baseline scenario with continued operation at greater capacity would effectively result in a net decrease in emissions and consequent effects.

Baseline Methodology

12.23 The background concentration often represents a large proportion of the total pollution concentration, so it is important that the background concentration selected for the assessment is realistic. Environmental Protection UK (EPUK) & Institute of Air Quality Management (IAQM) guidance highlight public information from Defra and local monitoring studies as potential sources of information on background air quality. LAQM Technical Guidance: LAQM.TG16

recommends that Defra mapped concentration estimates are used to inform background concentrations in air quality modelling and states that: *"Where appropriate these data can be supplemented by and compared with local measurements of background, although care should be exercised to ensure that the monitoring site is representative of background air quality".*

12.24 For this assessment, the background air quality has been characterised by drawing on information from the following public sources:

- Defra maps which show estimated pollutant concentrations across the UK in 1 km grid squares (Defra, no date); and
- published results of local authority Review and Assessment (R&A) studies of air quality, including local monitoring and modelling studies (NCC, 2018).

12.25 A detailed description of how the baseline air quality has been derived for the Uskmouth Conversion Project is provided in Appendix 12.2 and is summarised in the Baseline Environment section of this chapter.

Consultation

12.26 Paragraph 1.1.4 of the February 2020 scoping opinion shows that Natural Resources Wales states "*We note that Air Quality has been scoped in and proposed to have its own chapter in the ES. It is noted that this chapter will assess operational effects (from facility) from the stack and potential fugitive emissions on ecologically designated sites. We agree that Air Quality chapter should assess the construction phase, operational phase (both emissions and traffic).*"

12.27 This assessment considers both the construction phase and the operational phase. For the operational phase, emissions from the stack have been assessed by detailed modelling and emissions from traffic have been assessed and screened out in paragraph 12.46.

Assessment Criteria and Assignment of Significance

Construction Phase

12.28 Exhaust emissions from construction-related vehicles (contractors' vehicles and Heavy Goods Vehicles (HGV), diggers, and other diesel-powered vehicles) are unlikely to have a significant impact on local air quality except for large, long-term construction sites: the EPUK & IAQM *'Land-Use Planning & Development Control: Planning For Air Quality'* document (EPUK & IAQM, 2017) indicates that air quality assessments should include developments increasing annual average daily Heavy Duty Vehicle (HDV) traffic flows by more than 25 within or adjacent to an AQMA and more than 100 elsewhere. For Light Duty Vehicles (LDVs) the threshold is 100 within or adjacent to an AQMA and more than 500 elsewhere.

12.29 Construction-related traffic for the Uskmouth Conversion Project has not been specifically assessed as the number of daily HDV movements is approximately 30 and the number of LDV movements is 314 which are both below the EPUK & IAQM thresholds away from an AQMA.

12.30 Dust is the generic term used to describe particulate matter in the size range 1-75 µm in diameter (British Standard Institute, 1983). Particles greater than 75 µm in diameter are termed grit rather than dust. Dusts can contain a wide range of particles of different sizes. The normal fate of suspended (i.e. airborne) dust is deposition. The rate of deposition depends largely on the size of the particle and its density; together these influence the aerodynamic and gravitational effects that determine the distance it travels and how long it stays suspended in the air before it settles out onto a surface. In addition, some particles may agglomerate to become fewer, larger particles, while others react chemically.

12.31 The effects of dust are linked to particle size and two main categories are usually considered:

- PM_{10} particles, those up to 10 µm in diameter, remain suspended in the air for long periods and are small enough to be breathed in and so can potentially impact on health; and
- Dust, generally considered to be particles larger than 10 µm which fall out of the air quite quickly and can soil surfaces (e.g. a car, window sill, laundry). Additionally, dust can potentially have adverse effects on vegetation and fauna at sensitive habitat sites.

12.32 The IAQM Guidance on the assessment of dust from demolition and construction (IAQM, 2014) sets out 350 m as the distance from the site boundary and 50 m from the site traffic route(s) up to 500 m of the entrance, within which there could potentially be nuisance dust and PM_{10} effects on human receptors. For sensitive ecological receptors, the corresponding distances are 50 m in both cases. These distances are set to be deliberately conservative.

12.33 Concentration-based limit values and objectives have been set for the PM_{10} suspended particle fraction, but no statutory or official numerical air quality criterion for dust annoyance has been set at a UK, European or WHO level. Construction dust assessments have tended to be risk based, focusing on the appropriate measures to be used to keep dust impacts at an acceptable level.

12.34 The IAQM dust guidance (IAQM, 2014) aims to estimate the impacts of both PM_{10} and dust through a risk-based assessment procedure. The IAQM dust guidance document states: "*The impacts depend on the mitigation measures adopted. Therefore the emphasis in this document is on classifying the risk of dust impacts from a site, which will then allow mitigation measures commensurate with that risk to be identified.*"

12.35 The IAQM dust guidance provides a methodological framework, but notes that professional judgement is required to assess effects: "*This is necessary, because the diverse range of projects that are likely to be subject to dust impact assessment means that it is not possible to be prescriptive as to how to assess the impacts. Also a wide range of factors affect the amount of dust that may arise, and these are not readily quantified.*"

12.36 Consistent with the recommendations in the IAQM dust guidance, a risk-based assessment has been undertaken for the development, using the well-established source-pathway-receptor approach.

12.37 The dust impact (the change in dust levels attributable to the development activity) at a particular receptor will depend on the magnitude of the dust source and the effectiveness of the pathway (i.e. the route through the air) from source to receptor.

12.38 The effects of the dust are the result of these changes in dust levels on the exposed receptors, for example annoyance or adverse health effects. The effect experienced for a given exposure depends on the sensitivity of the particular receptor to dust. An assessment of the overall dust effect for the area as a whole has been made using professional judgement, taking into account both the change in dust levels (as indicated by the dust impact risk for individual receptors) and the absolute dust levels, together with the sensitivities of local receptors and other relevant factors for the area.

12.39 The detail of the dust assessment methodology is provided in Appendix 12.3.

12.40 The assessment methodology does not consider the air quality impacts of dust from any contaminated land or buildings; potential impacts of ground contamination are assessed in Chapter 5: Geology, Hydrogeology and Ground Conditions of this ES.

Decommissioning Phase

12.41 The risk of dust impacts during the decommissioning phase of Uskmouth Conversion Project, including demolition, will be the same or similar to the risk of impacts during the construction phase and therefore has not been assessed separately.

12.42 Decommissioning-related traffic is expected to be lower than the construction phase and the impacts of decommissioning-vehicle exhaust emissions have not been assessed specifically.

Operational Phase

12.43 The residual emissions to air from the exhaust stack ('stack emissions') and their effects on human health and ecological receptors have been assessed in this chapter.

12.44 The EA's *Guidance for Developments Requiring Planning Permission and Environmental Permits (*Environment Agency*, 2012)* states "*New development within 250m of an existing incinerator [5] might, in some cases, mean people are exposed to odour, dust or noise emissions".* The nearest sensitive receptors (that are not part of the Uskmouth Power Station itself) are more than 250 m from the development, therefore an assessment of dust and odour has been scoped out.

12.45 The EA takes a precautionary approach to permitting sites that emit bioaerosols, as described by its Position Statement (Environment Agency, 2010b) on permit applications for composting operations. The EA Position Statement requires new composting operations within 250 m of workplaces or dwellings to carry out a Site Specific Bioaerosol Risk Assessment (SSBRA). As set out above, there are no sensitive receptors (that are not part of the Uskmouth Power Station itself) within 250 m of the Uskmouth Conversion Project and a SSBRA would not be required for a composting operation. Bioaerosol emissions from this Uskmouth Conversion Project are likely to be considerably lower than from a composting operation. Therefore, an assessment of bioaerosol emissions from the Uskmouth Conversion Project has also been scoped out.

12.46 The fuel pellets are to be delivered to site by rail, Chapter 2: Project Description of this ES outlines that delivery of operational consumables to site and the removal of ash from site will be by road. Uskmouth Power Station operation will generate approximately 60 HDV and 28 LDV movements per day. As these are below the EPUK & IAQM threshold criteria of 100 HGVs and 500 LDVs outside of an AQMA outlined in paragraph 12.28 above, an assessment of traffic related emissions has been scoped out.

Dispersion Model Selection

12.47 A number of commercially available dispersion models are able to predict ground level pollutant concentrations arising from emissions to atmosphere from elevated point sources such as an exhaust stack. Modelling for this study has been undertaken using ADMS 5, a version of the Atmospheric Dispersion Modelling System (ADMS) developed by Cambridge Environmental Research Consultants (CERC) that models a wide range of buoyant and passive releases to atmosphere either individually or in combination. The model calculates the mean concentration over flat terrain and also allows for the effect of plume rise, complex terrain, buildings and deposition. Dispersion models predict atmospheric concentrations within a set level of confidence and there can be variations in results between models under certain conditions; the ADMS 5 model has been formally validated and is widely used in the UK and internationally for regulatory purposes (CERC, 2016).

Meteorological Data

12.48 The most important meteorological parameters governing the atmospheric dispersion of pollutants are wind direction, wind speed and atmospheric stability:

[5] Whilst the development is not an incinerator, the 250 m buffer is still relevant as waste is used as a fuel.

- Wind direction determines the sector of the compass into which the plume of stack exhaust gas is dispersed;
- Wind speed affects the distance that the plume travels over time and can affect plume dispersion by increasing the initial dilution of pollutants and inhibiting plume rise; and
- Atmospheric stability is a measure of the turbulence of the air, and particularly of its vertical motion. It therefore affects the spread of the plume as it travels away from the source. New generation dispersion models, including ADMS, use a parameter known as the Monin-Obukhov length that, together with the wind speed, describes the stability of the atmosphere.

12.49 For meteorological data to be suitable for dispersion modelling purposes, a number of meteorological parameters need to be measured on an hourly basis. These parameters include wind speed, wind direction, cloud cover and temperature. There are only a limited number of sites where the required meteorological measurements are made.

12.50 The year of meteorological data that is used for a modelling assessment can have a significant effect on source contribution concentrations. Dispersion model simulations have been performed using five years of data from the Rhoose monitoring station (near Cardiff) between 2014 and 2018.

12.51 Wind roses have been produced for each of the years of meteorological data used in this assessment and are presented in Figure 12.1.

Surface Roughness

12.52 The roughness of the terrain over which a plume passes can have a significant effect on dispersion by altering the velocity profile with height, and the degree of atmospheric turbulence. This is accounted for by a parameter called the surface roughness length.

12.53 A surface roughness length of 0.5 m has been used within the model to represent the average surface characteristics across the study area.

Terrain

12.54 The presence of elevated terrain can significantly affect (usually increase) ground level concentrations of pollutants emitted from elevated sources such as stacks, by reducing the distance between the plume centre line and ground level and by increasing turbulence and, hence, plume mixing. A complex terrain file has been used within the model.

Building Wake Effects

12.55 The movement of air over and around buildings generates areas of flow circulation, which can lead to increased ground level concentrations in the building wakes. Where building heights are greater than about 30 – 40% of the stack height, downwash effects can be significant. The buildings comprising the Uskmouth Conversion Project that have been included within the model are provided in Table 12.5. The predictions presented in this report therefore include building wake effects.

Table 12.5: Buildings Included Within the Model

Building Name	Approx. location of centre (x,y)	Length (m)	Width (m)	Height (m)
Electrostatic Precipitators	332844, 183804	17.1	77.0	22.0
Bunker Bay	332837, 183818	34.2	80.0	10.4
Boiler House	332829, 183836	46.1	80.0	30.5

Tank Bay	332821, 183856	30.2	80.0	11.6
Turbine House part 1	332815, 183870	28.1	80.0	17.2
Turbine House part 2	332816, 183889	28.1	100.0	19.0
Turbine House part 3	332859, 183894	28.1	19.0	6.5
Transformer	332810, 183903	12.8	100.0	13.7
West Building	332781, 183826	12.8	15.0	70.0
East Building	332873, 183861	12.8	18.8	64.0

Stack Parameters and Emissions Rates Used in Model

12.56 Stack emission characteristics modelled are provided in Table 12.6 and mass emissions are provided in Table 12.7.

Table 12.6: Stack Characteristics

Parameter	Unit	Value
Stack height	m	122
Internal diameter	m	7.01
Efflux velocity	$m.s^{-1}$	9.9
Efflux temperature	^{o}C	72
Actual volumetric flow (9.7% H_2O, 72°C, 5.3% O_2)	$m^3.s^{-1}$	383
Normalised volumetric flow (Dry, 0°C, 6% O_2)	$m^3.s^{-1}$	286

Table 12.7: Mass Emissions of Released Pollutants

Pollutants	BAT-AELs at 11% O_2 ($mg.Nm^{-3}$)	BAT-AELs at 6% O_2 ($mg.Nm^{-3}$)	Mass Emission Rate ($g.s^{-1}$)
PM	5	7.5	2.14
CO	50	75	21.44
SO_2	40	60	17.15
HCl	8	12	3.43
HF	1	1.5	0.43
NOx	150	225	64.32
Group 1 Metals Total (a)	0.02	0.03	8.58E-03
Group 2 Metals (b)	0.02	0.03	8.58E-03
Group 3 Metals Total (c)	0.3	0.3	8.58E-02
Dioxins and furans	6.00E-05	9.00E-05	2.57E-05
NH_3	15	23	6.57
PCBs	0.00008	0.00012	3.43E-05

(a) Cadmium (Cd) and thallium (Tl).

(b) Mercury (Hg).

(c) Antimony (Sb), arsenic (As), lead (Pb), chromium (Cr), cobalt (Co), copper (Cu), manganese (Mn), nickel (Ni), and vanadium (V).

*emission concentrations all at $0^{o}C$, dry

12.57 Emission limits are provided for total particles. For the purposes of this assessment and to ensure the assessment is conservative, all particles are assumed to be less than 10 µm in diameter (i.e. PM_{10}). Furthermore, all particles are also assumed to be less than 2.5 µm in diameter (i.e. $PM_{2.5}$). In reality, PM_{10} and $PM_{2.5}$ concentrations will be a smaller proportion of the

total particulate emissions and the $PM_{2.5}$ concentration will be a smaller proportion of the PM_{10} concentration. Therefore, this can be considered a conservative estimate of the likely particulate emissions in each size fraction.

12.58 There is no BAT-AEL for polycyclic aromatic hydrocarbons (PAHs). For the purposes of this assessment, the emission concentration in Table 12.8 has been used to calculate the mass emission rates. Emission concentrations for PAHs were obtained from the IPPC Reference Document on the Best Available Techniques for Waste Incineration (Final Draft December 2018, Figure 8.118). The maximum of the average PAHs emission concentrations reported in the IPPC document was approximately triple the next highest averages and was considered an anomaly. The second, third and fourth highest averages are all approximately 0.003 $mg.m^{-3}$ (at 11% O_2) and have been used in this assessment.

Table 12.8 Mass Emissions for PAHs

Pollutant	BAT-AEL at 6% O_2 ($mg.Nm_{-3}$)	Mass Emission Rate ($g.s^{-1}$)
PAHs	0.0045	1.29E-03

Notes: All concentrations referenced to temperature 273 K, pressure 101.3 kPa, 6% oxygen, dry gas.

Stack Height Determination

12.59 There is a need to discharge the flue gases through an elevated stack to allow dispersion and dilution of the residual combustion emissions. The stacks need to be of sufficient height to ensure that pollutant concentrations are acceptable by the time they reach ground level. The stacks also need to be high enough to ensure that releases are not within the aerodynamic influence of nearby buildings, or else wake effects can quickly bring the undiluted plume down to the ground.

12.60 A stack height determination has been undertaken to identify the stack height required to overcome the wake effects of nearby buildings and to establish the height at which there is minimal additional environmental benefit associated with the cost of further increasing the stack. The EA removed its detailed guidance, Horizontal Guidance Note EPR H1 (Environment Agency, 2010a) for undertaking risk assessments on 1 February 2016; however, the approach used by RPS is consistent with that EA guidance which required the identification of "*an option that gives acceptable environmental performance but balances costs and benefits of implementing it".*

12.61 The stack height determination has focused on identifying the stack height required to overcome the wake effects of nearby buildings. This involved running a series of atmospheric dispersion modelling simulations to predict the ground-level concentrations with the stack at different heights: starting at 110 m and extending up in 2 m increments, until a height of 130 m was reached. The results of the stack height determination are provided in Appendix 12.4. The stack height determination indicated that the existing stack height of 122 m was appropriate.

NO_x to NO_2 Assumptions for Annual-Mean and Hourly-Mean Calculations

12.62 Total conversion (i.e. 100%) of NO to NO_2 is sometimes used for the estimation of the absolute upper limit of the annual mean NO_2. This technique is based on the assumption that all NO emitted is converted to NO_2 before it reaches ground level. However, in reality the conversion is an equilibrium reaction and even at ambient concentrations a proportion of NOx remains in the form of NO.

12.63 The Environment Agency's '*Environmental Permitting: air dispersion modelling reports'* guidance (Environment Agency, 2019) states that a conversion to NO_2 of 35% and 70% should be used for short- and long-term average concentrations respectively.

Modelling of Long-term and Short-term Emissions

12.64 Long-term (annual-mean) NO_2 has been modelled for comparison with the relevant annual mean objectives.

12.65 For short-term NO_2, the objective is for the hourly-mean concentration not to exceed 200 $\mu g.m^{-3}$ more than 18 times per calendar year. As there are 8,760 hours in a non-leap year, the hourly-mean concentration would need to be below 200 $\mu g.m^{-3}$ in 8,742 hours, i.e. 99.79% of the time. Therefore, the 99.79th percentile of hourly NO_2 has been modelled.

Sensitive Receptors

12.66 The air quality assessment predicts the impacts at locations that could be sensitive to any changes. For human-health effects, such sensitive receptors should be selected where the public is regularly present and likely to be exposed over the averaging period of the objective. LAQM Technical Guidance 16 (Defra, 2016) provides examples of exposure locations and these are summarised in Table 12.9.

Table 12.9: Examples of Where Air Quality Objectives Apply

Averaging Period	Objectives should apply at	Objectives should generally not apply at
Annual-mean	All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, care homes.	Building façades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building's façades), or any other location where public exposure is expected to be short-term.
Daily-mean	All locations where the annual-mean objective would apply, together with hotels. Gardens of residential properties.	Kerbside sites (as opposed to locations at the building's façade), or any other location where public exposure is expected to be short-term.
Hourly-mean	All locations where the annual and 24 hour mean would apply. Kerbside sites (e.g. pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations to which the public might reasonably be expected to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.

12.67 The effects of the proposed conversion have been assessed at the façades of local existing receptors. All human receptors have been modelled at a height of 1.5 m, representative of typical head height. The locations of these discrete receptors are listed in Table 12.10 and illustrated in Figure 12.2. For the highlighted receptors the annual mean, daily mean and hourly mean objectives apply. For receptors that are not highlighted, only the daily and hourly mean objectives apply.

Table 12.10: Modelled Sensitive Receptors

Receptor ID	Receptor	Receptor Type	Grid Reference	
			x	y

1	Newport Uskmouth Sailing Club	0.4	332993	184167
2	RSPB Wetlands	0.6	333427	183478
3	Farm along West Nash Road-1	1.0	333880	183542
4	Farm along West Nash Road-2	1.1	333939	183714
5	Residential Property within Nash Village-1	1.4	334246	183695
6	Residential Property within Nash Village-2	1.7	334526	183762
7	Residential Property along Nash Road	1.9	334666	184508
8	Residential Property within Pye Corner Village	1.9	334296	185085
9	Lliswerry High School	2.7	334015	186235
10	Residential Property along Lysaght Avenue	2.7	332761	186503
11	Residential Property near A48 Usk Way - 1	2.8	331461	186208
12	Residential Property near A48 Usk Way - 2	3.4	330101	185735
13	The John Frost School	3.0	330046	184748
14	Residential Property near B4239	2.7	330124	183875
15	West Usk Lighthouse B&B	2.0	331115	182882
16	East Usk Lighthouse (popular walking area)	1.0	333034	182786
17	Commercial Receptor within Alexandra Docks (Closest)-1	0.9	332106	184339
18	Commercial Receptor within Alexandra Docks-2	1.6	331673	184849
19	Welsh Water Office	0.6	333464	183895
20	SUP: Façade of Main Office	0.2	332843	183925
21	SUP: Engineering Offices	0.2	332683	183760
22	SUP: Gatehouse	0.3	333176	183628
23	Severn Power Offices	0.4	332477	183731

12.68 Concentrations have also been modelled across a coarse 30 km by 30 km grid, with a spacing of 100 m, and a fine 4 km by 4 km grid, with a spacing of 10 m. Both grids are at a height of 1.5 m, centred on the proposed development.

12.69 There are a number of designated ecological sites within 15 km of the proposed conversion. The air quality impact on ecological receptors is assessed in Appendix 12.5.

Significance of Effects

Construction Phase

12.70 Dust impact risk categories have been determined for demolition, earthworks, construction and trackout. These have been used to define the appropriate site-specific mitigation measures based on those described in the IAQM dust guidance (IAQM, 2014). The guidance states that provided the mitigation measures are successfully implemented, the resultant effects of the dust exposure will normally be “not significant”.

Operational Development

12.71 The online EA guidance for risk assessments (Defra & EA, 2016) provides details for screening out substances for detailed assessment. In particular, it states that:

"To screen out a PC for any substance so that you don't need to do any further assessment of it, the PC must meet both of the following criteria:

- *the short-term PC is less than 10% of the short-term environmental standard*
- *the long-term PC is less than 1% of the long-term environmental standard*

If you meet both of these criteria you don't need to do any further assessment of the substance.

If you don't meet them you need to carry out a second stage of screening to determine the impact of the PEC."

12.72 PC is the process contribution, i.e. the pollution from the Uskmouth Conversion Project . The PEC refers to the Predicted Environmental Concentration calculated as the PC added to the ambient (background) concentration. The online EA guidance continues by stating that:

"You must do detailed modelling for any PECs not screened out as insignificant."

12.73 It then states that further action may be required where:

- "*your PCs could cause a PEC to exceed an environmental standard (unless the PC is very small compared to other contributors – if you think this is the case contact the EA)*
- *the PEC is already exceeding an environmental standard*"

12.74 On that basis:

- The impacts are not considered significant if the short-term PC is less than 10% of the short-term EAL;
- The impacts are not considered significant if the long-term PC is less than 1% of the long-term EAL; or
- The impacts are not considered significant if the PEC is below the EAL.

12.75 For the purposes of this assessment, impacts that are not considered significant are described as causing negligible effects.

Limitations of the Assessment

12.76 All air quality assessment tools, whether models or monitoring measurements, have limitations. The choices that the practitioner makes in setting-up the model, choosing the input data, and selecting the baseline monitoring data will decide whether the final predicted impact should be considered a central estimate, or an estimate tending towards the upper bounds of the uncertainty range (i.e. tending towards worst-case).

12.77 The atmospheric dispersion model itself has limitations, being a simplified version of real atmospheric processes and uses a sophisticated set of mathematical equations to approximate the complex physical and chemical atmospheric processes taking place as a pollutant is released and travels to a receptor. The predictive ability of even the most accurate model is limited by how well the turbulent nature of the atmosphere can be represented.

12.78 Each of the data inputs for the dispersion model listed earlier in this section will also have some uncertainty associated with them. Where it has been necessary to make assumptions, these have mainly been made towards the upper end of the range informed by an analysis of relevant, available data.

12.79 The main components of uncertainty in the total predicted concentrations, comprising; the background concentration and the modelled fraction, include those summarised in

12.80 Table 12.11.

Table 12.11: Summary of Main Components of Uncertainty

Concentration	Source of Uncertainty	Approach to Dealing with Uncertainty	Comments
Background Concentration	Characterisation of future baseline air quality (i.e. the air quality conditions in the future assuming that the development does not proceed).	The future background concentration used in the assessment is the same as the current background concentration and no reduction has been assumed. This is a conservative assumption as, in reality, background concentrations are likely to reduce over time as cleaner vehicle technologies form an increasing proportion of the fleet.	The background concentration is the major proportion of the total predicted concentration. The conservative assumptions adopted ensure that the background concentration used within the model contributes towards the results being towards the conservative end of the uncertainty range, rather than a central estimate.
Model Input/ Output Data	Meteorological data.	Uncertainties arise from any differences between the conditions at the met station and the development site, and between the historical met years and the future years. These have been minimised by using meteorological data collected at a representative measuring site. The model has been run for five full years of meteorological conditions and the highest results from any year reported.	
	Receptors.	The model has been run for a grid of receptors. In addition, receptor locations have been identified where concentrations are highest or where the greatest changes are expected.	

12.81 Notwithstanding the limitations of the assessment, the predicted total concentration is likely to be towards the top of the uncertainty range (i.e. towards worst-case) rather than being a central estimate. The actual concentrations that will be found when the development is operational are unlikely to be higher than those presented within this report and are more likely to be lower.

Baseline Environment

12.82 A detailed description of how the baseline air quality has been derived for the Uskmouth Conversion Project is provided in Appendix 12.2. The background concentrations used in this air quality assessment are set out in Table 12.12.

Table 12.12: Summary of Assumed Background Concentrations

Pollutant	Long-term	Short-term	Data Source
Nitrogen dioxide (NO_2)	23.1 µg.m^{-3}	46.2 µg.m^{-3} (a)	Monitored Concentration (St Julian's 2013)
Arsenic (As)	0.8 ng.m^{-3}	-	Monitored (Lead and Multi-elements Network Maximum Values)
Manganese (Mn)	45.9 ng.m^{-3}	-	
Nickel (Ni)	5.0 ng.m^{-3}	-	
Cobalt (Co)	0.3 ng.m^{-3}	-	
PAHs	0.2 ng.m^{-3}	-	Monitored (PAH Network)

Note: Background concentrations were only derived for pollutants where it was required for the PEC to be calculated.

Future Baseline Conditions

12.83 Historically the view has been that background traffic related NO_2 concentrations in the UK would reduce over time, due to the progressive introduction of improved vehicle technologies and increasingly stringent limits on emissions. However, the results of recent monitoring across the UK suggest that background annual-mean NO_2 concentrations have not decreased in line with expectations. To ensure that the assessment presents conservative results, no reduction in the background for any pollutant has been applied for future years.

Mitigation Measures Adopted as Part of the Project

Construction Mitigation

12.84 The IAQM dust risk assessment aims to classify the risk of dust impacts from a development which will then allow mitigation measures commensurate with that risk to be identified. Appendix 12.3 sets out the assessment of construction dust risks.

12.85 The IAQM dust guidance (IAQM, 2014) lists mitigation measures for the site as a whole and for each of the four activities (demolition, earthworks, construction and trackout). Different mitigation measures are recommended depending on whether the risk is low, medium or high. In this case, the predicted dust impact risk for the development as a whole is classified as low and the 'highly recommended' measures for low risks are listed below along with the 'highly recommended' measures for medium risk trackout. There are no 'highly recommended' measures for low risk earthworks or construction.

12.86 The measures listed below will be adopted as part of the Uskmouth Conversion Project.

Table 12.13: Designed-in Dust Control Measures Adopted as part of the Project Design

Communications
• Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager. • Display the head or regional office contact information
Site management
• Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. • Make the complaints log available to the local authority when asked. • Record any exceptional incidents that cause dust and/or air emissions, either on- or off- site, and the action taken to resolve the situation in the log book.
Monitoring
• Carry out regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of site boundary. • Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
Preparing and maintaining the site
• Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. Use screening intelligently where possible – e.g. locating site offices between potentially dusty activities and the receptors. • Erect solid screens or barriers around the site boundary. • Avoid site runoff of water or mud.
Operating vehicle/machinery and sustainable travel
• Ensure all vehicles switch off engines when stationary – no idling vehicles. • Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.

Operations
• Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems. • Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible. • Use enclosed chutes, conveyors and covered skips, where practicable. • Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
Waste management
• Avoid bonfires and burning of waste materials.
Medium risk measures specific to trackout
• Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use. • Avoid dry sweeping of large areas. • Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport. • Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable. • Record all inspections of haul routes and any subsequent action in a site logbook. • Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned. • Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable). • Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits. • Access gates to be located at least 10m from receptors where possible.

12.87 The IAQM dust guidance (IAQM, 2014) states that with the recommended dust mitigation measures in place the residual effect will normally be "not significant", and provides recommendations of how the mitigation can be secured, for example through planning conditions, a legal obligation, or by legislation.

Assessment of Construction Effects

12.88 Provided the mitigation measures adopted as part of the Uskmouth Conversion Project are implemented, the residual construction dust effects are considered to be negligible which is not significant. The IAQM dust guidance (IAQM, 2014) states that *"For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'."*

Further Mitigation

12.89 With the IAQM recommended dust controls in place, the effects are not considered significant and further mitigation is not required. However, the effectiveness of the controls will be checked through an inspection/monitoring programme detailed below.

Future Monitoring

12.90 The main influences on air quality arising from the construction of the Uskmouth Conversion Project are likely to be dust generating activities. The recommended inspection and monitoring methods include:

- Carry out regular site inspections to record inspection results, and make an inspection log available to the local authority when requested.

- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

Accidents and/or Disasters

12.91 In accordance with the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 ("2017 EIA Regulations"), consideration has been given to the potential significant adverse effects of the development upon the environment derived from the vulnerability of the development to risks of major accidents and/or disasters. There is a low probability that potential construction accidents or disasters that are relevant to air quality could occur. No significant adverse air quality effects to the environment during the construction phase due to accidents or disasters are anticipated.

Assessment of Operational Effects

Stack Emissions

12.92 Table 12.14 summarises the maximum predicted Process Contribution (PC) to ground-level concentrations across the model grid. The PC has been compared with the relevant Environmental Assessment Level (EAL) to determine if the impacts are potentially significant. Where the PC is considered potentially significant, the Predicted Environmental Concentration (PEC) has been calculated by adding the PC to the background Ambient Concentration (AC). Appendix 12.2 provides more detail on the ACs used and the results at the modelled receptors are included in Appendix 12.6. Figure 12.3 and Figure 12.4 show the contour plots for annual mean NO_2 and hourly mean NO_2 PCs.

Table 12.14: Predicted Maximum Process Contributions (µg.m^{-3}) – Results Across the Modelled Grid

Pollutant	Averaging Period	EAL (µg.m^{-3})	Max PC (µg.m^{-3})	Max PC as % of EAL	Criteria (%)	Is PC Potentially Significant?	AC (µg.m^{-3})	PEC (µg.m^{-3})	PEC as % of EAL	Is PEC Potentially Significant?
PM_{10}	24 hour (90.41st percentile)	50	0.3	1	10	No	-	-	-	-
	24 hour (annual mean)	40	0.1	0	1	No	-	-	-	-
$PM_{2.5}$	24 hour (annual mean)	25	0.1	0	1	No	-	-	-	-
HCl	1 hour (maximum)	750	2.9	0	10	No	-	-	-	-
HF	1 hour (maximum)	160	0.4	0	10	No	-	-	-	-
SO_2	15 minute (99.90th percentile)	266	12.3	5	10	No	-	-	-	-
	1 hour (99.73th percentile)	350	10.3	3	10	No	-	-	-	-
	24 hour (99.18th percentile)	125	4.2	3	10	No	-	-	-	-
	1 hour (annual mean)	50	0.6	1	1	No	-	-	-	-
NO_2	1 hour (99.79th percentile)	200	14.3	7	10	No	-	-	-	-
	1 hour (annual mean)	40	1.7	4	1	Yes	23.1	24.8	62	No
CO	8 hour (maximum daily running)	10,000	11.7	0	10	No	-	-	-	-
Cd	1 hour (annual mean)	0.005	0.0003	6	10	No	-	-	-	-
Tl	1 hour (maximum)	30	0.0072	0	10	No	-	-	-	-
	1 hour (annual mean)	1	0.0003	0	1	No	-	-	-	-
Hg	1 hour (maximum)	7.5	0.0072	0	10	No	-	-	-	-
	1 hour (annual mean)	0.25	0.0003	0	1	No	-	-	-	-
Sb	1 hour (maximum)	150	0.0719	0	10	No	-	-	-	-
	1 hour (annual mean)	5	0.0032	0	1	No	-	-	-	-
As	1 hour (annual mean)	0.003	0.0032	106	1	Yes	0.00081	0.00400	133	Yes
Cr	1 hour (maximum)	150	0.0719	0	10	No	-	-	-	-
	1 hour (annual mean)	5	0.0032	0	1	No	-	-	-	-
Co	1 hour (maximum)	6	0.0719	1	10	No	-	-	-	-
	1 hour (annual mean)	0.2	0.0032	2	1	Yes	0.00028	0.00347	2	No
Cu	1 hour (maximum)	200	0.0719	0	10	No	-	-	-	-
	1 hour (annual mean)	10	0.0032	0	1	No	-	-	-	-
Pb	1 hour (annual mean)	0.25	0.0032	1	1	No	-	-	-	-

Pollutant	Averaging Period	EAL ($\mu g.m^{-3}$)	Max PC ($\mu g.m^{-3}$)	Max PC as % of EAL	Criteria (%)	Is PC Potentially Significant?	AC ($\mu g.m^{-3}$)	PEC ($\mu g.m^{-3}$)	PEC as % of EAL	Is PEC Potentially Significant?
Mn	1 hour (maximum)	1500	0.0719	0	10	No	-	-	-	-
	1 hour (annual mean)	0.15	0.0032	2	1	Yes	0.04594	0.04913	33	No
Ni	1 hour (annual mean)	0.02	0.0032	16	1	Yes	0.00499	0.00818	41	No
V	1 hour (maximum)	5	0.0719	1	10	No	-	-	-	-
	1 hour (annual mean)	1	0.0032	0	1	No	-	-	-	-
Dioxins & Furans	1 hour (annual mean)	-	9.57E-07	-	1	-	-	-	-	-
PAHs	1 hour (annual mean)	0.00025	4.80E-05	19	1	Yes	2.00E-04	2.48E-04	99	No
PCB	1 hour (annual mean)	0.2	1.28E-06	0	1	No	-	-	-	-

Cells are shaded grey where the impacts can not be screened out as insignificant

12.93 The results presented in Table 12.14 show that the predicted PC is below 10% of the relevant short-term EAL and below 1% of the long-term EAL or the PEC is below 100% for all pollutants with the exception of As (arsenic).

12.94 For As, the predicted PC is more than 1% of the EAL and the PEC is above the EAL. As set out in Table 12.7, limits are set for three different groups of metals and arsenic is one of the group 3 metals. These predictions are based on the assumption that arsenic comprises the total of the group 3 metals emissions. The concentration used in this assessment applies to all nine of the group 3 metals in total.

12.95 Table 12.15 shows the predicted PC if the total emission concentration used in the assessment is assumed to apply equally to each of the nine group 3 metals. i.e. the PC for arsenic has been divided by 9. In this case, the predicted PC remains more than 1% above the EAL; however, the PEC for arsenic is below the EAL and the impacts are therefore not considered significant.

Table 12.15: Maximum Predicted Environmental Concentrations (µg.m^{-3}) – Arsenic

Pollutant	Averaging Period	EAL (µg.m^{-3})	Max PC (µg.m^{-3})	Max PC as % of EAL	Criteria (%)	Is PC Potentially Significant?	AC (µg.m^{-3})	Max PEC (µg.m^{-3})	Max PEC as % of EAL	Is PEC Potentially Significant?
As	1 hour (annual mean)	0.003	0.0004	12	1	Yes	0.00081	0.00116	39	No

12.96 For hexavalent chromium (CrVI), the measured concentrations in the Environment Agency '*Releases from waste incinerators – Guidance on assessing group 3 metal stack emissions from incinerators*' version 4 (Environment Agency, 2016), varies from 0.0005% to 0.03% of the emission concentration limit in the IED. Table 12.16 shows the predicted PC at 0.03% of the IED emission limit of 0.5 mg.m^{-3} rather than the BAT-AEL of 0.3 mg.m^{-3}.

Table 12.16: Predicted Maximum Cr VI Process Contributions (µg.m^{-3})

Pollutant	Averaging Period	EAL (µg.m^{-3})	Max PC (µg.m^{-3})	Max PC as % of EAL	Is PC Potentially Significant?
Cr VI	1 hour (annual-mean)	0.0002	1.6E-06	1	No

12.97 The PC does not exceed 1% of the EAL and the impacts are therefore screened out as being insignificant.

Further Mitigation

12.98 The effects are not considered to be significant and further mitigation is not required.

Future Monitoring

12.99 The Uskmouth Conversion Project will be regulated by the EA under the permit and monitoring required for the Environmental Permit will be undertaken.

Accidents/Disasters

12.100 In accordance with the 2017 EIA regulations, consideration has been given to the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters. There is a low probability that potential operational accidents or disasters that are relevant to air quality could occur. No significant adverse air quality effects on the environment during the operational phase are anticipated.

Potential Changes to the Assessment as a Result of Climate Change

12.101 43,800 hours of meteorological data has been used within the atmospheric dispersion model ensuring that a wide range of weather conditions have been considered. Based on current knowledge, the results of this air quality assessment are not expected to be affected by climate change.

Assessment of Cumulative Effects

12.102 During the construction phase, cumulative dust effects are only likely to occur where two or more developments are within 700 m of each other; and then only for receptors within 350 m of both developments. Cumulative effects would then only be experienced if construction works on both developments were to take place simultaneously. Effective implementation of relevant mitigation measures at both developments should ensure the risk of cumulative dust effects is minimal. There are no additional construction developments within the local area and as a result no significant cumulative effects are anticipated during the construction phase. Cumulative effects are assessed as 'negligible' and "not significant".

12.103 During the operational phase, cumulative effects are likely to occur where there are developments that generate large amounts of traffic or include significant combustion processes.

12.104 Table 12.14 shows the pollutants for which impacts have been screened out as having an insignificant effect at human-health receptors based on the PC alone. For arsenic, cobalt, manganese and nickel the impacts could not be screened out based on the PC alone but the PEC is less than half of the EAL. It is highly unlikely that, in combination with other developments, the PECs would exceed the EAL therefore the cumulative impacts for metals are considered to be not significant. For NO_2 the PEC is 62% of the EAL. For the cumulative effects to be significant, the PCs in combination with other development would need to be more than 15 $\mu g.m^{-3}$ for the cumulative NO_2 PEC to exceed the EAL. This is considered to be highly unlikely, and the cumulative impacts for NO_2 are considered to be not significant.

12.105 For PAHs, Table 12.14 shows that the maximum non-cumulative PEC across the modelled grid is 99% of the EAL and there is therefore little headroom before the cumulative PEC exceeds the EAL. The Môr Hafren Energy Recovery Facility (ERF), located approximately 9 km south west of Uskmouth Power Station is the only development identified that could have a cumulative effect with regards to PAHs. The Môr Hafren ERF is currently at the scoping stage so there is limited information publicly available.

12.106 Whilst the maximum non-cumulative PEC is 99% of the EAL across the modelled grid, when considering the PEC as discrete receptors, the PEC is lower. At receptor 15, the closest modelled receptor to the Môr Hafren ERF, the PEC is 2.2×10^{-4} $\mu g.m^{-3}$ which is 88% of the EAL of 2.5×10^{-4} $\mu g.m^{-3}$. Therefore, the Môr Hafren ERF PC would need to be greater than 0.3×10^{-4} $\mu g.m^{-3}$ for the cumulative PEC to exceed the EAL. This is more than four times greater than the Uskmouth Power Station Development PC of 0.18×10^{-4} $\mu g.m^{-3}$ for receptor 15. This is considered highly unlikely considering that the Môr Hafren ERF is approximately 8 km from receptor 15. On that basis the cumulative effect of PAHs are not considered to be significant.

Inter-relationships

12.107 The impact of stack emissions at designated habitat sites have been considered in Appendix 12.5 and the air quality impacts have been screened out from the assessment as being insignificant.

Summary of Effects

12.108 A detailed air quality assessment predicting the potential effects of emissions generated during the construction and operation of the Uskmouth Conversion Project has been undertaken.

12.109 Impacts during construction, such as dust generation and plant vehicle emissions, are predicted to be of short duration and only relevant during the construction phase. The results of the risk assessment of construction dust impacts undertaken using the IAQM dust guidance (IAQM, 2014), indicates that before the implementation of mitigation and controls, the risk of dust impacts will be low. Implementation of the highly-recommended mitigation measures described in the IAQM construction dust guidance should reduce the residual dust effects to a level categorised as "*not significant*".

12.110 Stack emissions from the operational Uskmouth Conversion Project have been assessed through detailed dispersion modelling using best practice approaches. The assessment has been undertaken based on a number of conservative assumptions. This is likely to result in an over-estimate of the contributions that will arise in practice from the facility. The results of dispersion modelling reported in this assessment indicate that predicted contributions and resultant environmental concentrations of all pollutants considered would be of "negligible" significance.

12.111 Overall the air quality effects of the Uskmouth Conversion Project, both separately and cumulatively, are not considered to be significant.

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Table 12.17: Summary of Likely Environmental Effects on Air Quality

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact	Significance of effect	Significant / Not significant	Notes
Construction phase							
A range of receptors within 350 m of the site boundary	Receptors considered range from low to high sensitivity	Suspended particulate matter and deposited dust	Medium-term	Risk – Medium	Negligible	Not significant	
Operational phase							
Grid of receptors 10 km by 10 km with 100 m spacing and 3 km by 3 km with 30 m spacing	Assumed to be high.	Increased atmospheric pollutant concentrations	Long-term	Small	Negligible	Not significant	

13 CLIMATE CHANGE

Introduction

13.1 This chapter assesses the likely significant effect on climate change resulting from the Uskmouth Conversion Project as a consequence of the impact of greenhouse gas (GHG) emissions. It is supported by Appendix 13.1 containing details of the GHG emissions calculations and Appendix 13.2 containing further detail and references to the policy and guidance summarised in this chapter.

13.2 Climate change in the context of EIA can be considered broadly in two domains: the impact of GHGs caused directly or indirectly by the Uskmouth Conversion Project, which contribute to climate change; and the potential impact of changes in climate to the Uskmouth Conversion Project, which could affect it directly or could modify its other environmental impacts.

13.3 This chapter focuses on the impact of GHG emissions. GHG emissions are normally expressed as carbon dioxide equivalents, explained in the methodology section below, and are therefore often referred to as 'carbon' as a shorthand (e.g. when speaking of 'low-carbon power' or 'carbon reduction targets').

13.4 Assessment of the Uskmouth Conversion Project's risk from and resilience to climate change has been scoped out of this chapter. An assessment of the future potential flood risk taking account of climate change is provided in Chapter 6: Hydrology.

13.5 There are other potential inter-relationships between climate change and environmental topic areas reported in other chapters of this ES. These are summarised in the Inter-relationships section at the end of this chapter. Details of the inter-related effects can be found in each relevant ES topic chapter in the Potential Changes to the Assessment as a Result of Climate Change subsection of the Assessment of Operational Effects section.

13.6 As detailed in Environmental Statement Chapter 1: Introduction, Uskmouth Power Station has not generated electricity since a technical fault in April 2017. However, significant investment continues to be made to preserve and maintain the plant in readiness for conversion and return to service.

Assessment Methodology

GHG Emissions Calculation Overview

13.7 In overview, GHG emissions have been estimated by applying published emissions factors to activities in the baseline and those required for the Uskmouth Conversion Project, as applicable. The emissions factors relate a given level of activity, a physical or chemical process, or amount of fuel, energy or materials used to the mass of GHGs released as a consequence.

13.8 The assessment reported in this chapter is for operation of the Uskmouth facility at a 90% load factor combusting 849,443 tonnes of waste-derived fuel pellets per annum, having a design net calorific value (NCV, the energy content) of 22 MJ/kg. Further detail of the approach, data inputs, assumptions and boundaries of the calculations are given in Appendix 13.1.

13.9 The Applicant has stated that these fuel consumption and energy content values represent the expected and commercially realistic operation of the facility on an annual average basis. These values are therefore considered appropriate for the assessment of climate change impacts, which arise from the long term operation of the facility.

13.10 The Applicant has stated that higher figures of >1 Mtpa provided for annual fuel throughput in the Scoping Report and ES Project Description result from the erroneous scaling of exceptional short-term operations to an annual rate, which would not be representative of normal or

commercially feasible operation. The calorific value of the fuel pellets will vary within a contractually-defined range. The calorific value of 22 MJ/kg is expected as an annual average by the Applicant and has been selected as the design value for fuel NCV. Over the course of annual operation there will be times when fuel of lower calorific value is received, necessitating greater fuel consumption per hour or day to maintain the same energy output, and equally times when fuel of higher calorific value is received and less is required.

13.11 In terms of operating time, the '90% load factor' scenario (operation of the Uskmouth Conversion Project at its maximum generation capacity for 90% of the year) is the maximum operating scenario identified in Chapter 2.

13.12 The GHGs considered in this assessment are those in the 'Kyoto basket' of global warming gases[6] expressed as their CO_2-equivalent global warming potential (GWP). This is denoted by CO_2e units in emissions factors and calculation results. GWPs used are typically the 100-year factors in the Intergovernmental Panel on Climate Change Fifth Assessment Report (Myhre et al, 2013) or as otherwise defined for national reporting under the United Nations Framework Convention on Climate Change (UNFCCC).

13.13 The main emissions sources assessed comprise:

- direct combustion emissions;
- nitrous oxide emissions[7] from the air pollution control system;
- management of process outputs (bottom ash and fly ash);
- transport of inputs and outputs; and
- the baseline scenario of electricity generation at the Uskmouth B site

13.14 Fuel produced from mixed waste typically contains both 'biogenic' and 'fossil' carbon, both of which are released as CO_2 when the waste is combusted. Proportions of both will therefore occur in the fuel pellets.

13.15 Biogenic carbon is that in plant-derived material, such as paper and cardboard, whereas fossil carbon is that in material derived from fossil fuels, such as plastics. Only fossil carbon is regarded as causing a net increase in atmospheric CO_2 concentration, having been released from long-term geological storage. Biogenic carbon was drawn down from the atmosphere by the plants during growth prior to being released again by combustion, so over this short cycle does not change the net atmospheric concentration, provided that the C content is released as CO_2 and not as methane (CH_4, such as from a decomposition process).

Legislation and Planning Policy Context

13.16 A summary only is given here; policy detail and full references are provided in Appendix 13.2. There is much legislation and policy concerning climate change, energy and waste management in general, which is not exhaustively listed: this summary focuses on aspects of legislation or policy concerning energy production and climate change. While the Uskmouth Conversion Project involves conversion of the existing coal-fired power station to use waste-derived fuel pellets as a fuel source, the primary purpose of the Uskmouth Conversion Project remains power generation rather than waste management.

[6] carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride (SF_6), where relevant.

[7] formation of N_2O in the stack exhaust due to excess NH_3 from the reagent used in the air pollution control system to reduce NO_x formation.

13.17 Planning Policy Wales Edition 10 (Welsh Government, 2018) indicates that significant weight will be given to the facilitation of renewable and low carbon energy developments, as they will be of paramount importance in meeting the commitment to tackling climate change (paragraph 5.7.8). The Welsh government recognise an energy hierarchy which obligates new developments to reduce energy demand and increases energy efficiency, be suitably located and designed and assist in meeting energy with renewable and low carbon sources (paragraph 5.7.14). The report also obligates new developments to include mitigation measures against the causes of climate change in their design (paragraph 5.9.19).

13.18 The Climate Change Act 2008 commits the UK government to reducing greenhouse gas emissions by 100% of 1990 levels by 2050. National carbon budgets of 2.54 $GtCO_2e$ for 2018-2022, 1.95 $GtCO_2e$ for 2023-2037 and 1.73 $GtCO_2e$ for 2028-2032 have been set. A statutory Committee on Climate Change to advise the government was created and its advice, while not adopted policy, is relevant to consider. The Committee is due to advise on a sixth carbon budget in September 2020.

13.19 The Welsh Government has been provided with powers to put in place statutory emissions reduction targets, including at least an 80% reduction in emissions by 2050, through the Environment (Wales) Act (2016). The Welsh Government has accepted the Committee on Climate Change's suggestion, in its 2019 Net Zero report, that it should amend this target to a 95% reduction (compared with 1990 baseline) and has gone further by stating an ambition to reach net-zero.

13.20 The Climate Change (Carbon Budgets) (Wales) Regulations 2018 set two carbon budgetary periods: the period of 2016-2020 limits GHG emissions to an average of 23% lower than the baseline year of 1990, and the period of 2021 to 2025 limits GHG emissions to an average of 33% lower than the baseline. The 2021-2025 budget is equivalent to 37.4 $MtCO_2e$/annum (67% of the Wales 1990 baseline of 55.8 $MtCO_2e$/annum (National Assembly for Wales, 2014).

13.21 Total GHG emissions in the UK power generation sector are capped through participation in the EU Emissions Trading Scheme (ETS). The operational Uskmouth Conversion Project is defined under the Environmental Permitting regime as a co-incineration installation and as such will be subject to the EU ETS (under legislation in force at present). At the time of writing, early February 2020, it is unclear whether the UK will continue to participate in a linked UK-EU ETS after the Brexit transition period or will implement a domestic carbon tax or other alternative; and whether the carbon tax, if introduced, will provide an equivalent total cap on emissions.

13.22 The overriding advice of the Committee on Climate Change is that significant improvements in climate policy are necessary if the UK is to adhere to its net-zero target. The Committee has suggested that most sectors across the UK need to be close to net zero without the reliance on carbon offsetting and international carbon credits. With respect to the power sector, the overarching advice from the Committee is for the immediate rollout of low-carbon generation (with low-carbon, non-renewable sources having a role in the transitionary period). The Committee also places strong emphasis on the requirement for the rapid and widespread rollout of carbon capture and storage (CCS) technology.

13.23 The Wales 2019 Low Carbon Plan sets out plans to significantly increase the level of renewable generation in Wales' energy mix.

13.24 Newport City Council's Local Development Plan (2011-2026) states that new developments in the area should make a positive contribution to minimising, adapting to or mitigating the causes and impacts of climate change.

Relevant Guidance

13.25 The main guidance used for the assessment of GHG emissions in EIA is the IEMA guide '*Assessing Greenhouse Gas Emissions and Evaluating their Significance*' (IEMA, 2017).

13.26 The main guidance used for the quantification of GHG emissions are the principles for GHG accounting in the Greenhouse Gas Protocol suite of documents (World Resources Institute and World Business Council for Sustainable Development, 2004) and the information in BEIS, Defra and Treasury guidance for carbon reporting in the UK (BEIS, 2019a and 2019b). The principles of PAS2080 Section 7 (BSI, 2016) are also relevant, but as this is an assessment of GHG emissions for EIA, the other elements of whole-life carbon management for infrastructure in the standard are not addressed here.

Study Area

13.27 As GHG impacts are global and cumulative with all other sources, no specific geographical study area is defined for this assessment.

Baseline Methodology

13.28 The approach to establishing the baseline is to consider what would have occurred in the absence of the Uskmouth Conversion Project. This includes both the baseline condition and any GHG-emitting activities on the application site itself, and GHG-emitting activities that would be affected by the Uskmouth Conversion Project at other locations.

13.29 As the Uskmouth Conversion Project is a conversion of an existing power station, with limited construction required for new fuel silos and rail facilities on land that has previously been developed or used for coal storage, there is no potential for significant GHG emissions due to land-use change. The physical baseline of the site – i.e. its existing vegetation and soil carbon stocks and fluxes – has therefore not been considered.

13.30 Electricity generation from other sources and manufacture of cement or concrete products without use of recycled ash would occur in the absence of the proposed development. GHG emissions in a baseline scenario for these activities have been established from published emission factors. Information on current and future baseline GHG emissions associated with electricity generation has been collected from the BEIS GHG Conversion Factors for Company Reporting (BEIS, 2019b), projected future marginal electricity generation emissions factors (BEIS, 2019b) and the BEIS Response to Consultation on Implementing the End of Unabated Coal by 2025 (BEIS, 2018). Information on baseline cement and concrete production has been gathered from MPS Essential Materials Sustainable Solutions: Embodied CO_2e of UK Cement, Additions and Cementitious Materials (2014) and Tarmac's Environmental Product Declaration (EPD) for generic aggregate (2016).

Consultation

13.31 Pre-application consultation has been carried out as detailed in Chapter 2 of the ES and in the Planning Statement. A Scoping Opinion (ref. 19/1313) has been received from Newport City Council. This has indicated at paragraph 5.5 that any comparison in the ES to a baseline position of continued operation of the power plant as a coal-fired facility would need to show that this is "*more than theoretically possible*" and has stated in paragraph 5.8 that "*currently the Council considers that a nil use would be the correct baseline for assessments*".

13.32 The Applicant considers that development and operation of the Uskmouth facility on a coal and biomass fuel mixture (rather than nil use) is more than theoretically possible and as such is the most likely and realistic future baseline. Chapter 3 (Need and Alternatives) of the ES describes seven viable development alternatives for the continued use of Uskmouth Power Station as an electricity generation facility. The coal and biomass fuel mixture baseline has been selected as the most likely to proceed, if the Uskmouth Conversion Project does not, as all consents and permits are currently in place to facilitate this option. Accordingly, this is the baseline that has been used for assessment of climate change impacts.

13.33 Save in respect of flood risk (at paragraph 1.1.16), the Scoping Opinion makes no further reference to climate change.

Assessment Criteria and Assignment of Significance

13.34 The significance of an effect is determined based on the magnitude of an impact and the sensitivity of the receptor affected by the impact of that magnitude. This section describes the criteria applied in this chapter to characterise the magnitude of potential impacts and sensitivity of receptors.

Receptor Sensitivity

13.35 GHG emissions have a global effect rather than directly affecting any specific local receptor to which a level of sensitivity can be assigned. The global atmospheric mass of the relevant GHGs and consequent warming potential, expressed in CO_2 equivalents, has therefore been treated as a single receptor of high sensitivity given the severe consequences of global climate change.

Magnitude of Impact

13.36 GHG emissions can be quantified directly and expressed based on their global warming potential (GWP) as tonnes of CO_2-equivalent emitted, so the magnitude of impact is reported numerically rather than requiring descriptive terms.

Significance of Effects

13.37 Assessment guidance for GHG emissions (IEMA, 2017) indicates that in principle, any GHG emissions may be considered to be significant, and advocates as good practice that GHG emissions should always be reported at an appropriate, proportionate level of detail in an ES. There are however no clear, generally-agreed thresholds or methods for evaluating the significance of GHG effects in EIA.

13.38 To aid in considering whether effects are significant, the IEMA guidance referenced above recommends contextualising the magnitude of a development's GHG impacts in several possible ways. Taking the guidance into account, the following factors are considered relevant for contextualising the Uskmouth Conversion Project's GHG emissions:

- the magnitude of GHG emissions as a percentage of the UK and Wales national carbon budgets;
- the GHG emissions intensity of the Uskmouth Conversion Project compared with baseline emissions intensity for electricity generation; and
- whether the Uskmouth Conversion Project contributes to and is in line with carbon policy goals for GHG emissions reduction, where these are consistent with science-based commitments to limit global climate change to an internationally agreed level.

13.39 Effects from GHG emissions are described in this chapter as being adverse, neutral/negligible or beneficial based on the following definitions:

- **Adverse:** the development's GHG impacts would be greater than the current or future baseline and/or would not meet existing policy goals for GHG reduction.
- **Neutral or negligible:** the development's GHG impacts would be consistent with existing policy goals for GHG reduction, or the impact is little or no net environmental change.
- **Beneficial:** the development's GHG impacts would be reduced compared to the baseline and/or would include measures that go beyond existing policy goals.

13.40 Adverse or beneficial effects are considered to be significant, taking into account the IEMA guidance and the high sensitivity of the receptor. Neutral or negligible effects are not considered to be significant.

Limitations of the Assessment

13.41 The three main potential areas of uncertainty in the assessment are:

- the applicable carbon intensity of marginal baseline electricity generation that is displaced during the Uskmouth Conversion Project operating lifetime;
- uncertainty concerning the specific potential uses of recycled ash in the cement and concrete industry; and
- any potential for variability in the composition, calorific value and ratio of fossil to biogenic carbon in the fuel pellets used by the Uskmouth Conversion Project .

13.42 These uncertainties have been addressed as follows.

13.43 Several different published projections of future baseline electricity generation carbon intensity have been considered. These show an expected decarbonisation of electricity generation from both grid-average and marginal sources over time. However, in this instance, the proposed Uskmouth Conversion Project is considered to be replacing an alternative form of operation on the same site (see Future Baseline section, below) that would conform to a fixed emissions performance standard that is expected to be introduced in the near future.

13.44 The assessment has considered use of recycled ash as both aggregate and cement replacement (with low and high carbon intensity of baseline GHG emissions avoided, respectively) to show the sensitivity of the net total GHG emissions to this element of the assessment.

13.45 Regarding fuel pellet energy content (calorific value) and fossil to biogenic carbon ratio, information has been provided by the applicant for the specification that meets its design case for operation of the proposed Uskmouth Conversion Project. The fuel pellet is a product supplied to a specification and therefore not subject to the same level of variability as unsorted residual waste. The applicant's expected total carbon content, calorific value and fossil to biogenic carbon ratio have been compared to published information and information held by RPS concerning other developments with combustion of waste or waste-derived fuel and the values are considered to be appropriate for use in the assessment.

13.46 A further limitation of the assessment is that it is difficult to establish detailed information about construction material quantities and engineered products required for a project at an early stage of design. The assessment of construction impacts has therefore used a screening approach and published information to consider whether these impacts would be significant to the total effects of the Uskmouth Conversion Project.

Baseline Environment

13.47 The current UK national baseline carbon intensity of electricity on an as-generated basis (excluding transmission and distribution losses and scope 38 supply chain emissions) is 0.2566 tCO_2e/MWh (BEIS, 2019a). For the maximum 1,734,480 MWh of electricity that would be exported to the grid by the Uskmouth Conversion Project per annum, that equates to 445,068 tCO_2e per annum. However, this baseline will change over time as the mix of grid electricity generation sources change, so the likely evolution of the future baseline (see

[8] Scope 3 emissions in the context of electricity generation refer to emissions from the upstream supply chain of the generating facility, e.g. extraction and transport of gas fuel or manufacture and installation of a wind turbine.

following section) has been considered to determine the baseline conditions that should be used in the assessment.

Future Baseline Conditions

13.48 The carbon intensity of baseline electricity generation is projected to reduce over time and so too would the intensity of the marginal generation source displaced at a given time, as projected in displaced electricity generation emission factors published by BEIS (2019b). Table 13.1 shows the projections over the project's 20 year operational life-time from 2022 onwards. The reductions in carbon intensity of baseline electricity generation that are projected by BEIS are in line with national climate policy and are expected to occur as result of changes such as increased use of renewable electricity generation, new nuclear capacity and future introduction of CCS for remaining fossil-fuelled generation.

Table 13.1: Projected carbon intensity of marginal and grid-average electricity generation

Operating year	Calendar year	Marginal carbon intensity (tCO_2e/MWh)	Grid-average carbon intensity (tCO_2e/MWh)
1	2022	0.246	0.098
5	2026	0.189	0.09
10	2031	0.105	0.067
15	2036	0.059	0.037
20	2041	0.064	0.036

13.49 The BEIS projections are an average for the UK electricity grid, which would be appropriate to apply if the generation at the proposed Uskmouth Conversion Project were displacing generation elsewhere on the grid.

13.50 However, in this case, the Applicant has stated that it is expected and commercially likely for the Uskmouth facility to operate as a combined coal- and biomass-fired facility in the future, if the Uskmouth Conversion Project were not to go ahead. This scenario is described in detail in Chapter 3, where the Applicant provides the evidence for this being the likely future evolution of the baseline at this development site, and therefore this has been adopted as the future baseline for the ES including the climate change assessment. The Applicant has stated that this likely future baseline operation as a coal- and biomass-fired facility would continue for the same 20-year lifetime as the proposed Uskmouth Conversion Project.

13.51 The Applicant has stated that in the future baseline, all three generating units of Uskmouth B would operate. Each unit would generate the same power as the units in the proposed conversion, i.e. 121 MW gross and 110 MW net for export to the grid per unit, so 363 MW gross and 330 MW net in total.

13.52 The government has set out plans to limit the GHG emissions from existing coal-fired generation plant to an emissions intensity of 0.450 tCO_2e/MWh from 2024 or 2025 (BEIS, 2018)9. The Applicant has stated, as discussed in Chapter 3, that Uskmouth Power Station in the likely future baseline would achieve this standard by co-firing biomass with coal. For the equivalent annual operating time as the proposed Uskmouth Conversion Project, total annual GHG emissions at this intensity would equate to 1,287,851 tCO_2e per annum based on 2,861,892 MWh for all three units.

[9] this is considered likely to be measured on a gross generation basis, consistent with the approach to the Emissions Performance Standard applied to new fossil-fuelled generators, although that is not confirmed until legislation has been introduced (BEIS, 2018 and D. Panzeri (BEIS), pers. comm. 10/03/20)

13.53 A digest of potential changes in local climatic and weather conditions over the project's operating lifetime due to climate change has been provided to all ES topic chapter authors to inform consideration of the future baseline in other chapters. The information has been drawn from the UK Climate Projections 2018 (UKCP18) resource (Met Office Hadley Centre (MOHC), 2018). Further details of inter-related effects of climate change and other topics are given in paragraph 13.100.

Mitigation Measures Adopted as Part of the Project

13.54 A minimum of 99% of the fuel supplied to the proposed Uskmouth Conversion Project will be delivered by rail. No more than 1% of the fuel, as an annual average, will be delivered by road. This is likely to reduce total GHG emissions compared to greater use of road transport as rail transport has a lower carbon intensity per tonne-km, although that would depend on the relative distances and logistics for fuel pellet supplies that can utilise rail and on the relative future rates of decarbonisation in road transport and rail freight transport (both mainly diesel-powered in the present day).

13.55 Operating in combined heat and power (CHP) mode by exporting waste steam or hot water from the development has the potential to provide significant GHG emission reductions through displacing fossil-fuelled heat generation in the baseline, reducing the carbon intensity of the development per unit of useful energy generated. CHP is strongly supported by local and national climate change policy.

13.56 The Applicant has undertaken the first six stages of a CHP-Readiness assessment as directed by Natural Resources Wales (NRW). The assessment has identified that while there are three theoretical large heat loads within a 10 kilometre radius, the Applicant has reasoned in the assessment that none of these options is likely to be practicable: the heat rejected from the turbine in the form of low temperature steam under vacuum is low grade and would be subject to further transmission and distribution losses, would be extremely difficult to extract and there are several practical difficulties in establishing pipelines which are discussed. However, the Applicant commits to undertaking a regular review of CHP opportunities, at no more than two year intervals, with the intention that waste heat will be utilised should a viable customer emerge.

13.57 Recycling the fly ash and bottom ash waste from the proposed Uskmouth Conversion Project in the production of carbon-intensive construction materials such as cement has the potential to provide significant GHG emission reductions through substitution of the production of those materials. While fly ash from waste combustion has been considered a hazardous material (due to air pollutant control system residues), in recent years options for its processing and re-use have emerged. The applicant commits to endeavouring where possible to recycle bottom ash and fly ash.

13.58 Adopted mitigation measures for flood risk with climate change allowance are detailed in Chapter 6: Hydrology and Flood Risk.

Assessment of Construction Effects

13.59 As a facility providing electricity over an operating lifetime of approximately 20 years, the project's net total GHG emissions would be dominated by its operational phase. The ongoing emissions of such a facility year on year will typically substantially outweigh the one-off 'embodied carbon'10 cost of producing building materials and emissions from plant used in

[10] the GHG emissions associated with extracting raw materials, manufacturing into products and transportation that are 'embodied' in construction materials used

construction phase of Uskmouth Conversion Project, especially given that the existing structure is remaining largely the same. However, this is difficult to quantify in detail at an early stage of design where full bills of quantities and materials specifications for construction are not yet available.

13.60 A screening approach has therefore been taken to consider whether construction-stage GHG emissions could be material to the total impact of the Uskmouth Conversion Project and the significance of effects. Materiality is a term used in GHG accounting to distinguish minor and major emission sources for a proportionate assessment, with non-material or *de minimis* sources being those that are unlikely to appreciably affect the total or are likely to be within its uncertainty range. A materiality threshold of 5% of total emissions is commonly used and has been adopted in this assessment.

13.61 Using embodied carbon factors for engineering steel and concrete published by BEIS (2019a) and the World Steel Association (pers. comm, 2017), the 5% materiality threshold of direct combustion emissions over the project's operating lifetime would be equivalent to approximately half a million tonnes of steel or more than six million tonnes of concrete, which are much larger amounts than could reasonably be expected to be employed in construction given the minor nature of the conversion and silo construction works required.

13.62 Construction stage GHG emissions are therefore considered likely to make a negligible contribution to lifetime impacts of the Uskmouth Conversion Project and are not significant to total climate change effects.

Further Mitigation

13.63 Construction-stage effects are predicted to be negligible. Nevertheless, in consideration of the IEMA guidance and government policy seeking GHG emissions reductions across all economic sectors including construction, Uskmouth Power Station will assess the following further mitigation measures during detailed design and will implement these where it is feasible and cost-effective to do so:

- seek a reduction in total materials required and hence embodied carbon through lean/efficient design;
- specify materials and products with low embodied carbon, e.g. based on data in the Building Research Establishment (BRE) Green Guide to Specification (BRE, not dated) or environmental product declarations (EPDs);
- source materials locally where possible to reduce transport GHG emissions;
- design the facility for durability, re-use and efficient deconstruction and re-use or recycling of materials at the end of its operational life; and
- consider use of life-cycle assessment within the framework of an established sustainability rating methodology, such as CEEQUAL (BRE, 2020), to guide low-carbon and climate-resilient design and construction, set a feasible reduction target and quantify its achievement.

Future Monitoring

13.64 No construction-stage monitoring is required.

Accidents and/or Disasters

13.65 There are no likely significant adverse effects due to GHG emissions from accidents or disasters during demolition or construction.

13.66 There is no significant increase in accident or disaster risk due to climate change during construction programme ending in 2022 as conditions would be similar to the present day.

Assessment of Operational Effects

13.67 In the operational phase of the Uskmouth Conversion Project the facility is expected to combust typically 849,443 tonnes per annum (tpa) of fuel pellets to generate 242 MW gross of electricity. Net of up to 22 MW of parasitic load, a minimum of 220 MW of electricity would be exported to the national grid, which at 7,884 annual operating hours would be 1,734,480 MWh per annum.

13.68 The fuel pellets will, by design, typically have a calorific value of 22 MJ/kg, with 48% total carbon content and a 50:50 ratio of fossil to biogenic carbon. The applicant may substitute up to 1% of total annual fuel input with non-waste-derived fuel biomass fuel pellets, which are assumed to have equivalent calorific value and to contain only biogenic carbon.

13.69 After combustion, approximately 25,000 tpa of bottom ash and 144,000 tpa of air pollution control residue (comprising fly ash with limestone and flue gas reagents) would remain. It is expected that the bottom ash will be recycled into construction industry products as an aggregate substitute. With processing, there is also potential for the fly ash to be used as an aggregate or cement substitute and the potential benefits of this have been considered in the assessment. Given the pre-processed nature of the fuel pellet fuel, it has been assumed that the amount of other potentially recyclable non-combustible material (such as metals and glass) left in bottom ash is negligible.

Magnitude of Impact

13.70 Details of the GHG emission calculations and data used in the assessment are provided in Appendix 13.1.

13.71 Gross GHG emissions from fuel pellet combustion and air pollutant control by the proposed Uskmouth Conversion Project are estimated to be 816,916 tCO_2e/annum.

13.72 GHG emissions from transport of the fuel pellets by rail and other inputs and outputs by road are estimated to be 11,614 tCO_2e/annum, with the assumed distances and payloads described in Appendix 13.1.

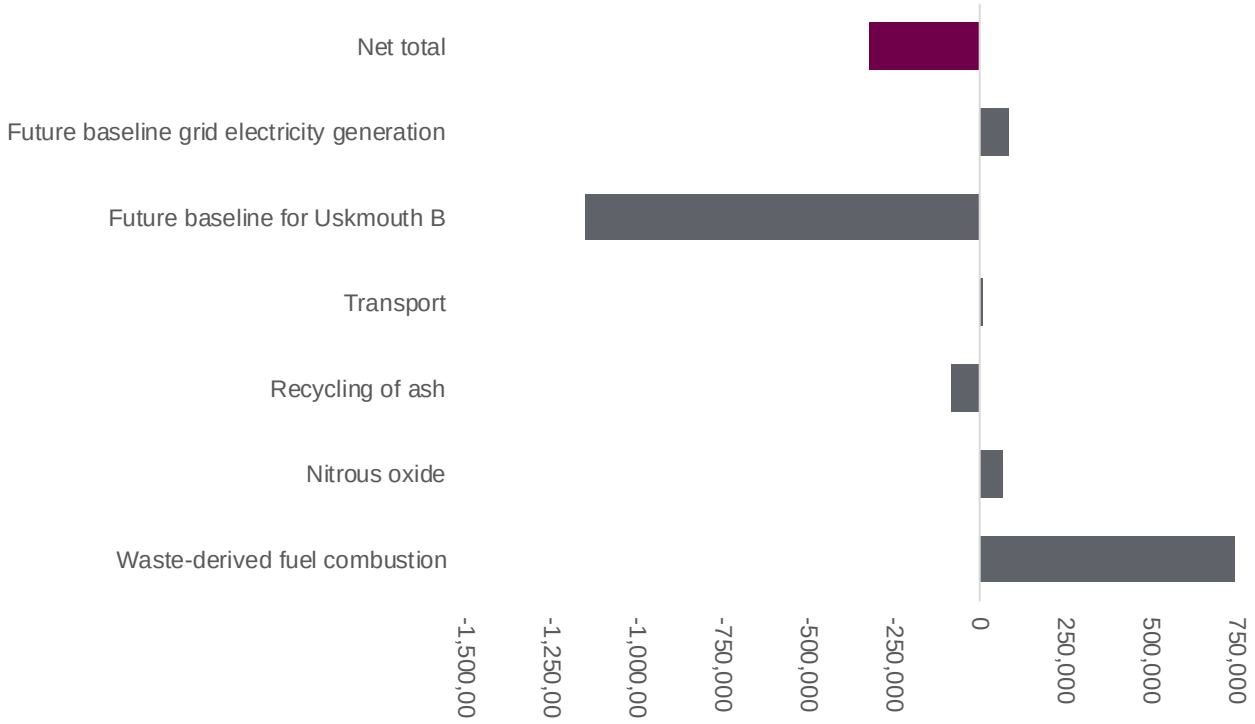
13.73 Any GHG emissions that would be avoided by recycling ash depend heavily on the carbon intensity of primary materials production for which the ash substitutes. Based on a scenario of fly ash and limestone substituting directly for Portland cement in concrete production, and bottom ash substituting for virgin aggregates, GHG emissions avoided due to recycling would be up to 83,416 tCO_2e/annum. If this fly ash substitution into Portland cement is not possible, the emission savings would be lower, as shown Appendix 13.1.

13.74 GHG emissions in the future baseline for operation of all three units of Uskmouth Power Station to generate 2,601,720 MWh of electricity (gross) at an emissions intensity of 0.45 tCO_2e/MWh would be 1,287,851 tCO_2e. Fuel transport and ash recycling for the future baseline have also been estimated for the purpose of comparison by assuming that these are similar to the proposed Uskmouth Conversion Project but scaled in proportion to the greater fuel throughput. The net total CO_2 emissions in the future baseline of Uskmouth Power Station operation are therefore estimated as 1,151,894 tCO_2e/annum (with fly ash substituting for Portland cement).

13.75 Because the three units of Uskmouth Power Station would have generated more electricity than the two units of the proposed Uskmouth Conversion Project it is also necessary to consider the emissions associated with generating this electricity from other sources in the development scenario. Using the BEIS projected grid-average carbon intensity of generation for year one of the proposed Uskmouth Conversion Project operation, this would be 84,990 tCO_2e. This would be lower in future years (as further decarbonisation of generation for the grid occurs) so year one is the maximum case for the assessment.

13.76 Net total GHG emissions from the Uskmouth Conversion Project and its outputs compared to the future baseline are predicted to be -321,857 tCO_2e/annum. The net emissions and a breakdown of the contributions are illustrated in Graph 13.1.

Graph 13.1: Year one GHG emissions breakdown (tCO_2e)



Significance of effect

13.77 Paragraph 13.38 defined three ways in which GHG impacts could be contextualised to aid in determining significance of effects: as a percentage of national carbon budgets, by comparison to baseline emissions intensity, and with reference to whether the impact is in line with policy goals for carbon reduction.

Carbon budgets

13.78 The direct GHG emissions from combustion at the proposed operational Uskmouth Conversion Project would be equivalent to 0.22% of the total UK carbon budget during the period 2023-203211, or 2.19% of the Wales carbon budget per year for 2021-202512.

13.79 The direct GHG emissions from combustion in the future baseline with three units operating at Uskmouth B would be equivalent to 0.35% of the UK carbon budget or 3.44% of the Wales carbon budget.

13.80 The net GHG emissions reduction comparing the proposed Uskmouth Conversion Project to the future baseline (taking into account all the sources described above and holding those that

[11] Based on the Carbon Budget Order 2011 and Carbon Budget Order 2016's totals of 1,950 and 1,725 $MtCO_2e$ in total for 2023-27 and 2028-32

[12] Based on Wales' 2021-2025 carbon budget of 33% lower than the 1990 baseline of 55.8 $MtCO_2e$ per year

change over time constant, to be conservative) would be equivalent to 0.09% of the UK carbon budget or 0.86% of the Wales carbon budget.

Carbon intensity

13.81 The direct carbon intensity of the proposed operational Uskmouth Conversion Project electricity generation would be 0.471 tCO_2e/MWh of electricity exported to the grid or 0.428 tCO_2e/MWh of gross electricity generated. The gross carbon intensity is 4.9% lower than the emissions standard of 0.450 tCO_2e/MWh that would be expected to be applied on a gross generation basis to the operation of Uskmouth Power Station in the future baseline.

13.82 In the case of both the proposed Uskmouth Conversion Project and the future baseline, the emissions intensity of electricity generation is significantly higher than the projected marginal generator carbon intensity on the UK electricity grid, which is projected to be 0.246 tCO_2e/MWh, 0.105 tCO2e/MWh and 0.036 tCO_2e/MWh in years 1, 10 and 20 of operation, respectively.

Climate policy

13.83 Government policy, legislation and guidance from the Committee on Climate Change all emphasise the need to rapidly decarbonise the energy sector through renewable and low carbon sources. The overarching advice is that while non-renewable sources will have a transitional role to play as the grid is decarbonising, this must be accompanied by deployment of CCS and use of CHP wherever possible in order to keep in line with national carbon targets.

13.84 The proposed Uskmouth Conversion Project will use fuel pellets that are considered to provide a mixture of renewable and non-renewable energy, with around 50% of its total combustion GHG emissions having a net neutral effect on atmospheric CO_2 concentration due to the biomass fraction of the pellets. In the future baseline for the site, similarly it would be necessary for Uskmouth Power Station's three units to fire a substantial proportion of renewable biomass fuel alongside coal in order to meet the emissions performance standard expected to be required.

13.85 On an absolute emissions basis, the proposed Uskmouth Conversion Project will provide a substantial reduction in GHG emissions compared to the future baseline for the site. This saving comes from the reduced power generation (two units operating rather than three), with the shortfall in electricity generation expected to be made up by other lower-carbon generators on the grid.

13.86 On an emissions intensity basis, the Uskmouth Conversion Project and the future baseline are comparable, in both cases being electricity generation from a mix of fossil and biomass fuel that achieves around 0.425 tCO_2e/MWh and 0.450 tCO_2e/MWh respectively. A small reduction in emissions intensity of approximately 4.9% is predicted due to the Uskmouth Conversion Project, although this is likely to lie within the uncertainty range of the assessment and assumes that Uskmouth Power Station in the future baseline operates continuously at the maximum permitted emissions intensity.

13.87 The operational phase of Uskmouth Conversion Project would be consistent with national climate change policy to divert waste from landfill, particularly biodegradable waste (with net neutral emissions when combusted) and to recover energy from waste. By contrast, in the future baseline, non-renewable coal and sustainably sourced biomass fuel would be required.

13.88 Present day recycling techniques cannot recycle all waste materials and as a result there remains a significant quantity of material sent for disposal. These non-recyclable materials are presently sent to landfill or to purpose-built energy-from-waste facilities. This residual, non-recyclable waste stream is used as feedstock to produce the fuel pellets. In the absence of commercial users of fuel pellets such as the Uskmouth Conversion Project, the residual waste used to produce the pellets may require alternative treatment and, for some proportion,

disposal. Assessment of emissions from alternative waste treatment or disposal absent waste-derived fuel pellet production is outside the scope of this assessment, but it is worth noting that the Uskmouth Conversion Project does contribute to national policy goals to recover value from residual waste and this may be associated with further GHG emission savings depending on the waste management baseline and process of pellet production.

Effect

13.89 The long-term impact of GHG emissions from the operational phase of Uskmouth Conversion Project, which is the balance of direct and indirect impacts of combustion, energy export and re-use of its outputs compared to the future baseline that has been defined by the Applicant in Chapter 3, is considered to cause a beneficial effect that is significant, using the definition in paragraphs 13.39 to 13.40.

Further Mitigation

13.90 The value assumed in the assessment for N2O slip is the high end of the range given in the BREF for Waste Incineration (European Commission Joint Research Centre, 2018). The BREF gives a range because lower values can be achieved. This is recommended as further mitigation because it would be of material benefit to the total GHG emissions in operation compared to the worst-case assessment presented in this chapter. Reduced N2O formation is possible where the selective non-catalytic reduction air pollution control system is operated at the optimum temperature (around 1,010 to 1,050 °C) and where excess combustion air and hence oxygen availability is minimised. N2O levels can be continuously monitored and reported to operating staff, as with certain other air pollutants. This data together with a procedure for operators to minimise N2O formation through control of temperature and oxygen levels could reduce typical N2O emissions significantly. This could provide a reduction in GHG emissions from the Uskmouth Conversion Project equivalent to up to 49,576 tCO_2e/annum compared to the upper end of the range for N2O emissions assessed.

13.91 Other mitigation opportunities that may be possible in future include installation of carbon capture technology (should an endpoint for captured carbon emerge, i.e. national infrastructure for geological carbon storage) or offsetting of a proportion of carbon emissions by woodland planting. The applicant commits to keeping such reduction opportunities under regular review, as with the commitment (specified in the adopted measures section) made to review and where possible implement CHP opportunities and to seek the most beneficial use (in GHG emission terms) for recovered ash.

Future Monitoring

13.92 No operational-stage monitoring is required.

Accidents/Disasters

13.93 No significant effect on climate change due to GHGs released by accidents or disasters is considered likely.

Potential Changes to the Assessment as a Result of Climate Change

13.94 Climate changes would not affect the assessment of GHG emissions reported in this chapter. It is suggested that other possible effects of climate change on the Uskmouth Conversion Project are to be scoped out of this report.

13.95 Assessment of the Uskmouth Conversion Project risk from and resilience to climate change has been scoped out of this chapter on the basis that no significant risks (other than flooding, addressed in Chapter 6: Hydrology) were predicted, as discussed in the Scoping Report.

13.96 There are other potential inter-relationships between climate change and environmental topic areas reported in other chapters of this ES as summarised in the Inter-relationships section, below. A digest of climate projections data has been provided to other topic authors to inform this section (Potential Changes to the Assessment as a Result of Climate Change) of the other ES chapters where relevant.

Assessment of Cumulative Effects

13.97 As set out in the IEMA guidance, any project has the potential in principle to result in adverse or beneficial effects on climate change that could be significant, and this may include other consented or planned developments in the area of the Uskmouth Conversion Project. This is because climate change is a global effect, not an effect that is localised in the area around any one individual development or group of developments, so all projects have the potential to contribute cumulatively to the effect.

13.98 For this reason, the sensitivity of the receptor (atmospheric greenhouse gas concentrations) has been defined as 'high' for the assessment in this chapter, taking into account the cumulative contribution to climate change of other projects and anthropogenic activities. The significance of cumulative effects has therefore already been considered in the assessment in this chapter.

13.99 The type of impacts and suitable measures to mitigate these from other developments would need to be dealt with for each application as it comes forward, to ensure that the effects on climate change are reduced as far as possible.

Inter-relationships

13.100 The assessment of inter-related effects with climate change is given in in the Potential Changes to the Assessment as a Result of Climate Change subsection of the Assessment of Operational Effects section of each relevant ES chapter based on climate projections data provided to each topic author (and other topic-specific guidance where applicable). The main areas where there is a (hypothetical) potential for inter-related effects, subject to assessment, are considered to be:

- landscape and visual – consideration of climate resilience (e.g. drought tolerance) in the design and species mix of any landscape planting proposed;
- ecology – potential changes in the sensitivity of habitats or species to development impacts in the future due to the effects of climate change;
- flood risk – changes in rainfall frequency and intensity; changes in tidal or storm surge risk;
- air quality – changes in weather patterns that affect air pollutant dispersion (annual average);
- accidents and disasters – possible increase in fire risk with sustained hot and dry conditions; and
- health and wellbeing – potential changes in sensitivity of human receptors to development impacts due to climate changes, e.g. vulnerability to air pollution during certain weather conditions.

Summary of Effects

13.101 The potential impact of the Uskmouth Conversion Project on GHG emissions, resulting in an effect on atmospheric GHG concentration that contributes to climate change, has been assessed and reported in this chapter.

13.102 The potential for impacts of climate change to cause effects on the Uskmouth Conversion Project has been scoped out of the assessment, as no significant effects were considered likely.

13.103 The potential for impacts of climate change to cause inter-related effects with other environmental impacts has been assessed and is reported in the Potential Changes to the Assessment as a Result of Climate Change subsection of the Assessment of Operational Effects section of ES chapters where relevant.

13.104 Construction phase GHG impacts have been screened and are predicted to be non-material to the total GHG impacts of the Uskmouth Conversion Project, which is a negligible effect that is not significant.

13.105 Operational phase GHG impacts from combustion of fuel pellets by the Uskmouth Conversion Project, transport and recycling of ash have been assessed. These have been compared to GHG emissions estimated for the future baseline at the application site, which the Applicant has shown (in Chapter 3) would be operation of all three units of Uskmouth Power Station firing a mixture of coal and biomass fuel. Compared to this future baseline, the Uskmouth Conversion Project (operation of two power station units firing fuel pellets) is predicted to cause a beneficial effect that is significant because it would reduce GHG emissions in total and per unit of electricity generated.

13.106 Committed and further recommended mitigation measures to reduce this effect are: transport fuel pellets by rail; regular review of CHP opportunities and implementation if feasible; seek maximally beneficial recycling of ash; monitor and manage SNCR system to minimise N2O slip; and install carbon capture technology when feasible.

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Table 13.2: Summary of Likely Environmental Effects on Climate Change

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact	Significance of effect	Significant / Not significant	Notes
Construction phase							
Atmospheric CO_2e concentration	High	Greenhouse gas emissions	Long term	Non-material	Negligible	Not significant	A non-material impact is one that makes no significant contribution to the total impact of the development
Operational phase							
Atmospheric CO_2e concentration	High	Greenhouse gas emissions	Long term	-330,973 tCO_2e	Beneficial	Significant	In initial year of operation

14 POPULATION AND HEALTH

Introduction

14.1 For the purposes of this chapter, health is defined as '*a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity'* (WHO, 1948). As such, this chapter applies a broad socio-economic model of health that encompasses conventional health impacts such as disease, accidents and risk, along with wider socio-economic health determinants vital to achieving good health and wellbeing.

14.2 The chapter draws from and builds upon Chapter 2: Project Description and the other relevant technical chapters within the ES (most notably: Chapter 10: Traffic and Transport; Chapter 11: Noise and Vibration; and Chapter 12: Air Quality) to form the basis of the assessment for population and health. For the sake of brevity, this chapter does not seek to repeat text or replicate data from the inter-related technical disciplines.

14.3 The following appendices support this chapter:

- Appendix 14.1: Population and Health Baseline.

Assessment Methodology

Planning Policy Context

Welsh National Planning Policy

14.4 Achieving a healthier Wales, whereby people's physical and mental well-being is maximised and choices/behaviours that benefit future health are understood, is one of seven goals outlined in the Well-being of Future Generations (Wales) Act 2015 (Welsh Assembly, 2015).

14.5 Planning Policy Wales Edition 10 (PPW10) (Welsh Government, 2018) aims to deliver the vision set out by the Well-being of Future Generations Act. As such, "promoting healthier places" is identified as one of several key themes which collectively contribute to placemaking in Wales. It is recognised that the built and natural environment is a key determinant of health and wellbeing, whereby the planning system, and planning authorities themselves, have a role to play in the prevention of health impacts caused or exacerbated by a range of factors which determine health. As a result, the planning system must consider the impacts of all proposed developments on existing communities to maximise health protection, well-being and safeguard amenity.

14.6 In addition, within PPW10, health protection is mentioned in the context of specific determinants of health:

- Paragraph 3.51 states that for land which has been previously developed on, it may be appropriate to secure remediation (if land is contaminated) to reduce risks to human health.
- Paragraph 4.1.1, 4.1.8 and 4.1.25 focus on sustainable transport where it states that the planning system should enable people to access jobs and services through shorter, more efficient and sustainable journeys, by walking, cycling and public transport. As a result, this will improve air quality, increase physical activity and improve health.
- Paragraph 6.72 states that national air quality objectives are not necessarily safe levels of air pollution, whereby there are still long-term population health risks associated with air quality concentrations below these levels. Rather, the objectives represent a pragmatic threshold above which government considers the health risks associated with air pollution are unacceptable. From a public health perspective, the primary pollutants of concern are nitrogen dioxide and particulate matter which currently have no safe threshold defined. As a result, it is desirable to keep levels of pollution as low as possible.

- Paragraph 6.73 states that certain sounds can be problematic, can affect amenity and be harmful to health or a nuisance. In addition, it is recognised that lower levels of noise can still be disruptive, impact on amenity, and as such should be protected through the planning process.

Local Planning Policy

14.7 Providing an environment that is safe, encourages healthy lifestyle choices and promotes wellbeing is a key objective of the Newport Local Development Plan 2011-2026 (Newport City Council, 2015), which states that many factors that contribute to achieving good health and wellbeing have some basis in the planning system. These factors include locating development near safe, accessible and sustainable travel routes; attention to air quality issues; designing out crime; and enhancing access to green spaces and the wider natural environment.

14.8 As health and wellbeing is influenced by a number of factors, there are many local policies which are somewhat relevant to population and health. For the sake of brevity, only local policies which explicitly relate to the protection or promotion of health and wellbeing are deemed relevant to the assessment of population and health.

14.9 On this basis, there are three local policies which are particularly relevant to the population and health chapter. These comprise:

- SP2 Health;
- GP7 Environmental Protection and Public Health; and
- W2 Waste Management Proposals.

14.10 Firstly, the SP2 Health policy states that proposals should seek to maximise their positive contribution to health and wellbeing in addition to minimising negative effects by being appropriately located, close to public transport links, providing walking/cycling routes and other green infrastructure.

14.11 Secondly, the GP7 Environmental Protection and Public Health policy states that any development which would result in unacceptable harm to health (associated with risks to environment, local amenity or public health and safety) will not be permitted.

14.12 Finally, the W2 Waste Management Proposals policy states that development proposals for sustainable waste management facilities will be permitted provided that (amongst other factors) the development would not result in unacceptable harm to health.

Relevant Guidance

14.13 The current EIA Regulations reinforce health within the planning and assessment process, but do not provide definitive guidance on the approach, process or methodology to follow.

14.14 Taking this into consideration, it is considered appropriate for the health and wellbeing chapter to apply recognised Health Impact Assessment (HIA) guidance and other relevant guidance, and combine this with the requirements defined for EIA to investigate, inform, assess and effectively communicate how and where all health issues and opportunities are addressed.

14.15 The following guidance has been taken into account in undertaking the assessment:

- Health Impact Assessment: A practical guide (Chadderton, et al., 2012);
- A Critical Guide to HIA (West Midlands Public Health Observatory, 2007);
- Health Impact Assessment: A practical guide (Chadderton et al., 2012);
- Fair Society, Healthy Lives: The Marmot Review. Strategic review of health inequalities in England post-2010 (Marmot, et al., 2010);

- Healthy Lives, Healthy People: Our strategy for public health in England (Department of Health, 2010);
- National Planning Practice Guidance: Health and wellbeing (Ministry of Housing, Communities & Local Government, 2019); and
- Reuniting Health with Planning - Healthier Homes, Healthier Communities (Ross & Chang, 2012).

Study Area

14.16 Environmental health determinants (such as changes to air quality and noise exposure) are likely to have a local impact where the potential change in hazard exposure is limited by physical dispersion characteristics. As a result, the study area for health-specific baseline statistics relating to population and health effects focuses on Newport Unitary Authority (which encompasses the city and surrounding area), using the national average as a comparator.

Baseline Methodology

14.17 Different communities have varying susceptibility to health and wellbeing effects (both adverse and beneficial) as a result of social and demographic structure, behaviour and relative economic circumstances.

14.18 The approach to defining the baseline involved collation and interpretation of published demographic, socio-economic and public health data. Health Map Wales (Public Health Wales, n.d.), which draws from a number of datasets, was used in order to develop the population and health baseline.

14.19 These baseline data have been used to better understand local health and socio-economic circumstances; where quantitative assessment methods are being applied, locally specific parameters can be used within equations used to predict changes in baseline population health, and then assess the significance of an effect. Understanding the existing baseline socio-economic and health status within the study area also supports bespoke mitigation and community support initiatives tailored to local circumstances and need, where appropriate.

Consultation

14.20 A summary of the consultation relevant to population and health and how/where this is addressed is provided in Table 14.1.

Table 14.1: Consultation Responses Relevant to this Chapter

Date	Consultee and Issues Raised	How/ Where Addressed
Date	Consultee and Issues Raised	How/ Where Addressed
17/06/2019	Senior Scientific Officer, Newport City Council: Health is mentioned in the context of contaminated land, whereby it is recognised that given the high risk nature of the former land use there is potential for contamination on site that would pose a risk to human health. as such, it is recommended that a full contaminated land site investigation is undertaken, with particular attention given to PCBs and asbestos.	Refer to Chapter 5: Geology, Hydrogeology and Ground Conditions for a full assessment of potential impacts on human health associated with land contamination. For the sake of brevity, the population and health chapter does not seek to repeat the outputs from this assessment.

Assessment Criteria and Assignment of Significance

Receptor Sensitivity/Value

14.21 Within a defined population, individuals will range in level of sensitivity due to a range of factors such as age, socio-economic deprivation and the prevalence of any pre-existing health conditions which could become exacerbated. These individuals can be considered particularly vulnerable to changes in environmental and socio-economic factors (both adversely and beneficially) whereby they could experience disproportionate effects when compared to the general population.

14.22 As an example, the elderly, young children and individuals with chronic pre-existing respiratory conditions would be more sensitive to adverse changes to air quality, with the potential for emergency admission to hospital more likely than someone of working age who is in good respiratory health. On the other hand, an individual who has been unemployed for a long period of time would benefit more from employment opportunities in comparison to an individual who is already employed.

14.23 The baseline data collated to inform and interpret local health circumstance is provided in full in Appendix 14.1: Population and Health Baseline, and summarised within the Baseline Environment section of this chapter. For the majority of indicators, local health circumstance in Newport is considered worse than the national (Wales) average. On this basis, a precautionary approach has been applied by assuming that the population within the study area is of uniformly high sensitivity.

Magnitude of Impact

14.24 The criteria for defining magnitude in this chapter are outlined in Table 14.2.

Table 14.2: Definitions of Magnitude

Sensitivity	Typical Descriptors
High	Change in environmental or socio-economic factor sufficient to result in a major change in baseline population health or socio-economic circumstance (adverse or beneficial)
Medium	Change in environmental and socio-economic factor sufficient to result in a moderate change in baseline population health or socio-economic circumstance (adverse or beneficial)
Low	Change in environmental and socio-economic factor sufficient to result in a minor change in baseline population health or socio-economic circumstance (adverse or beneficial)
Negligible	Change in environmental and socio-economic factor below which it is possible to result in any manifest health outcome at the population level but may impact at an individual level (adverse or beneficial)

Significance of Effects

14.25 The significance of an effect is determined based on the sensitivity/value of a receptor and the magnitude of an impact. The method employed for this assessment is presented in Table 14.3. Where a range of significance levels are presented, the final assessment for each effect is based upon expert judgement.

14.26 In all cases, the evaluation of receptor sensitivity, impact magnitude and significance of effect has been informed by professional judgement and is underpinned by narrative to explain the conclusions reached.

14.27 For the purpose of this assessment, any effects with a significance level of minor or less are not considered to be significant in terms of the EIA Regulations.

Table 14.3: Assessment Matrix

Sensitivity	Magnitude of Impact			
	Negligible	Low	Medium	High
Negligible	Negligible	Negligible or minor	Negligible or minor	Minor
Low	Negligible or minor	Negligible or minor	Minor	Minor or moderate
Medium	Negligible or minor	Minor	Moderate	Moderate or major
High	Minor	Minor or moderate	Moderate or major	Major

Quantitative Methodology for Health Effects from Changes to Air Quality

14.28 While the air quality limits detailed within Chapter 12 (Air Quality) are set to protect the environment and health, health effects may be experienced at the population level for concentrations below these limits, and on the basis of the available evidence, there may not be a concentration threshold below which no adverse health effects occur. As such, the population and health assessment provides further context and added value to the assessment outputs provided in Chapter 12 (Air Quality).

14.29 Chapter 12 (Air Quality) have modelled five years (2014 to 2018) of changes in concentrations of nitrogen dioxide (NO_2) and particulate matter (PM) associated with the stack across a coarse 30 km by 30 km grid with a spacing of 100 m, and a fine 4 km by 4 km grid with a spacing of 10 m. The coarse and fine grid points intersect a total of 358 Lower Super Output Areas (LSOAs) located in Newport and the surrounding areas of Blaenau Gwent, Caerphilly, Cardiff, Monmouthshire, North Somerset, The Vale of Glamorgan and Torfaen.

14.30 To estimate the change in health outcomes associated with changes in exposure to air quality (i.e. the population attributable fraction), concentration-response functions (CRFs) recommended in the World Health Organisation's (WHO) Health Risks of Air Pollution in Europe (HRAPIE) guidance (HRAPIE, 2013) are applied with the absolute change in air quality (in µg/m^3), population estimates (Office for National Statistics, 2018), and various baseline health data for the study area, using the following equation:

$$PAF = \frac{RR - 1}{RR} \times P \times B$$

where:
PAF is population attributable fraction (health outcome within the exposed population due to changes in air quality)
P is the population exposed
B is the baseline annual rate of a specific health outcome per person
RR is the relative risk, which is calculated for changes in air quality the following equation:

$$RR_A = RR^{(A/10)}$$

where:
A is the change in air pollution

14.31 The grid size used for air quality modelling purposes was primarily chosen to capture specific ecological receptors (such as the Severn Estuary) which are of interest to Chapter 7: Ecology and are not relevant to the population and health assessment.

14.32 To provide a more representative selection of grid points for use in the population and health assessment, it was considered appropriate that all grid points with an increase of <0.1 µg/m^3 for the primary pollutant associated with the Uskmouth Conversion Project (i.e. NO_2) were excluded

from analysis. The selected modelled grid points intersect a total of 139 LSOAs (rather than the original 358) located in Newport and the surrounding areas of Caerphilly, Cardiff, Monmouthshire and North Somerset. The total population within the 139 LSOAs is 231,155, with a 30+ population of 143,430.

14.33 The assessment is completed at the LSOA level, with outputs across all 139 LSOAs summed to provide the total health effect across the affected population. As several grid points detailing modelled changes in air quality are located within each of the 139 LSOAs selected for analysis, the average increase in pollutant concentrations across each LSOA was calculated to use in the equation. In addition, as air quality modelling outputs were generated for five separate years (2014 to 2018), the average change in concentration across all years was used in the population and health assessment on the basis that the worst-case change in pollutant concentration at each grid point does not necessarily occur in the same year.

Limitations of the Assessment

14.34 The population and health assessment partially draws from and builds upon, the outputs from inter-related technical disciplines, namely: Chapter 10: Traffic and Transport; Chapter 11: Noise and Vibration; and Chapter 12: Air Quality.

14.35 As a consequence, the assumptions and limitations of those assessments also apply to any information used in this chapter (e.g. for modelling work undertaken). It is, however, considered that the information available provides a suitable basis for an assessment of population and health for the purposes of this ES.

Baseline Environment

Introduction

14.36 Individuals and communities have varying susceptibilities to adverse and/or beneficial population and health effects associated with changes in environmental and socio-economic conditions as a result of: demographic structure (i.e. age); existing burden of poor health; behaviours (i.e. lifestyle choices which constitute risk factors); and socio-economic circumstance. As an example, an elderly individual with an existing chronic cardiovascular health condition who is a smoker and has a lower than average socio-economic circumstance, would be considered more sensitive than a healthy working age individual.

14.37 The aim of the following information, is to provide a summary of local health and socio-economic circumstance of the communities living in the study area (Newport), using the national (Wales) average as a relevant comparator. Where data for Newport is unavailable, representative data for Aneurin Bevan University Health Board (i.e. a lower spatial resolution) has been collected and compared to the national average. Refer to Appendix 14.1: Population and Health Baseline for the population and health baseline in full.

Nearby receptors

14.38 As stated in Chapter 2 (Project Description), the Uskmouth Conversion Project site is located on the eastern bank of the River Usk, close to the confluence with the Severn Estuary and around 4 km south of central Newport. The closest receptors to the Uskmouth Conversion Project are located approximately 600 m to the south-east (at Great House).

Demography

14.39 There is a relatively young population living in Newport in comparison to the national average. Specifically, there is a larger proportion of males and females in the 0-19 years old and 25-49

years old age categories. In addition, there is a lower proportion of males and females in the 20-24 age category and in all age categories above 55 years old.

14.40 In terms of population growth, the number of people living in Newport has increased by nearly double the average population increase for Wales from 145,785 (in 2011) to 151,485 (in 2017).

Deprivation

14.41 The Welsh Index of Multiple Deprivation (WIMD) ranks all Lower Super Output Areas (LSOAs) in Wales from 1 (most deprived) to 1,909 (least deprived). Of the LSOAs which make up Newport, 43% are categorised within the 20% most deprived LSOAs nationally. However, approximately 36% are categorised within the 20% least deprived LSOAs nationally which suggests that there is a relatively high disparity in terms of deprivation across the communities living in Newport.

Physical health

14.42 All-cause mortality has been increasing steadily in Newport between the years of 2010-12 and 2015-17. Whereas in Wales, all-cause mortality has remained relatively static over the same time period. Most recent statistics show that all-cause mortality in Newport is higher than the national average by approximately 64 people per 100,000 population.

14.43 Regarding specific causes, cardiovascular disease and cancer mortality rates in Newport have shown a general decrease between 2010-12 and 2015-17. Conversely, there has been a general increase in respiratory disease mortality rate in Newport during the same time period. Mortality rate for all specific causes (i.e. cardiovascular, respiratory and cancer) is consistently higher in Newport when compared to the national average.

14.44 Hospital admissions for cardiovascular disease in Newport have shown a general decrease over the years and are relatively similar to the national average; recent statistics show that there are 92 less people per 100,000 population admitted to hospital in Newport for cardiovascular diseases when compared to the national average. Respiratory disease hospital admissions in Newport have been increasing over the years, where recent statistics are higher than the national average by 132 people per 100,000 population. Across all years analysed, cancer hospital admission rate in Newport is lower than the national average but has shown a general increase between the years of 2012/13-2014/15 and 2015/16-2017/18.

Mental health

14.45 Hospital admission rate for self-harm is used as a proxy indicator for mental health. Hospital admissions for self-harm in Newport have been consistently above the national average in all years analysed and has remained relatively static over the years. Depression prevalence has increased in Newport between 2015/16 to 2016/17, consistent with the national average. Most recent statistics show that depression prevalence in Newport is 1.5% higher than the national average. It should be noted that due to better awareness of mental health issues, increases in prevalence is likely to be associated with better diagnosis rates.

14.46 Dementia/Alzheimer's mortality rate has been increasing in Newport over the years, consistent with the national average. Mortality rate from dementia/Alzheimer's has increased in Newport from lower than the national average in 2010-12 to higher than the national average in 2013-15.

Lifestyle

14.47 Obesity across Aneurin Bevan University Health Board (of which Newport is located within) is consistently higher than the national average. Most recent statistics show that obesity across Aneurin Bevan University Health Board is 1.4% higher than the national average.

14.48 Drug related hospital admission rate in Newport is also consistently higher than the national average where most recent statistics show that drug related hospital admission rate in Newport is higher than the national average by approximately 87 people per 100,000 population.

Conclusion

14.49 Overall, the majority of indicators show that local health circumstance in Newport is considered worse than the national average. However, as previously recognised, within a defined population, individuals will range in level of sensitivity due to a range of factors such as age, socio-economic deprivation and the prevalence of any pre-existing health conditions which could become exacerbated. As a result, a precautionary approach has been applied by assuming that the population within the study area is of uniformly high sensitivity.

Future Baseline Conditions

14.50 Trends are analysed as part of the current baseline to provide insight into likely future local community circumstances. Overall, while the existing health burden is higher than the national average, data collated generally shows positive trends for health-specific data. As it is challenging to predict health-specific data with high confidence, it is considered appropriate that the present-day statistics are used for the purpose of this assessment, offering a precautionary approach.

14.51 Regarding the potential influence on the population and health baseline associated with climate change, while it is probable that the effects of climate change will be realised to some extent during the lifetime of the Uskmouth Conversion Project, these changes are not expected to materially alter the population and health baseline conditions.

Mitigation Measures Adopted as Part of the Project

14.52 Mitigation measures adopted as part of the construction and operation of the Uskmouth Conversion Project focus on environmental precursors to adverse population and health outcomes, thereby providing an opportunity for intervention to prevent any manifest health outcome.

14.53 Construction would be undertaken in accordance with a Code of Construction Practice (CoCP) and Construction Environment Management Plan (CEMP) which sets out the key management measures that contractors would be required to adopt and implement in order to control the generation or release of environmental pollutants with the potential to cause adverse population and health outcomes.

14.54 During operation, such mitigation measures are embedded within the design of the Uskmouth Conversion Project itself e.g. through the application of specific abatement technology and will be controlled by the Environmental Permit.

Assessment of Construction Effects

Health effects from changes to air quality

14.55 Construction of the Uskmouth Conversion Project has the potential to influence population and health by contributing to nuisance dust (from general on-site construction activities and/or through track out). Changes to air quality resulting from construction-related traffic has not been assessed on the basis that the number of daily Heavy Duty Vehicle (HDV) movements during construction of the development is approximately 60, which falls below the threshold for assessment.

14.56 As stated in Chapter 12 (Air Quality), provided that mitigation measures adopted as part of the construction of the Uskmouth Conversion Project are implemented, residual construction dust emissions are not anticipated to be significant.

14.57 On this basis, the magnitude of impact on population and health would be negligible, which, in an area of high sensitivity would result in a minor adverse effect, which is not considered to be significant.

Health effects from changes in noise exposure

14.58 Construction activities would generally take place between 07:00 to 19:00 hours Monday to Friday and 07:00 to 13:00 hours on Saturday. On this basis, the opportunity for population and health effects associated with the night time period, such as sleep disturbance and associated hypertension are unlikely. As such, population and health and effects would primarily be limited to temporary annoyance.

14.59 The indicative construction programme estimates a total duration of approximately 18 months where, as stated in Chapter 11: Noise and Vibration, noise generation is likely to be highest at the early stages of works, decreasing during the plant and building erection and fit-out stages. While there is potential for noise from construction activities to be noticeable at the closest receptors, all noise generating construction activities would be intermittent in nature and therefore, any annoyance-related population and health effects are unlikely to persist for long enough to result in any changes to behaviour or attitude.

14.60 As a result, the magnitude of impact on population and health would be negligible, which, in an area of high sensitivity would result in a minor adverse effect, which is not considered to be significant.

Health effects from changes to transport nature and flow rate

14.61 Relevant health determinants associated with changes in transport nature and flow rate during construction comprise: severance; pedestrian amenity and accidents and safety.

14.62 As stated in Chapter 10: Traffic and Transport, there will be up to 15 HGV deliveries resulting in 30 HGV movements and up to 157 staff vehicles resulting in up to 314 staff vehicle movements per day during peak construction which would equate to a maximum percentage increase of 49.0% for overall traffic flows and 101.4% for HGV traffic flows (both occurring on West Nash Road, which has the lowest baseline traffic flows of all links analysed). The 30% Rule 1 threshold is exceeded for overall traffic flows along West Nash Road. For HGV traffic flows, the 30% Rule 1 threshold is exceeded along the length of West Nash Road, Nash Road (between West Nash Road and Meadows Road) and Meadows Road south of the industrial park.

14.63 As stated in Chapter 10: Traffic and Transport, the impact on severance is predicted to be negligible on the basis that: the roads analysed are not considered to be major traffic arteries; communities are only located on one side of most affected road links (West Nash Road, Nash Road and Meadows Road); and maximum hourly traffic flows fall below the threshold where perceived difficulty in crossing is anticipated.

14.64 As stated in Chapter 10: Traffic and Transport, changes in pedestrian amenity is anticipated to occur where the overall traffic flow, or HGV traffic flow, is either halved or doubled. In addition, fear and intimidation could be experienced when there are more than 1,000 HGVs during an 18-hour day. Using these thresholds, the only road link where a change in pedestrian amenity could occur is along West Nash Road where a doubling of HGV movements is anticipated due to baseline HGV movements being very low. However, while HGV movements would double, they would remain below the 1,000 HGV threshold when measured over an 18-hour day.

14.65 Regarding risk of accidents and injury, there would be no significant change in the character of the network and therefore it is considered that the proposals would not alter the injury accident rate.

14.66 Overall, the magnitude of impact on population and health would be low, which, in an area of high sensitivity would result in a minor adverse effect, which is not considered to be significant.

Further Mitigation

14.67 Mitigation measures relating to construction of the Uskmouth Conversion Project would focus on environmental precursors to adverse population and health outcomes, thereby providing the opportunity for intervention to prevent any manifest health outcome.

14.68 The above assessment of population and health effects has taken into account any proposed mitigation measures which are outlined within the relevant environmental technical disciplines, namely: Chapter 10: Traffic and Transport; Chapter 11: Noise and Vibration; and Chapter 12: Air Quality. On this basis, no additional mitigation measures relevant to population and health are considered necessary.

Future Monitoring

14.69 Where necessary, monitoring during the construction of the Uskmouth Conversion Project would focus on environmental precursors to adverse population and health outcomes. The necessity of such monitoring would be established within the relevant technical disciplines, namely: Chapter 10: Traffic and Transport; Chapter 11: Noise and Vibration; and Chapter 12: Air Quality. On this basis, no additional monitoring relevant to population and health are considered necessary.

Accidents and/or Disasters

14.70 Population and health as an ES topic chapter relates to potential impacts on population health rather than occupational health and safety concerns, which are managed by their own distinct regulatory regimes (i.e. The Health and Safety at Work Act 1974). On this basis, there are no identified accidents or disasters relevant to population and health that could realistically occur during construction of the Uskmouth Conversion Project.

Assessment of Operational Effects

Health effects from changes to air quality

Nitrogen Dioxide and Particulate Matter

14.71 Following the methodology outlined in the Assessment Methodology section of this chapter, population and health effects associated with changes in air quality from the operational activities of the Uskmouth Conversion Project have been quantitatively assessed.

14.72 Table 14.4 shows the potential health outcomes associated with the predicted change in air pollutant exposure. The results indicate that the predicted changes in air quality would lead to a small but measurable change in health outcomes, with an effect on mortality equivalent to around one additional death and an increase of around one additional emergency hospital admission spread across a total population of 231,155 and a 30+ population of 143,430 (in the 139 LSOAs assessed). However, as shown, these changes would not materially change the baseline health for the population living within the 139 LSOAs assessed.

Table 14.4: Air pollution exposure health outcomes – population attributable fraction (PAF)

Health outcome	Number of cases (PAF)	Proportion of the baseline rate
Annual mortality (aged 30+)	1.3	<0.1%
Annual respiratory and cardiovascular disease related emergency hospital admissions	1.2	<0.1%

14.73 As stated in Chapter 12: Air Quality, the maximum change in air quality pollutant concentrations at any receptor is predicted to be 1.7 µg/m^3 for NO_2 and 0.1 µg/m^3 for PM. To set the results provided in Table 14.4 into further context, for there to be a measurable change in mortality health

outcomes in the 30+ population, approximately 8,500 people (aged 30+) would need to be exposed to the maximum change in air quality pollutant concentrations. In addition, for there to be a measurable change in hospital admission health outcomes in the total population, approximately 15,500 people would need to be exposed to the maximum change in air quality pollutant concentrations.

Dioxins, Furans, PAHs and Heavy Metals

14.74 A Human Health Risk Assessment (HHRA) has been completed as part of the Environmental Permit application. The HHRA assesses the potential risk to human health from lifetime exposure to dioxins, furans, Polycyclic Aromatic Hydrocarbons (PAHs) and heavy metals. The evaluation is based upon worst-case, conservative scenarios, with respect to the following factors: location of the exposed individual and duration of exposure; exposure rate; and emission rate from the source.

14.75 Overall, the conclusions of the HHRA state that the impact of emissions on local sensitive receptors would not be significant.

Conclusion

14.76 Overall, the magnitude of impact on population and health would be low, which, in an area of high sensitivity would result in a minor adverse effect, which is not considered to be significant.

Health effects from changes in noise exposure

14.77 Chapter 11: Noise and Vibration have predicted the change in ambient sound levels at the nearest sensitive receptors during operation of the Uskmouth Conversion Project in the day, evening and night time periods.

14.78 As stated in Chapter 11: Noise and Vibration, the predicted specific sound levels associated with the operation of the Uskmouth Conversion Project range from 26 to 34 dB $L_{Aeq,T}$ during the daytime and 28 to 35 dB $L_{Aeq,T}$ during the evening and night-time which are well below the criteria for speech intelligibility and moderate annoyance during the daytime and sleep disturbance during the night-time provided in the WHO Guidelines for Community Noise (WHO, 1999). Furthermore, at the majority of locations, the specific sound levels[13] are sufficiently below residual sound levels[14] that they would not cause an increase to the overall ambient sound levels[15].

14.79 The worst case increase of +1 dB dB to the overall ambient sound levels is predicted to occur at Great House (located approximately 600 m to the south-east of the Uskmouth Conversion Project) during the evening and night-time periods. However, as the overall ambient sound level remains well below the threshold at which sleep disturbance is predicted to occur, this increase is not considered significant in noise terms.

14.80 On this basis, the magnitude of impact on population and health would be negligible, which, in an area of high sensitivity would result in a minor adverse effect, which is not considered to be significant.

[13] Specific sound levels – defined as the A-weighted, Leq sound level produced by a sound source during a specified period of time

[14] Residual sound levels – defined as the ambient sound remaining when the specific sound is suppressed

[15] Overall ambient sound levels – defined as the sound in a given situation at a given time, usually composed of sound from many sources

Health effects from changes to transport nature and flow rate

14.81 Relevant health determinants associated with changes in transport nature and flow rate during construction comprise: severance; pedestrian amenity and accidents and safety.

14.82 As stated in Chapter 10: Traffic and Transport, there will be up to 31 HGV deliveries resulting in 62 daily HGV movements (including biomass) during the Uskmouth Conversion Project's first year of operation. From year two onwards, this would decrease to up to 30 HGV deliveries resulting in 59 HGV daily HGV movements.

14.83 The existing daytime staff already employed at the site are already be accounted for within the traffic surveys. In addition, there would be up to 14 operational staff resulting in 28 additional staff vehicle movements. The above changes in transport nature and flow rate would equate to a maximum percentage increase of 12.3% for overall traffic flows, which falls below the 30% Rule 1 threshold set out in the IEMA guidelines. The 30% Rule 1 threshold is exceeded for HGV traffic flows along the length of West Nash Road, Nash Road (between West Nash Road and Meadows Road) and Meadows Road south of the industrial park.

14.84 As stated in Chapter 10: Traffic and Transport, the impact on severance is predicted to be negligible on the basis that: the roads analysed are not considered to be major traffic arteries; communities are only located on one side of most affected road links (West Nash Road, Nash Road and Meadows Road); and maximum hourly traffic flows fall below the threshold where perceived difficulty in crossing is anticipated.

14.85 As stated in Chapter 10: Traffic and Transport, changes in pedestrian amenity is anticipated to occur where the overall traffic flow, or HGV traffic flow, is either halved or doubled. In addition, fear and intimidation could be experienced when there are more than 1,000 HGVs during an 18-hour day. Using these thresholds, the only road links where a change in pedestrian amenity could occur is along Nash Road and West Nash Road where a doubling of HGV movements is anticipated due to baseline HGV movements being very low. However, while HGV movements would double, they would remain below the 1,000 HGV threshold when measured over an 18-hour day.

14.86 Regarding risk of accidents and injury, there would be no significant change in the character of the network and therefore it is considered that the proposals would not alter the injury accident rate.

14.87 Overall, the magnitude of impact on population and health would be low, which, in an area of high sensitivity would result in a minor adverse effect, which is not considered to be significant.

Further Mitigation

14.88 Mitigation measures relating to the Uskmouth Conversion Project operation would focus on environmental precursors to adverse population and health outcomes, thereby providing the opportunity for intervention to prevent any manifest health outcome.

14.89 The above assessment of population and health effects has taken into account any proposed mitigation measures which are outlined within the relevant environmental technical disciplines, namely: Chapter 10: Traffic and Transport; Chapter 11: Noise and Vibration; and Chapter 12: Air Quality. On this basis, no additional mitigation measures relevant to population and health are considered necessary.

Future Monitoring

14.90 Where necessary, monitoring during operation of the Uskmouth Conversion Project would focus on environmental precursors to adverse population and health outcomes. The necessity of such monitoring would be established within the relevant technical disciplines, namely: Chapter 10: Traffic and Transport; Chapter 11: Noise and Vibration; and Chapter 12: Air Quality. On this basis, no additional monitoring relevant to population and health are considered necessary.

Accidents/Disasters

14.91 Following a review of historic incidents at similar facilities across the UK, it is considered plausible, albeit of low likelihood, that either a fire or explosion could occur during operation of the Uskmouth Conversion Project. However, in the event of a fire, a finite fuel stock is contained within fuel storage silos with fire suppressant and containment integrated into facility design and management (as detailed in the Fire Prevention and Mitigation Plan (FPMP)). On this basis, it is likely that the primary effects would remain confined to the facility itself.

14.92 Potential direct effects on population and health (from a fire or explosion) are limited as there is a significant buffer between the Uskmouth Conversion Project and nearest sensitive receptor (Great House, which is located approximately 600 m to the south-east). As a result, any direct population and health effects associated with the Uskmouth Conversion Project are unlikely.

14.93 Potential indirect effects are limited to acute exposure to high levels of air pollution from an uncontrolled fire. The potential risk in this context is dependent upon the hazard profile of the fuel stock and distance from residential receptors. Given that the fuel stock will comprise waste derived fuel pellets/potentially biomass fuel pellets and there is a significant buffer between the Uskmouth Conversion Project and sensitive receptors, the nature of the hazard is well-known and the potential for exposure to accidents/disasters is low. Additionally, any residual risk can be further managed through standard crowd control and evacuation procedures if necessary.

14.94 On the above basis, the Uskmouth Conversion Project includes a number of features and measures to contain, supress and manage the immediate fire/explosive risk. Overall, the risk to population and health is therefore not considered to be significant.

Potential Changes to the Assessment as a Result of Climate Change

14.95 The primary impacts associated with climate change include increased temperatures, increased atmospheric CO_2, sea level rise and increased incidence of extreme weather events. These primary impacts affect several environmental functions (such as water availability, salinization, varying crop yields, wildfires, ozone/PM concentrations, and migration patterns) which could plausibly alter the prevalence of a range of population and health outcomes.

14.96 Of particular relevance in this context is the modification of atmospheric emission dispersion, related concentration hazard exposure and consequent changes in cardiovascular/respiratory disease prevalence associated with climate change driven meteorological variations.

14.97 Chapter 13: Climate Change identifies a range for potential future changes in temperature and precipitation rates using the Met Office UKCP18 probabilistic dataset. However, it is not possible to predict future changes in atmospheric emission dispersion and related concentration hazard exposure which have the largest potential to influence population and health.

14.98 While the effects of climate change outlined above do have the potential to exacerbate existing health conditions at a population level, there are clear limitations associated with predicting future meteorological changes that arguably, have the largest influence on population and health. Despite this, the effects of climate change likely to be realised during the operational lifetime of the Uskmouth Conversion Project are not expected to materially alter the assessment conclusions on the basis that any potentially adverse population and health effects identified are concluded to be negligible.

Assessment of Cumulative Effects

Cumulative health effects from changes in air quality

14.99 Based on predicted NO_2 and PM concentrations with the operational Uskmouth Conversion Project, it is highly unlikely that cumulative NO_2 and PM concentrations would exceed objective threshold set to be protective of the environment and health. Similarly, predicted cumulative concentrations of heavy metals analysed (arsenic, cobalt, manganese and nickel) would be less than half the objective threshold set to be protective of the environment and health in all instances.

14.100 Regarding PAHs, the predicted concentrations with the operational Uskmouth Conversion Project across the modelled grid is close to exceeding the objective threshold set to be protective of the environment and health. As a result, there is the potential for this to be exceeded when considering the cumulative air quality contribution from The Môr Hafren Energy Recovery Facility (ERF), located approximately 9 km south-west of the Proposed Development.

14.101 However as stated in Chapter 12: Air Quality, while the predicted PAH concentrations across the modelled grid is close to exceeding the objective threshold, the predicted PAH concentrations at specific receptors is lower. At the receptor most likely to experience cumulative impacts (R15), the change in PAH concentration would need to be more than four times greater that the contribution of the operational Uskmouth Conversion Project at that receptor, which is considered highly unlikely on the basis that the Môr Hafren ERF is approximately 8 km from R15.

14.102 As a result, the magnitude of impact on population and health would remain low, which, in an area of high sensitivity would result in a minor adverse effect, which is not considered to be significant.

Cumulative health effects from changes in noise exposure

14.103 As stated in Chapter 11: Noise and Vibration, no cumulative developments that fall within 1 km from a common sensitive receptor have been identified. As a result, cumulative noise impacts are considered to be unlikely and consequently, there is no potential for associated cumulative population and health effects.

Cumulative health effects from changes in transport nature and flow rate

14.104 As stated in Chapter 10: Traffic and Transport, no cumulative developments have been identified as there are no active planning applications on nearby employment and housing land allocations set out within the Local Plan which have not been considered as part of the committed applications. As a result, there is no potential for associated cumulative population and health effects.

Inter-relationships

14.105 The purpose of the population and health chapter is to draw from and build upon technical outputs presented for a range of health determinants. As such, there are several inter-relationships between population and health and the following technical disciplines: Chapter 10: Traffic and Transport; Chapter 11: Noise and Vibration; and Chapter 12: Air Quality. A summary of these inter-relationships is provided below:

- Health and traffic/transport – a change in transport nature (i.e. increasing presence of HGVs) and flow rate can cause negative mental and social health and wellbeing impacts through increasing perceptions of severance, reducing pedestrian amenity (and potentially causing fear/intimidation effects) and increasing risk of accident and injury;

- Health and air quality – there is a linear relationship between exposure to air pollutants and attributed health outcomes such as hospital admission/mortality rate from respiratory and cardiovascular diseases; and
- Health and noise – there is a complex relationship between noise and attributed health outcomes such as hospital admission/mortality rate from cardiovascular disease and mental health conditions (e.g. depression, anxiety and dementia). Noise can affect health both directly (in extreme circumstances, which is less common), and indirectly (through annoyance or sleep disturbance). However, the health effects from noise/vibration can also be affected by tonality and type of noise (e.g. low frequency noise, infrasound and amplitude modulation).

14.106 As these health determinants detailed within the relevant technical disciplines have informed the population and health assessment, it can be concluded that all relevant inter-relationships have been fully considered within the population and health chapter.

Summary of Effects

14.1.1 Table 14.5 provides a summary of the predicted effects on population and health. Overall, it is not anticipated that there would be any significant population and health effects resulting from the construction or operation of the Uskmouth Conversion Project, or through worst-case interactions with relevant cumulative developments in the area.

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Table 14.5: Summary of Likely Environmental Effects on Population and Health

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact	Significance of effect	Significant / Not significant	Notes
Construction phase							
Health effects from changes in air quality	High	Direct	Medium term	Negligible	Minor adverse	Not significant	
Health effects from changes in noise exposure	High	Direct	Medium term	Negligible	Minor adverse	Not significant	
Health effects from changes in transport nature and flow rate	High	Direct	Medium term	Low	Minor adverse	Not significant	
Operational phase							
Health effects from changes in air quality	High	Direct	Long term	Low	Minor adverse	Not significant	
Health effects from changes in noise exposure	High	Direct	Long term	Negligible	Minor adverse	Not significant	
Health effects from changes in transport nature and flow rate	High	Direct	Long term	Low	Minor adverse	Not significant	