

SHOTTON MILL

Environmental Statement

Redevelopment and Expansion of Existing Paper Mill at
Shotton Mill, Weighbridge Road, Deeside Industrial Park,
Flintshire, CH5 2LL



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EIA Quality Mark

This Environmental Impact Assessment Report, and the Environmental Impact Assessment (EIA) carried out to identify the significant environmental effects of the proposed development, was undertaken in line with the EIA Quality Mark Commitments.

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ACROYNMS AND ABBREVIATIONS

AADT	Annual Average Daily Traffic Flow
AAWT	Annual Average Weekday Traffic
ACM	Asbestos Containing Materials
AD	Anaerobic Digestion
AOD	Above Ordnance Datum
AQAL	Air Quality Assessment Levels
AQMA	Air Quality Management Area
ASCV	Area of Special County Value
ASHE	Annual Survey of Hours and Earnings
ATC	Automatic Traffic Counts
BAP	Biodiversity Action Plan
Bgl	Below Ground Level
BMWP	Biological Monitoring Working Party
BNL	Baseline Noise Levels
BOD	Biological Oxygen Demand
BSI	British Standards Institution
CA	Conservation Area
CAR	Control of Asbestos Regulations
CBC	Common Bird Census
CDM	Construction Design and Management
CEA	Cumulative Effects Assessment
CEMP	Construction Environment Management Plan
CERC	Cofnod Environmental Records Centre
CHP	Combined Heat and Power
CIBSE	Chartered Institution of Building Services Engineers
CIRIA	Construction Industry Research and Information Association
CLEA	Contaminated Land Exposure Model
COD	Chemical Oxygen Demand
COVID	Corona Virus Disease
CRTN	Calculation of Road Traffic Noise
CroW	Countryside and Rights of Way Act
CS	Conversation Score
CSM	Conceptual Site Model
CTC	Classified Turning Counts
CWG	Criteria Working Group
dB	Decibel
Defra	Department for Environment, Food and Rural Affairs
Dft	Department for Transport
DMRB	Design Manual for Roads Bridges
DS	Do Something
DSM	Digital Surface Model
DTM	Digital Terrain Model
EA	Environment Act
EAL	Environmental Assessment Levels
Edna	Environmental Deoxyribonucleic Acid
EIA	Environmental Impact Assessment

EMS	Environmental Management System
ES	Environmental Statement
ETP	Effluent Treatment Plant
EPA	Environmental Protection Act
EPS	European Protected Species
ES	Environmental Statement
EQS	Environmental Quality Standards
EU	European Union
FCA	Flood Consequences Assessment
FCC	Flintshire County Council
FTE	Full Time Equivalent
FUDP	Flintshire Unitary Development Plan
FWNP	Future Wales the National Plan
GLVIA	Guidance for Landscape and Visual Impact Assessment
GSV	Gas Screening Value
GVA	Gross Value Added
GWD	Groundwater Directive
Ha	Hectares
HGV	Heavy Goods Vehicle
HRA	Habitat Regulations Assessment
HIS	Habitat Suitability Index
IDA	Industrial Denatured Alcohol
IEMA	Institute for Environment Management and Assessment
JNCC	Joint Nature Conservation Committee
Km	Kilometres
LAI	Local Area of Influence
LCA	Landscape Character Area
LCRM	Land Contamination Risk Management
LCT	Landscape Character Type
LDP	Local Development Plan
LDV	Light Duty Vehicle
LPA	Local Planning Authority
LVIA	Landscape and Visual Impact Assessment
MMP	Materials Management Plan
MRRF	Materials Recycling and Recovery Facility
NCA	National Character Area
NCR	National Cycle Route
NCN	National Cycle Network
NDF	National Development Framework
NE	Natural England
NERC	Natural Environment and Rural Communities
NGR	National Grid Reference
NLCA	National Landscape Character Area
NR	Network Rail
NRP	Natural Resources Policy
NRW	Natural Resources Wales
NSR	Noise Sensitive Receptors
NTS	Non-Technical Summary
OHL	Overhead Lines

ONS	Official for National Statistics
OS	Ordnance Survey
PAH	Polycyclic Aromatic Hydrocarbons
PBDE	Polybrominated Diphenyl Ethers
PCBs	Polychlorinated Biphenyls
PEDW	Planning and Environment Decision Wales
PLQRA	Preliminary Land Quality Risk Assessment
PM1	Papermill 1
PM2	Papermill 2
PPE	Personal Protective Equipment
PPV	Peak Particle Velocity
PPW	Planning Policy Wales
PRA	Piling Risk Assessment
PROW	Public Right of Way
RPE	Respiratory Protective Equipment
RSPB	Royal Society for the Protection of Birds
SAAR	Standardised Annual Average Rainfall
SAC	Special Area of Conservation
SD1	Special Digest 1
SFCA	Strategic Flood Consequence Assessment
SPA	Special Protection Area
SPMP	Site Protection Management Plan
SPZ	Source Protection Zone
SR	Scoping Report
SRN	Strategic Road Network
SSSI	Site of Special Scientific Interest
SUDS	Sustainable Urban Drainage System
SVOC	Semi volatile Organic Compounds
SWDS	Surface Water Drainage Strategy
SWMP	Site Waste Management Plan
T&CP	Town and Country Planning Act
TA	Transport Assessment
TAN	Technical Advice Note
TGN	Technical Guidance Note
TfG	Transport for Wales
TOC	Total Organic Content
TP	Travel Plan
TPH	Total Petroleum Hydrocarbons
TPO	Tree Preservation Order
TRL	Transport Research Laboratory
UDP	Unitary Development Plan
UN	United Nation
VOC	Volatile Organic Compound
WFD	Water Framework Directive
WG	Welsh Government
WRA	Water Resources Act
WSA	Wider Study Area

ZTV	Zones of Theoretical Visibility
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1.1 INTRODUCTION

- 1.1 This Environmental Statement (ES) has been prepared by SLR on behalf of Shotton Mill Limited for the Shotton Paper Mill (hereafter referred to as the proposed development) located at Shotton Mill, Weighbridge Road, Shotton at National Grid Reference (NGR) SJ 30461 71563. The Site is approximately 83.5 hectares (ha) in size. **Figure 1.1** illustrates the Site location and provides the geographical context for the proposed scheme. The Site boundary plan can be found in **Figure 1.2**.
- 1.2 The proposed development comprises the redevelopment and expansion of the existing Shotton Paper Mill Site comprising c. 83.5 hectares (ha) of new paper factory buildings and processing plant, energy generation, and associated landscaping, offices, access and parking.”
- 1.3 This ES supports and informs the planning applications for the proposed development (see **Figure 1.3** for the Overall Site Layout and **Figure 1.4** which illustrates the Site Context). Potential environmental impacts are identified, and mitigation measures proposed in accordance with the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017, (discussed further in **Chapter 5 Scoping and EIA Methodology**) hereafter referred to as the EIA Regulations.
- 1.4 Flintshire County Council and Welsh Ministers will be determining the planning applications and this ES has been undertaken in consultation with them and relevant statutory bodies which has informed the scope of the ES.
- 1.5 This ES is informed by a number of technical assessments which are supported by appendices and figures and a Non-Technical Summary has been provided separately.

1.2 BACKGROUND TO THE PROPOSED DEVELOPMENT

- 1.6 The Applicant for the proposed development is Shotton Mill Limited, a wholly owned subsidiary of the Eren Group. The Eren Group is a well-established, family-owned resources management company based in Turkey, employing over 8,000 people with annual turnover in excess of EUR 1.8 billion and total assets of over EUR 2.1 billion.
- 1.7 The company had been looking for a suitable site in the UK to expand its paper and packaging division. They were delighted to have acquired an established paper production site, albeit that significant capital investment is required to change the type of paper produced and bring the building and plant up to modern sustainable standards.
- 1.8 Eren’s plans for the Site will deliver a market leading operation incorporating the newest innovations and technologies in this market. These will make this Site a flagship exemplar project across the UK and Europe, delivering significant job creation and improvements in working environments.

1.3 THE NEED FOR AN ENVIRONMENTAL IMPACT ASSESSMENT

1.9 The proposed development falls under Schedule 1 of the EIA Regulations which means that an EIA is compulsory for this type of development (see **Chapter 5 Scoping and EIA Methodology** for further information). As EIA is a compulsory requirement for Schedule 1 developments a Screening Request was not submitted to the LPA or PINS. An Environmental Scoping Report (see **Technical Appendix 5.1**) was submitted to the LPA and PINS which proposed the scope and assessment methodologies of the ES. Following the submission of the Scoping Report and Scoping Opinion was received from the LPA and a Scoping Direction was received from PINS (see **Technical Appendix 5.2**).

1.4 STRUCTURE AND CONTENT OF THE ES

1.10 The content of this ES has been informed and directed by pre-application consultation with stakeholders, the scoping opinion and scoping direction. In addition, desk top surveys and site surveys have been undertaken which have further identified scope, sensitive receptors and through an iterative process have informed mitigation and design evolution.

1.11 The ES has been prepared in accordance with EIA Regulations and includes the following elements:

- description of the site and proposed scheme (see **Chapter 3, Project Description**). This chapter provides details pertaining to the proposed scheme as assessed in the technical chapters;
- a discussion on alternatives considered;
- baseline data with regard to the receiving environment is identified, discussed and quantified in the technical chapters (presented in the technical chapters 7-16);
- the potential for significant effects (adverse or beneficial) is assessed;
- a description of the mitigation and embedded mitigation required in order to avoid, reduce significant adverse effects. Where a beneficial effect is identified including as a result of mitigation this is also described (presented in the technical chapters 7-16) and
- a Cumulative Assessment (presented in **Chapter 17 Cumulative Effects**) which considers intra-project cumulative effects and effects from other committed developments on a receptor.
- a Non-Technical Summary (in a separate document); and
- Statement of Capability.

1.12 The purpose of this ES is to provide the reader with a detailed assessment of the potential significant effects the proposed development would have on the existing receiving environment. These effects can be both adverse and beneficial and take into account mitigation during both construction and operation.

1.13 The ES contains a number of introductory chapters which are detailed below:

- Chapter 1: Introduction – Introduces the ES and the proposed development and provides an overview of the purpose, content and approach of the ES.
- Chapter 2: Site and Surrounding Area – Provides a description of the Site and its immediate environment.
- Chapter 3: Project Description – Provides a narrative on the proposed development.
- Chapter 4: Alternatives – This chapter looks at the alternatives which were considered as part of the development, the evolution of the proposed development and details why the proposed development is the preferred option.
- Chapter 5: Scoping and EIA Methodology – This chapter provides information on the scoping work undertaken and how feedback from consultees has been taken into account in the assessment. It provides an overview of the EIA methodology which is then discussed further within the individual technical assessments.
- Chapter 6: Policy and Guidance – Provides an overview of relevant policy and guidance.

1.14 Following the introductory chapters, the ES then reports on the following technical assessments:

- Chapter 7 - Landscape and Visual;
- Chapter 8 - Land Quality;
- Chapter 9 - Hydrology and Flood Consequence;
- Chapter 10 - Ecology and Ornithology;
- Chapter 11 - Noise and Vibration;
- Chapter 12 - Air Quality;
- Chapter 13 - Traffic and Transport;
- Chapter 14 - Waste and Resources;
- Chapter 15 – Socio Economic
- Chapter 16 - Other Environmental Issues

1.15 Concluding Chapters

- Chapter 17 - Cumulative Effects
- Chapter 18 - Summary and Conclusions

- 1.16 A set of figures and appendices support the ES and provide further information on the Site, the proposed development and the technical assessments. The appendices include a Habitat Regulations Assessment (HRA) screening and an outline Construction Environment Management Plan (CEMP), **Technical Appendix 5.3**. The CEMP is a working document and will be updated as required.

1.5 EIA PROJECT TEAM

- 1.17 In accordance with the EIA regulation, the ES must be undertaken by experienced and appropriately qualified professionals with technical and quality checks being undertaken for all assessments.

1.5.1 Statement of Competence

- 1.18 SLR is a Registered Environmental Assessor Member of the Institute of Environmental Management and Assessment (IEMA) and holder of the EIA Quality Mark (<http://www.iema.net/qmark>).
- 1.19 The company has significant experience in undertaking EIA for a wide variety of projects, including commercial, residential, renewable energy, and infrastructure developments.
- 1.20 Further information on SLR can be found on its corporate website at www.slrconsulting.com.

1.6 PUBLICATION

- 1.21 The ES will be uploaded onto the relevant planning portal where it will be fully accessible free of charge.

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2.1 INTRODUCTION

- 2.1 This Environmental Statement (ES) Chapter provides an overview of the existing setting of the proposed development, a brief history of the Site and the current production operations at the Site.

2.2 LOCATION

- 2.2 The Site is located within the Wrexham and Deeside National Growth Area and is centred at NGR SJ 30461 71563. **Figure 1.1 Site Location Plan** illustrates the Site location and provides geographical context of the surrounding area.
- 2.3 The Site comprises the operational Shotton Mill paper manufacturing facility, formerly owned and operated by UPM (the Main Site), together with adjoining vacant brownfield land (the Expansion Site (also known as the A4 land)). **Figure 1.2 Site Boundary Plan** identifies the main Site boundary which totals an area of 83.15 hectares. In addition, **Figure 3.3** illustrates the location of the CHP Plant which totals 1.5 hectares, and the Piling Site boundary (illustrated on **Figure 3.2**) has an area of 3.65 hectares, these elements are discussed further in **Chapter 3 Project Description**.
- 2.4 The Site is situated with the Deeside Industrial Park close to the Dee Estuary in Flintshire, North Wales. The Dee Estuary is designated as a Ramsar Site, Special Areas of Conservation (SAC) and Special Protection Area (SPA). **Figure 2.1a – 2.1h Environmental Constraints Plans** presents the Environmental Constraints.
- 2.5 The Deeside Industrial Park has a number of large manufacturing businesses including Toyota, Morrisons Manufacturing and Tata Steel. There are a number of other businesses including large distribution and logistics operations. Other nearby development includes the Parc Adfer Energy Recovery Facility, the Deeside Power Station and Shotton Power Station.
- 2.6 **Photograph 2.1** provides an elevated view of the existing Site. The photograph shows the existing buildings which were utilised by the previous operation; car parking and site infrastructure. In addition to this views are shown towards the Dee Estuary and other large industrial operations can be seen in the background.
- 2.7 Areas of existing planting including trees and shrubs are shown with areas of amenity grassland interspersed throughout the Site.

Photograph 2.1: Overview of existing Site and its setting (provided by the applicant)



2.3 SITE DESCRIPTION

2.3.1 Existing Site and Operations

- 2.8 Shotton Paper Mill was founded in 1983 and, until recently, produced newsprint paper. Due to the decline in newspaper circulation, demand for newsprint products has declined globally. Consequently, the production and sales of newsprint has now ceased, and the outdated plant is being sold off/disposed of to make way for the redevelopment of the Site, including expansion into adjoining land.

Photograph 2.2 – View across the lagoon towards Shotton Mill (October 2021)



- 2.9 The current Site buildings, plant and infrastructure are identified in **Figure 1.3 Overall Layout** and can be seen in **Photograph 2.1, 2.2 and 2.3**. The redevelopment of the Site would retain much of the existing infrastructure, including the main Site access, car park, utilities, and water management lagoons.
- 2.10 In the south west corner of the Site is a large lagoon water body (see **Photograph 2.2**), bordered by established planting, comprising a trees, shrubs and grassland. There are a number of paths and access roads that border the lagoon (see **Photograph 2.4**).
- 2.11 A further smaller lagoon can be found in the south of the Site, adjacent to the larger lagoon. Again, this is bordered by a footpath which leads to the main Site. An area of established planting lies to the north of the lagoon

Photograph 2.3 - Utilities infrastructure (October 2021)



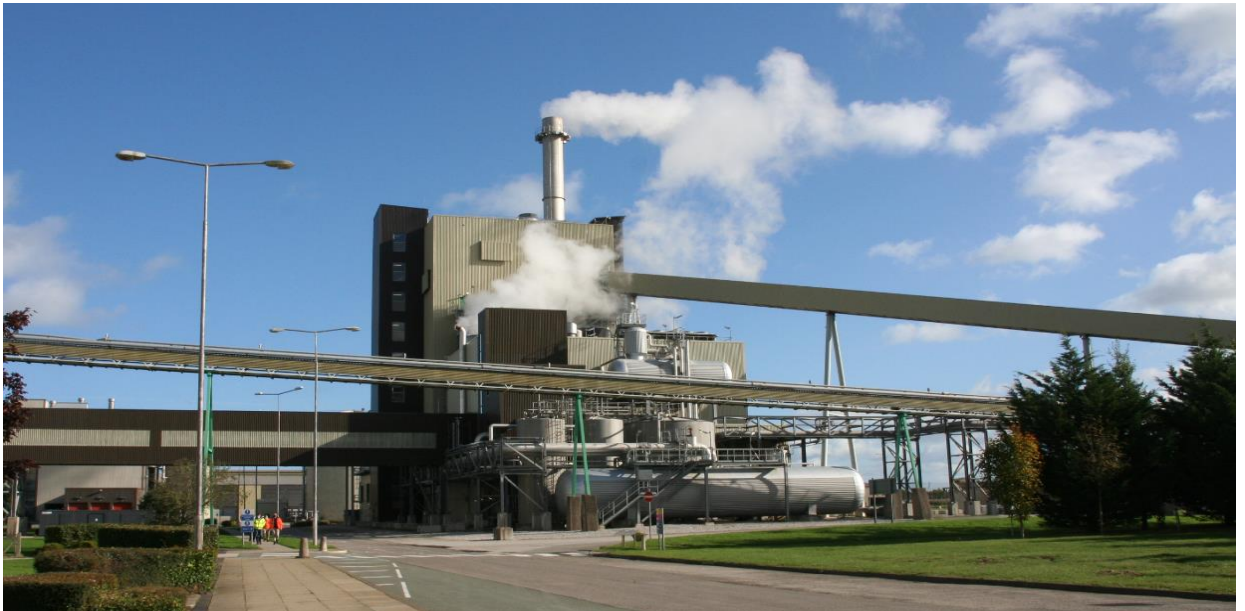
- 2.12 The perimeters of the Site have developed a mix of natural vegetation, landscaped areas, and coniferous plantation. These areas will be retained where possible and this is discussed further in **Chapter 7 Landscape and Visual Impacts**.

Photograph 2.4 - Natural revegetation to west of lagoons (October 2021)



- 2.13 In addition, certain buildings and processing plant would be retained; **Figure 1.3 Overall Layout** identifies those buildings and plant to be retained. Further details as to the retained is provided in section 2.5 below.

Photograph 2.5 - Biomass Plant (October 2021)



2.3.2 Site Access

- 2.14 Road access to the Site is obtained via a short stretch of road forming part of the Deeside Industrial Estate from the A548, a dual carriageway that is subject to the national speed limit and links the Site with the wider strategic highway network via the A494 to the M56.
- 2.15 Deeside Industrial Park is served by a number of bus routes which connect the Industrial Park to many nearby towns and settlements, including Shotton, Connah's Quay, Flint and Garden City. Additional peak hour bus services also provide access to more remote destinations, including Chester, Broughton, and Birkenhead via the Wirral.
- 2.16 The Site is also accessible by passenger rail services, with Hawarden Bridge and Shotton railway stations both being located approximately 3 - 4km directly south from the Site.
- 2.17 There is reasonable access to the Site by cycling using the National Cycling Network and there are no Public Rights of Way (PRoW) within the Site with the closest being 1.3km to the south of the Site.
- 2.18 Access to the Site is discussed further in **Chapter 13 Traffic and Transport**.

2.3.3 Land Use Designations

- 2.19 There are no designated sites within the Main Site or the Expansion Site.
- 2.20 The Site is separated from the Dee Estuary, a designated SPA, SAC and Ramsar site, by the A548 dual carriageway. The European designations continue around the eastern side of the Site and extend into the operational area of the Shotton Steelworks (operated by Tata Steel) covering the the Shotton Lagoons and Reedbeds Site of Special Scientific Interest (SSSI).

2.4 SITE SETTING

- 2.21 The area surrounding the Site is characterised by a diverse mix of built and natural landscapes. An overview of the Site setting is provided below.

North of the Site

- 2.22 The Dee Estuary lies to the north and north west of the Site. The Dee Estuary is an important site for wetland and shorebirds and has a number of ecological designations. The Dee Estuary is designated as a Ramsar Site, Special Areas of Conservation (SAC) and Special Protection Area (SPA). The Estuary covers over 15,000 hectares and comprises (but not limited to) tidal rivers, salt marshes, grassland and mud flats. Further information on the Dee Estuary ecological designations can be found in **Chapter 10, Ecology and Ornithology**.
- 2.23 Inner Marsh Farm (or Burton Mere Wetlands) is located at NGR SJ304744 and lies approximately 1.7km north of the Site. Inner Marsh Farm is a nature reserve on the Dee Estuary which is managed by the Royal Society for the Protection of Birds (RSPB). This nature reserve comprises a large area

of mixed wetland habitats, bluebell woodlands and arable fields. Species found on the site include waders including black-tailed godwit and ruff.

- 2.24 Shotwick Lake Sailing Club is to the north east of the Site approximately 600m from the proposed development. Shotwick Lake Sailing Club provides recreational sailing, windsurfing and water sports throughout the year.
- 2.25 Sustrans cycle route 568, again to the north of the Site, is a hardstanding cycle route with views out onto the Dee Estuary and the RSPB's Burton Mere Wetlands. The route follows the River Dee and heads along the west coast of the Wirral. The route is 10.6km long with large portions of it traffic free.
- 2.26 There are a number of small villages to the north and east of the Site, in the Wirral (England). These include Burton which is 2.5km north of the Site and Puddington 3km north east of the Site.

East of the Site

- 2.27 Immediately to the east of the Site is Parc Adfer, an Energy Recovery Facility that is the principal municipal waste management facility for north east Wales, being supplied with waste feedstock by five counties of North of Wales. Parc Adfer became operational in December 2019. The Facility accepts 200,000 tonnes per year of residual waste as a feedstock from household, business and commercial sources, and produces both electricity and heat through a combustion system as a CHP plant. The emissions stack from this Facility is 85m in height above ground level.
- 2.28 To the south east of the Site is the Flintshire Bridge HVDC Converter Station and a transport business. Adjacent to these sites is the railway line which leads into Shotton to the south and to Neston and beyond to the north. Beyond Parc Adfer and the Converter Station are businesses within the Deeside Industrial Park, including large distribution businesses such as Great Bear and Amazon.
- 2.29 Adjacent to the southern boundary of Shotwick Lake Sailing Club is a large Solar Farm which abuts the English and Welsh border.
- 2.30 The small village of Shotwick lies east of the Site, approximately 3.4km away, in England.

South of the Site

- 2.31 To the immediate south of the Site the land uses are predominantly commercial and industrial interspersed with green and blue areas.
- 2.32 Adjacent to the proposed development (southern boundary) is the Tata Steel site which manufactures approximately 500,000 tonnes of metallic coated and pre-finished steel per year. The Tata Steel site is approximately 750 hectares comprising large industrial units, office space, car parking and a site wide road network system.
- 2.33 Within the Tata Steel site, to the north west of the Tata Steel site is a large lagoon area which has become a safe nesting area for the Common Tern. The lagoon area, or Tata Steel Nature Reserve, is recognised as a Site of Special Scientific Interest (SSSI). The area has a reed bed habitat which is

suitable for nesting birds whilst the lagoons are used for circulating clean water from the site into the River Dee.

- 2.34 To the south of the Tata Steel site is a wetland area and beyond this the northern bank of the River Dee which is approximately 1.3km from the proposed development.
- 2.35 The largest residential area to the south is Shotton which is located approximately 1.6km south of the Site and is accessed via the A458 and the A550 which both provide crossing over the River Dee. It is also served by a railway station.
- 2.36 Shotton is located at NGR SJ305685 and is a town within Flintshire, Wales with a population of approximately 7,000.

South West

- 2.37 Connah's Quay is the largest town in Flintshire with a population of just under 18,000. The north eastern part of the town is within 1.5km of the Site. It can be reached by road from the and is accessed via the A458 and the A550 which both provide crossing over the River Dee.

2.5 SITE BASELINE

- 2.38 This section of the Chapter looks at the existing uses onsite and identifies those areas that would be retained as part of the proposed development and as a result forms the baseline of the assessment. The baseline for assessment is given full consideration in each technical chapter.
- 2.39 The existing buildings and plant that will be retained are concerned with preparation of the recycled paper and card feedstock; the Materials Recovery Facility; energy generation from the Biomass Plant; and preparation of recovered wood and wood products for the Biomass Plant.
- 2.40 Recovered paper and card is an integral part of the papermaking process, providing the feedstock for the paper mill. Raw materials include recovered white paper in bales or loose material. This part of the process will continue to use existing buildings comprising the Recovered Fibre Warehouses, RCF1, RCF 2 and RCF3.
- 2.41 The recycling process includes the recycling of old corrugated containers (OCC). Both the OCC pulping line and the RCF comprise a significant outlet for recycled paper and card collected by local authorities and businesses across the UK. This operation is currently suspended but will resume once paper making recommences on Site.
- 2.42 The Materials Recovery Facility accepts co-mingled dry recyclables from local authority collections and recycling centres for the recovery of fibres, glass, plastics, and metals. The fibre-based materials are used as a feedstock in the paper making process with other materials sold on to other downstream recyclers. The sorting process is undertaken using picking lines, with unacceptable materials being separated out from the process and taken off site for recycling elsewhere. These activities are continuing during the current suspension of paper making on Site, but all products are being exported from the Site for recycling.

- 2.43 The Biomass Plant, see **Photograph 2.5**, is a c. 18.5 MWe combined heat and power (CHP) facility that uses waste wood prepared on Site in the wood preparation plant. Waste wood is shredded and transferred by overhead conveyor directly into the biomass plant. The Biomass Plant operates under an Environmental Permit in compliance with the Waste Incineration Directive. As part of the air emissions management system, the plant has a stack height of 69m above ground level.
- 2.44 The Biomass Plant supplies both electricity and steam to the paper making process. During the current suspension of paper-making at the Site, the Biomass Plant is operating with reduced efficiency as steam is not being utilised, and supplying excess electricity to the grid. However, part of this waste steam also passes through a Low Pressure Condensing Turbine (LCPT) that contributes an additional 5MW of electrical energy to the grid.
- 2.45 As a result of the ongoing operations at the Site, Shotton Mill currently employs approximately 190 workers, including production staff, engineering support, and administration and management. This represents a large skilled and experienced workforce that Eren Group intends to retain during the conversion of the Site to new product production. In addition, administration and engineering staff are still based at the Site.

2.6 SUMMARY

- 2.46 The proposed development lies within an established industrial setting which has a variety of manufacturing, distribution and service industries. Access to the Site is via the A548 which provides a buffer between the industrial areas and the Dee Estuary and its ecological designations.
- 2.47 Looking north from the Site, the surrounding area is dominated by the Dee Estuary with a series of mudflats and grassland areas.
- 2.48 The southern area of the Site, beyond Tata Steel and the River Dee is the railway line and the residential areas of Shotton and Connah's Quay.
- 2.49 The Site baseline includes a substantial element of retained buildings and plant, many of which are currently operational during the current suspension of paper making on Site.

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3.1 INTRODUCTION

- 3.1 This Environmental Statement (ES) Chapter provides an overview of the proposed development and its key components.
- 3.2 The proposed development comprises a major new paper production facility for the UK that incorporates measures to maximise the use of recycled materials within the production process and the use of on-site low carbon energy generation for all power and heat demands.

3.2 OVERVIEW OF THE PROPOSED DEVELOPMENT

- 3.3 The proposed overall site layout, including buildings to be retained, is shown on **Figure 1.3 Overall Layout** and **Figure 7.23 Illustrative Landscape Masterplan**.
- 3.4 There are three planning applications for the proposed development (this ES covers all three applications). These applications are:
- Application 1 - The Main Site and the Expansion Site (shown in **Figure 3.1 Main Site Location Plan**, total area 83.5 ha)
 - The Main Site comprises the redevelopment of the existing developed (former UPM) Site which extends to 61 ha including the development of a new paper machine building, a corrugating machine building, old corrugated cardboard, warehousing and dispatch buildings, effluent treatment facility, starch processing and storage building, raw material area, energy services area, office accommodation, new site access and associated infrastructure.
 - The Expansion Site comprises the brownfield vacant site to the north of the Main Site which extends to 22 ha and is allocated for employment purposes. This development includes construction of three tissue machine buildings, reel storage building, converting building, pulp storage building, material storage, parking areas, auxiliary buildings, water tanks finished goods warehouse, truck loading building, new site access and associated infrastructure.
 - Application 2 - The Combined Heat & Power (CHP) Facility (as shown on **Figure 3.2 CHP Location Plan**)
 - The CHP production would take place within the Main Site. The CHP Facility would provide an additional 60MWe power as well as heat to Shotton Mill. The proposed CHP facility would have an efficiency of around 80% due to the utilisation of the heat that is a by-product of the electricity generation process. It is therefore considered a low carbon source of energy. Although the CHP facility forms an integral part of the Paper Mill production, it is identified as a separate planning application due to its categorisation as

a a Development of National Significance (DNS)¹ for which application must be made to Welsh Government under the Planning (Wales) Act 2015.

- Application 3 – The Piling Application (as shown on **Figure 3.3 Piling Site Location Plan**)
 - This application (total area 3.65 ha) comprises the advance piling works. This would facilitate early enabling works that would ensure that the paper mill is operational at the earliest available date. This application is also a full planning application to Flintshire County Council under the Town and Country Planning Act 1990.

3.3 NEED FOR THE PROPOSED DEVELOPMENT

The Main Site and Expansion Site

- 3.5 Analysis of the UK paper industry shows that the UK is currently a net importer of both containerboard products and tissue products, while at the same time being a net exporter of recycled (waste) paper. The proposed development is intended to close both these gaps by increasing production at the Site, thereby allowing the use of more recycled paper, with the proposed new cardboard paper production facility using 100% recycled paper.
- 3.6 At the same time, by switching production from the declining newsprint market to containerboard and tissue products, the new production facility would allow the UK as a whole to be more self-supporting in these materials, reducing reliance on external supplies.
- 3.7 The Applicant has been looking for a suitable Site in the UK for some time to expand its paper and packaging division. Having acquired the established paper production site at Shotton Mill, significant capital investment is required to change the type of paper produced and bring the building and plant up to modern sustainable standards. The Applicant intends to deliver a market leading operation with the newest innovations and technologies in this market. This would make this Site a flagship exemplar project in the UK and Europe, delivering significant job creation and improvements in working environments.
- 3.8 Due to the Applicant's commitment to sustainability and renewable resources, onsite efficiency in energy generation capacity would also be increased. The proposed CHP facility would provide on-site low carbon energy to ensure both a sustainable supply of energy and supply resilience for the manufacturing process.
- 3.9 It is intended that Shotton Mill would become the second largest paper manufacturing campus in the UK, and that when completed Shotton Mill's new containerboard machine would be amongst the largest and most technologically advanced paper mill in Europe.

¹ all energy generation projects of between 10MW and 350MW are defined as developments of national significance

3.10 The proposed development represents an opportunity to provide a high quality, imaginative and sustainable development on a significant brownfield site. The proposed development presents a range of economic, environmental and social benefits as discussed below.

Economic Benefits

- job creation (approximately 660 jobs);
- job retention - the Applicant has ensured that all existing employees' jobs are retained as part of the transition;
- the sixth largest inward investment scheme for the UK and the largest in Wales;
- the proposed development would reduce reliance on external supplies for containerboard and tissue products ensuring that the UK is more self-sufficient; and
- the investment value of approximately £600 million would create benefits for the local supply chain and the Flintshire and wider economy generally.

Environmental Benefits

- reduction in carbon emissions, when compared with other sources of electricity and heat;
- provision of landscaping and wider areas of biodiversity enhancement; and
- utilisation of 100% recycled paper in the card manufacturing process, providing an outlet for paper collections throughout England and Wales.

Social Benefits

- training provision – all new and existing employees are to be trained as part of ongoing training programmes;
- education – working with local schools and other organisations; and
- community cohesion – the Applicant is keen to work with the local area and is currently exploring ways in which the community can be involved, such as community tree planting schemes.

The CHP Plant

3.11 The pulp and paper manufacturing sector accounts for 7% of the UK's national energy demand, making it one of the UK's biggest energy users. Paper mills require a reliable and continuous source of energy and therefore the CHP Facility is proposed to provide additional power to Shotton Mill to enable the redeveloped and expanded Site to be self-sufficient in energy.

3.12 There is a requirement for an additional 60MWe of power for the proposed paper production facilities, together with steam which is an integral part of the paper manufacturing process. It is

proposed that this would be supplied by means of four CHP units to optimise operational flexibility. Existing CHP capacity provided primarily through the biomass plant would continue in use. The proposed new units would be located on the Main Site, close to the existing biomass CHP facility.

3.4 REDEVELOPMENT OBJECTIVES

- 3.13 It is the Applicant's intention to develop the Shotton Mill Site into one of the largest and most technologically advanced paper production facilities in Europe. The Site would produce two principal types of paper product: cardboard and tissue.
- 3.14 Added value activities within the Site would convert a proportion of the primary paper products into finished products including cartons (cardboard boxes) and tissue products such as paper tissues and napkins.
- 3.15 In addition to manufacturing finished goods on site, Shotton Mill would also supply customers with bulk primary materials such as paper reels and would therefore comprise an important component of the UK's paper products supply chain. The Applicant considers that the Proposed Development would help make the UK self-sufficient in a wide range of paper products, reducing reliance on imports from continental Europe.
- 3.16 The Site would continue to use as much recycled paper and card as possible in its products. Currently the Site is the largest user of recycled paper and card products in the UK, taking recyclables from household waste collections, recycling centre and commercial recycling collections. The redevelopment of the Site would allow this service to be enhanced and reduce the UK's reliance on the export of recycled paper and card overseas.
- 3.17 The Applicant wishes the Site to be self-reliant for energy. Paper manufacturing uses both power (electricity) and heat, and an additional combined heat and power capacity would be developed as part of the Site's redevelopment. The proposed CHP facility would provide additional on-site low carbon energy to ensure both a sustainable supply of energy and supply resilience for the manufacturing process.
- 3.18 Section 3.4.1 examines in further details the proposed elements of the Main Site and Expansion sit and details what buildings and operations are being retained, and Section 3.4.2 looks in more detail at the CHP Facility. Advance piling operations are described in Section 3.4.3.

3.4.1 Main Site and Expansion Site

- 3.19 The redevelopment of the Main Site would comprise both the retention of some existing buildings and the construction of new buildings. Other associated new works include landscaping, Sustainable Drainage Systems (SuDS) and car and lorry parking areas. Certain existing plant and infrastructure within the Main Site would be retained as an integral part of the redeveloped site and these are detailed below, see section 3.4.2.

3.20 The proposed Main Site and Expansion Site, including buildings to be retained, is shown on **Figure 1.3 Overall Layout**. The development proposals for the Main Site and Expansion Land comprise the following new build elements:

- Cardboard Paper Machine (PM) Building;
- New Warehouse;
- Dispatch Area;
- Corrugating Machine Building;
- Effluent Treatment Facility;
- Starch Process and Storage Building;
- Services area comprising:
 - Low Pressure Combined Turbine Area (LPCT)
 - Electrical Annex Motor Control Centre
 - Cooling Towers
 - Standby Boiler Boiler 6 (relocated from elsewhere within the Site)
- Pipe bridge;
- Old Corrugated Cardboard Building;
- Raw Material Storage Area;
- Storage Tanks;
- Truck Loading Area and
- Two new Site entrances off Weighbridge Road.

3.21 Certain existing plant and infrastructure within the Main Site would be retained as an integral part of the redeveloped site, including the following:

- Biomass Plant;
- Boiler 6 (but relocated);
- Wood Preparation Facility;
- Storage Tanks;
- White Paper Storage;

- Brown Paper Storage;
- Recovered Fibre 1&2;
- Recovered Fibre 3;
- Materials Recycling Facility; and
- Water Treatment Lagoons.

3.22 As outlined above the redevelopment and expansion of paper production at the Site would comprise both the retention of some existing buildings and the construction of new buildings. The following section provides more detail on the building uses and processes to be undertaken.

Existing Buildings and Plant

3.23 The existing buildings and plant that would be retained are primarily concerned with the reception, cleaning and preparation for use as feedstock of raw recycled paper, and energy generation.

3.24 The papermaking process starts with the delivery of the raw recycled material to the stock preparation area. Raw materials comprise products such as recycled paper and card, normally in bales. Following redevelopment, this part of the process would continue to use existing buildings comprising the White Paper Building and Recovered Fibre Warehouses, RCF1, RCF2 and RCF3, although there would be some internal alterations to the buildings. The Old Corrugated Cardboard (OCC) building would be relocated.

3.25 Pulp from the OCC production process is stored in short and long fibre storage towers (tanks). Approximately 70% of the produced pulp is short fibre and the remaining is long fibre. There is no fresh-water usage for the OCC line; the process uses only recycled water from the proposed Effluent Treatment Plant following biological treatment and water fed back from the papermaking process. There would be no direct freshwater input to the pulping plant.

3.26 Recycled paper is taken through a multi-stage cleaning process in which contaminants such as non-pulpable plastics, staples and sticky deposits are removed. The multi-stage reject handling system is designed to reduce the quantity of the reject material produced by each section of the process to minimise disposal. This is achieved by using a combination of sedimentation, floatation, screening, filtration, and compression. The recycling process is a significant outlet for recycled paper collected by local authorities and businesses across the UK.

3.27 There are two main types of rejects from the OCC process:

- Non-burnable rejects i.e. those not suitable to be used as a fuel; these can be utilised as building materials or would be disposed of via appropriate licensed companies; and
- Burnable rejects composed of sludge and light weight fibre rejects which can be used as a fuel in the Biomass Plant.

- 3.28 The Biomass Plant uses primarily waste wood to produce heat and power for the Site. This would continue at a rated capacity of 18.5MWe for the redeveloped Site. Wood preparation takes place in an existing on-site facility that prepares recycled wood grades for use in the Biomass Plant. The facility uses a number of different techniques to remove stones, metal and other unwanted contaminants from the fuel stream.
- 3.29 The Materials Recycling Facility (MRF) also contributes recycled fibre to the production process. The MRF takes co-mingled waste streams from household collections and processes them into a series of valuable materials for further processing at customer premises. The paper streams would be used in the OCC plant whilst the plastics, glass and metal streams would continue to be sold on for further processing. The MRF uses a series of mechanical process steps to sort the material along with a significant human resource who ensure the appropriate quality is achieved to allow maximum utilisation of these material streams.

Proposed Buildings and Plant

- 3.30 The overall scale of the proposed new buildings would be similar to the existing built form of the paper mill and ancillary plant, including buildings that would be retained such as the biomass plant and MRF. The development of the Expansion Site would extend the area of development to the north, closer to the A548 dual carriageway.
- 3.31 The CHP Facility would be located towards the southern part of the Main Site close to the existing Biomass Plant and Wood Preparation Facility. It would have a Gross Internal Floorspace (GIA) of 4,800 m².
- 3.32 The total floorspace of the new build development on the Main Site (excluding the CHP) would be approximately 132,634 m² (GIA). The maximum height of the proposed paper manufacturing buildings, other than stacks and storage tanks, would be 32 m above ground level, although most buildings would be considerably lower.
- 3.33 On the Expansion Site, the proposed new floor space associated with the tissue manufacturing production would comprise approximately 163,940 m² (GIA). The height of the proposed buildings on the Expansion Site would be less than on the Main Site with a maximum height of 24 m above ground level.
- 3.34 The principal new buildings and plant are described below.

Cardboard Paper Machine

- 3.35 There would be two principal process units proposed on the Main Site, the Cardboard Paper Machine and the Corrugating Machine. Output from the Cardboard Paper Machine would either be exported from the Site to supply other paper (corrugator) manufacturers or sent to a second stage of processing on site where it would be converted into card through a 'corrugation' process. Other proposed buildings on the Main Site are ancillary to these processes, including warehouses, loading bays and stores.

- 3.36 The proposed Cardboard Paper Machine would produce cardboard from recycled paper and card. The machine would have an annual output of 750,000tpa (the largest single machine in the UK).
- 3.37 The Cardboard Paper Machine passes paper pulp from recycled paper through a series of processes designed to dry and press the pulp into sheets. Once processed the card emerges as jumbo rolls that are cut to size and transferred to the New Warehouse Building from where it is either dispatched offsite to customers or transferred to the Corrugating Paper Machine. All operations in the warehouse would be automated using state of art technology.

Corrugating Machine Building

- 3.38 The corrugating machine would have a capacity of 110,000 tpa. Paper rolls would be transferred to the Corrugating Machine Building by an overhead conveyor that would link the Paper Machine Building with the Corrugating Machine Building.
- 3.39 Corrugating of 'fluting grade' paper is done with the corrugating rolls which are covered with flutes; these are horizontal, parallel ridges like the teeth of widely spaced gears. When the hot paper passes between the corrugating rolls, the flutes trap and bend it, forming the middle part of a sheet of corrugated cardboard. Installing a different flute size in the corrugator changes the width of the corrugated medium and hence the thickness of the finished cardboard.
- 3.40 After the corrugating process, boards would either be sold direct from the Site or converted into containers (i.e. cardboard boxes). Transfer to the box production area would be via internal conveyors. The box production lines, operated by skilled workers, would prepare boxes of different sizes and designs.

Effluent Treatment Facility

- 3.41 Paper mills use large quantities of water. The objective of the wastewater treatment system is to recycle as much water as possible for re-use in the system and to ensure that any water that is discharged from Site meets the regulatory standards. The process would be regulated by Natural Resources Wales (NRW) under an Environmental Permit.
- 3.42 Wastewater from the production process would be treated in a new Effluent Treatment Facility (EFT) (described below). The new ETF would make use of the existing lagoon system that would remain in operation and continue to fulfil the role it currently plays in ensuring that effluent produced in the process reaches the required standard for discharge to a watercourse. Lagoon 2A would continue as an aeration lagoon and Lagoon 3 would be the final balancing lagoon before discharge takes place on high tide. Lagoon 2B provides emergency by-pass capability.
- 3.43 The proposed EFT would replace the existing EFT with new, state-of-the-art technology comprising anaerobic digestion in combination with further processing to remove organic pollutants. The new EFT would service the whole Site, including both the Main Site and the Expansion Site. It would also manage foul water arising from staff welfare facilities throughout the Site, including the CHP plant.

- 3.44 The EFT process would remove organic pollutants by means of complete oxidation of organic matter to methane, carbon dioxide and water. It would be designed to meet the criteria set out in **Table 3-1**.

Table 3-1: Effluent Treatment Discharge Criteria

Parameters	PM
BOD ₅	< 25 mg/L
TSS	<60 mg/L
pH	6-9
Ammoniacal Nitrogen	<4 mg/L
Temperature	25 °C
Maximum Daily Flow Limit	22000 m ³ /day

- 3.45 The water treatment process would remove biomethane from the effluent. Biomethane is a valuable by-product that would then be upgraded in the biogas treatment line and used as a natural gas substitute, either for use in on-site boilers or for direct injection into the national grid. A biogas flare would be installed as a safety device to ensure a continuous and safe management of the biogas generated in the anaerobic reactor.

Starch Processing and Storage Building

- 3.46 This building would prepare starch from vegetable sources for use in card processing (for stiffening and water-proofing). The building would also house ancillary essential chemicals located in a self-contained bunded area.

Services Area

- 3.47 Site electrical and other support services are grouped together into a 'energy services island' comprising the following:
- Electrical Annex Motor Control Centre - this allows the incoming 132 KV power to Site to be stepped down to the correct operational voltage and then distributed to the designated operational areas.
 - Low Pressure Combined Turbine Area (LPCT) - the existing LPCT has to be relocated to allow construction of the new paper mill facilities. The LPCT uses low pressure steam to generate electrical power that is currently exported via a grip connection. In the future, once paper production has restarted, the LPCT unit would allow utilisation of any excess steam that is available to ensure this steam is not wasted and so maximise energy efficiency.

- Cooling Tower Area - cooling towers are used cool the condensed steam from the LPCT. These are existing equipment and are being relocated to make way for construction of the new paper mill facilities.
- Boiler 6 – this is an existing gas fired tube boiler that is used to supply steam for the papermaking operation when the Biomass Plant is not operating. The boiler is being relocated from elsewhere within the Site as part of the redevelopment. Boiler 6 only has intermittent use and is not part of the continual energy balance.

Raw Material Area

- 3.48 Due to the production level of the new paper machine, it would be necessary to store additional volumes of baled feedstock on site to allow continuous production during weekends and bank holidays. Suitable hard standing surfaces and screening would provide control of the materials in the area.

Old Corrugated Cardboard (OCC)

- 3.49 The Old Corrugated Cardboard Building will utilise the footprint of an existing building, which will be redeveloped. The building recycles OCC, otherwise known as cardboard boxes and includes a pulping line for preparation of feedstock for the paper making process.

Tissue Machine Buildings

- 3.50 The Tissue Machine Buildings would be housed on the Expansion Land. Tissue production would comprise three separate production units of 70,000tpa production capacity each, producing ‘jumbo rolls’. A converter unit would convert the jumbo rolls to finished products.
- 3.51 The Tissue Machine Buildings comprise three parallel, identical buildings producing jumbo rolls of tissue. Pulp for tissue manufacturing would be either virgin, recycled or a mix of these. Virgin pulp would be sourced from responsible, certified pulp producers and delivered in bales. Recycled pulp would be transferred to this process from the existing paper recycling process plant on the Main Site using the overhead pipe bridge.
- 3.52 Jumbo rolls would be stretch film wrapped and then transferred to the Reel Storage Building.

Pulp Storage Building

- 3.53 The Pulp Storage Building would accept recycled pulp using the overhead pipe from the existing paper recycling process plant on the Main Site.

Reel Storage Building

- 3.54 This building would store jumbo rolls. Jumbo rolls to be sold directly to the market would be loaded onto trucks in this building or would be sent to converter building to produce finished goods.

Converter Building

- 3.55 This building would house several different ‘converting’ lines to produce various tissue product lines including bathroom tissues and kitchen towels, napkins, handkerchiefs, facials and interfolded towels. All products would be wrapped, bundled and palletised before being sent to the finished goods warehouse.

Finished Goods Warehouse

- 3.56 This building would accept palletised finished goods and store them in racking. The number of pallets in stock would be around 50,000 units (or 6,000 tonnes) which corresponds to 15 days stock.

3.4.2 Combined Heat and Power (CHP)

- 3.57 Consent is sought for a CHP Facility with a capacity of 60MW. CHP is the generation of electrical power and usable heat in a single process. This is also known as co-generation. CHP is a well proven technique for reducing primary energy consumption, thereby reducing the total carbon emissions that would result from the generation of electrical power and heat separately.

Need for the CHP Facility

- 3.58 The pulp and paper manufacturing sector accounts for 7% of the UK’s national energy demand, making it one of the UK’s biggest energy users. Paper mills require a reliable and continuous source of energy, and a CHP Facility is proposed to provide additional power to Shotton Mill to enable the works to be self-sufficient in energy.
- 3.59 The proposed new CHP Facility would be located on the Main Site, close to the existing biomass CHP facility. The CHP Facility is identified on **Figure 3.2**. The proposed CHP plant and equipment would occupy a site area of 4800m².
- 3.60 The main building would be 60m wide by 80m in length and would be 20m in height. The tallest elements of the CHP plant would be four stacks that are proposed to be at a maximum of 106m above ground level and are required as part of the emissions management system. A cooling tower would be located to the east of the CHP on land known as the ‘power island’ that would also be used for electrical equipment associated with the Paper Mill. The cooling tower would be 15m in height and its purpose is to cool the condensed steam from the CHP.

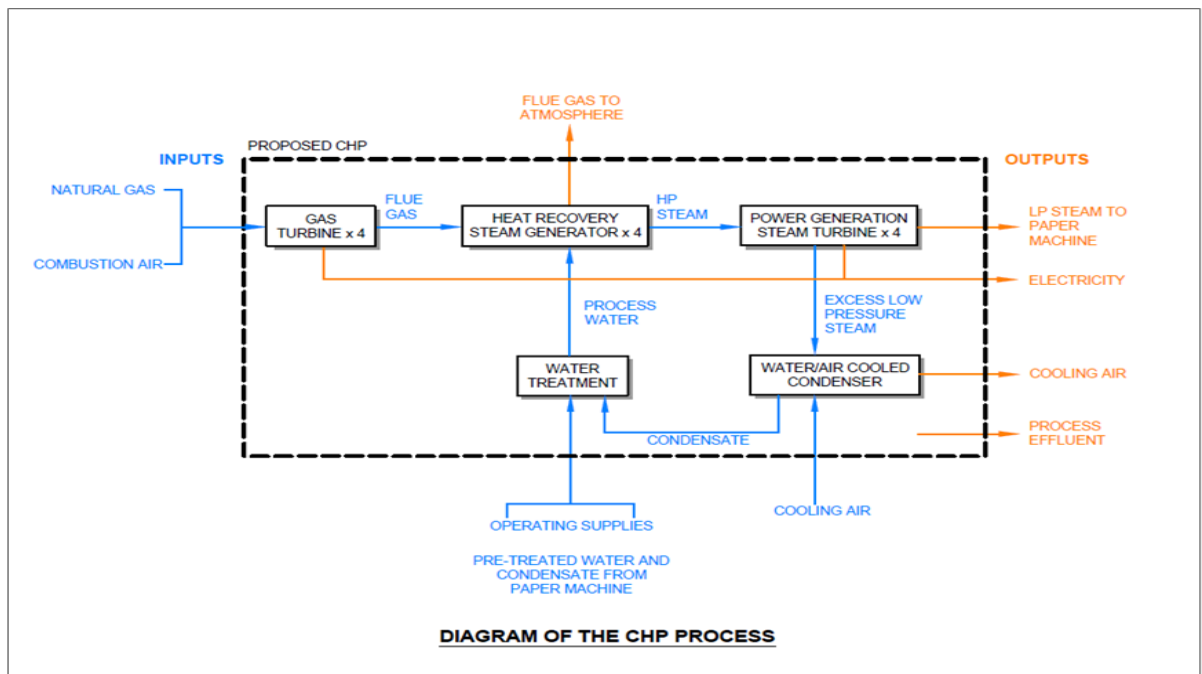
The CHP Process

- 3.61 The proposed CHP Facility would burn natural gas or biogas in a gas turbine. Air passing through an air filtration system would be compressed at the front end of the gas turbine and directed to the combustion section, where it would be mixed with gas and combustion would take place. The high temperature exhaust gases would expand in the turbine section, which makes the turbine shaft rotate and generate electrical energy.
- 3.62 To provide flexibility and allow for the normal steam /electricity fluctuations in demand of the paper manufacturing processes, a steam turbine would be added to the gas turbine and waste heat

recovery generator to reduce steam output and generate more electricity. This would help to optimise and stabilise the system. For instance, if one of the paper mills needed to suspend operations, the steam normally required for that paper mill could be directed immediately to the steam turbine to produce electricity instead. Any excess electricity would be exported to the grid, introducing low carbon energy supply to the network.

- 3.63 Low pressure steam would also be transferred to the paper mill for use within the production process. In the event that excess steam is created, or the mill production process is interrupted then the low pressure steam is instead transferred to the cooling tower where it is condensed into water, to be reused within the CHP process.
- 3.64 The key inputs for the CHP process are therefore natural gas and compressed air, together with pre-treated water and condensate from the paper machines where possible, together with cooling air.
- 3.65 The CHP plant creates electricity and low-pressure steam which are transferred to the paper mill (or exported to the grid in the case of any excess electricity), along with other outputs comprising exhaust gases which are discharged to the atmosphere. There would also be a small amount of process effluent arising from welfare facilities.
- 3.66 **Figure 3.4** illustrates the process which would take place within the proposed CHP plant.

Figure 3.4 – The CHP Process



- 3.67 CHP is considered to provide 'low carbon' energy as it produces substantially lower greenhouse gas emissions than conventional fossil fuel power generation.

- 3.68 There is a requirement for an additional 60MWe of power for the proposed paper production facilities, together with steam which is an integral part of the paper manufacturing process. The existing biomass CHP production at the Main Site would be retained; this would generate 18.5 MWe generation capacity. The additional (new) power requirement would be as follows:
- 6MWe required to power existing (retained) plants, e.g. MRF, woodyard, etc.;
 - new plant requirement = 78.5 Mwe and
 - total site requirement (78.5MWe) – existing Biomass CHP (18.5MWe) = 60 MWe deficit.
- 3.69 The proposed arrangement of the proposed CHP facility would comprise four parallel lines of gas turbine and heat recovery steam generator and /or steam turbine combination. The use of multiple units allows the paper production process to maximise operational flexibility and efficiency.
- 3.70 The hot exhaust (by-product) gases would then leave the gas turbine and be directed to the waste heat recovery steam generator through connected exhaust ducts. The low nitrous oxide (NOx) duct gas burner increases the exhaust gas temperature in order to produce high temperature and high-pressure steam for the paper machines. The duct burners are mostly used when excess steam is needed.
- 3.71 On a reciprocal arrangement, when the CHP facility needs to be closed for maintenance, electricity for the paper mill would be provided from the national grid or from contracted neighbouring power generation units.
- 3.72 A diesel generator would be made available for use in emergency situations.
- 3.73 An Energy Management System would be established to monitor, control, and optimise the use of electrical power in the paper mill and would be a part of the process automation software.

3.4.3 Piling Operations

- 3.74 Piling is required due to the nature of the ground conditions at the Site, which include made ground underlain by sandy alluvial deposits. Two alternative piling techniques have been considered: displacement (driven) piling and non-displacement (bored) piling. The difference between the two alternative methods is explained below.

Displacement Piling

- Displacement piling methods, also known as driven piling, form the pile by displacing soil horizontally from the space to be occupied by the pile, without the removal of soil to the ground surface. The density of the soil around the pile is increased and its permeability is reduced. Small displacement piles comprise steel sheet, H or I (in cross section), hollow tube sections, or hybrids such as the auger pile. Large displacement piles include pre-cast concrete elements, closed-end steel tube/timber sections, or may be cast in situ inside a casing or in a pre-formed void.

Non-Displacement Piling

- Non-displacement piling techniques, often called “bored” piling, extract a core of soil and replace it with the pile, which is typically formed by casting concrete in situ. Displacement of the surrounding soil is minimised. Temporary support of the hole prior to placing the pile is often required.

Preferred Option – Displacement/Driven Piling

- 3.6.1. Both driven piles and bored piles have previously been used at the Site and for other development around the Deeside Industrial Park. It is expected that a preferred piling technique (or combination of techniques) would be selected once the main contractor is appointed. However, the preferred piling method for the proposed development is driven piles, for the following reasons:
- natural ground conditions at the site consist of tidal flat deposits to depths of c. 20m.
 - tidal flat deposits are typically medium dense sands – ground investigation to date has found these sands to be very uniform in nature.
 - from the ground investigation to date, groundwater levels are in the order of 3m below ground level.
 - there is a concern that with shallow groundwater in uniform sands, the boreholes created for the construction bored piles may be unstable. This instability would arise because the high groundwater would potentially lead to a phenomenon often referred to as ‘running sands’, which may cause the pile boreholes to collapse.
 - driven piles do not produce arisings (the spoil that is removed from the ground when the boreholes are constructed) and so there are no off-site disposal requirements.

3.5 SITE ACCESS

- 3.75 Due to the location of the Site within the Deeside Industrial Park, accessibility of the Site by foot is poor, with no footways currently available from the Site access to public transport. However, there is a large cycle network nearby that users of the Site can utilise. This is accessed via National Cycle Network Route 568, providing a segregated route from near the site to Shotton, Chester, Neston and the wider cycle network.
- 3.76 There is a single priority junction vehicular access to the Site from the local highway, Weighbridge Road, and this is accessed off the A548. The local highway is a wide two-way single carriageway road, which is subject to a 30 mph signed speed limit, and features streetlighting. From the Site access, vehicular traffic continues to the A548 located less than 1 km away. The A548 is a dual carriageway subject to the national speed limit and links the Site with the strategic road network. Eastbound, the A548 continues to the A494, a trunk road linking north Wales to north west England.
- 3.77 **Chapter 13: Traffic and Transport** describes the transport connections in more detail and has considered all relevant national and local policy when reviewing the development to demonstrate compliance with relevant policy. The redevelopment of the site would support access by sustainable modes as far as practicable.

- 3.78 Two new vehicular access to the Site are proposed along the northern boundary of the Site to allow separate access to the external paper store and to the tissue production buildings. The junction with the local highway has been designed to accommodate turning movements for HGVs in accordance with the Design Manual for Roads and Bridges (DMRB).

3.6 PARKING PROVISION

- 3.79 Vehicle parking is provided across the Site. The retained main car park currently provides 342 spaces. Further parking is proposed to the north on the A4 expansion land (109 spaces). Access to both areas is provided from Weighbridge Road. Following the redevelopment of the Site there are proposed to be a total 451 formal parking spaces provided for cars and light vans.
- 3.80 Lorry parking is also proposed and comprises a total of 176 spaces.
- 3.81 Parking has been designed in accordance with Flintshire County Council's parking standards.
- 3.82 Electric Vehicle Charging Points are to be provided in line with Flintshire County Council standards. Policy PC5 Transport and Accessibility in the Flintshire's LDP requires that in non-residential developments, a minimum of 10% of parking spaces have electric vehicle charging points. As such, 45 of the 451 formal parking spaces would be electric.
- 3.83 Safe, secure and covered parking and storage facilities for cycles would be provided as part of the overall development. This would complement the already existing parking provided on Site.

3.7 EXTERNAL LIGHTING

- 3.84 Lighting would be installed throughout the entire Site. Lighting would be restricted to the minimum and would not cause harm to the public or the environment. Lighting installed during both the construction and operational phases would be controlled to prevent undue levels of spill, glare or sky glow.
- 3.85 Current unnecessary flood lighting would be removed. The locations and lighting specification would be agreed in consultation with Flintshire County Council post determination.

3.8 WATER RESOURCE MANAGEMENT

- 3.86 The Site has an existing private water supply, taking water piped from an abstraction point on the River Dee above Chester, which is sufficient for the proposed development. The proposed development would therefore be self-sufficient in process water without making any demands on public water supply.
- 3.87 Sustainable management of water resources within the Site is a key objective of the proposed development. Water from the paper manufacturing process, together with other areas such as raw materials storage areas, would be collected in an internal piped drainage network and directed to the ETF, where it would be treated to the high standard required for recycling within the process,

or discharge to the existing lagoons. The Site has an existing Permit to discharge regulated by Natural Resources Wales (NRW).

- 3.88 Due to the location of the Site close to the Dee Estuary, the requirements of the Permit are that discharge can only occur on the outgoing tide.
- 3.89 The development would include a new Sustainable Urban Drainage System (SuDS), which would provide water quality and biodiversity benefits and connect into the existing southwest lagoon which would provide attenuation to offset the increases in runoff associated with any additional hardstanding. The details of the SuDS would be agreed with the SuDS Approval Board (SAB) a process that occurs independently to the planning application.
- 3.90 The SuDS would be installed at the start of the construction phase and would therefore provide mitigation for any runoff contaminated by spillages or sediment. They would also be inspected and restored if any impacts have occurred during the construction phase to ensure their longevity during the operational phase.
- 3.91 In line with the permit conditions, the discharge to White Sands Gutter would be monitored and switched off should any breaches be identified. There is a large freeboard capacity within the lagoon to accommodate storm flow in the event of pollution occurring. If remediation cannot be achieved onsite, it would be removed off site to a suitable facility.
- 3.92 A drainage strategy has been prepared and a separate application has been made to Sustainable Drainage Approval Body (SAB). Full details and plans are included in **Chapter 9 Hydrology and Flood Risk** of this ES.

3.9 EMPLOYMENT

- 3.93 Existing operations currently employ approximately 190 people. The proposed development would require a substantially greater number of people, including existing staff who would be transferred to the new manufacturing facility as much as possible. The numbers shown on **Table 3-2** allow for shift working where required.

Table 3-2

Employment over the entire site (approximate numbers only)

Production facility	Employees (Approximate)
Cardboard Paper	160
Corrugated Paper and Box	203

Production facility	Employees (Approximate)
Tissue Paper	410
CHP	80
TOTAL EMPLOYEES	853

3.10 HOURS OF OPERATION

- 3.94 In general terms production on Site would be continuous (24 / 7) with staff working on a 5 shift pattern.
- 3.95 Deliveries of recycled and virgin paper to Site and deliveries and export of finished products are expected to take place during daytime working hours, as at present.

3.11 CONSTRUCTION PHASE

Programme and Phasing

- 3.96 It is intended that the proposed development would be constructed sequentially within an estimated three to four year period. In broad terms, development would commence on the Main Site but there is expected to be a certain degree of overlap with construction activities being completed on the Main Site, including installation of plant within buildings, fitting out and external works including landscaping, in parallel with development of the new tissue paper mills being constructed on the Expansion Site.
- 3.97 The Applicant is keen to commence development as soon planning permission may be secured, to ensure that paper manufacturing operations at the Site are suspended for as short a time as possible. To this end, an indicative 'phasing' plan has been prepared and is submitted with the planning application to assist the local planning authority in determining parts of the Site that would be developed concurrently.
- 3.98 The proposed phasing for the purposes of construction and development management is shown on **Table 3-3**.

Table 3-3 – Phasing Plan

Zone	Area / Buildings	Indicative Construction Timescale
1	Piling for Paper Machine Building.	June 2022 – October 2022
2	Paper Machine and CHP, warehouse and dispatch, new OCC, EFT, starch processing and storage building, energy services area, ancillary infrastructure, Tissue Mill 1, pulp storage area and pipe bridge, new entrance, weighbridge and car park, and associated infrastructure.	September 2022 – December 2024
3	Combined Heat and Power Facility and associated infrastructure.	October 2022 – March 2024
4	Tissue Mills 2 and 3, finished goods building, converting building, reel storage buildings and water tanks and associated infrastructure.	January 2025 – December 2025
5	Corrugating Building and associated infrastructure.	January 2025 – December 2025
6	Raw materials area, new site entrance and lorry parking and associated infrastructure.	September 2022 – December 2024

Construction Management

3.99 Construction management would be undertaken by an approved and experienced contractor or contractors, in accordance with a Construction Environmental Management Plan (CEMP) (see **Technical Appendix 5.3, Outline CEMP**). The CEMP would be maintained as a ‘live’ document that would be updated throughout the planning and construction process, taking account of proposed mitigation and other planning commitments as required.

Construction Hours of Working

3.100 The proposed hours of working for the construction activities would be similar to the demolition work for which prior notification was submitted in 2021.

3.101 The following hours of operation are proposed for the construction works:

- Monday to Friday – 07:00 - 19:00 hours; and
- Saturdays – 07:00 – 13:00.

3.102 There is likely to be some exceptions to the above where 24-hour construction would be required. This could be for activities taking place within buildings, including installation of plant and equipment, fitting out, and certain activities that may need to be undertaken on a continuous basis for certain purposes, such as continuous concrete pours and piling.

3.12 SUMMARY

3.103 This chapter has provided a detailed description of the proposed development.

3.104 The technical assessments which can be found in chapters 7 - 16 are informed by this chapter.

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4.1 INTRODUCTION

4.1 This Environmental Statement (ES) Chapter sets out the alternatives considered by the Applicant with regard to location, technology and design of the proposed development.

4.2 REQUIREMENT TO CONSIDER ALTERNATIVES

4.2 Alternatives are considered in the context of Regulation 17(3)(d) and paragraph 2 of Schedule 4 of the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017.

4.3 Regulation 17(3)(d) states that an Environmental Statement (ES) should include:

“a description of the reasonable alternatives studied by the applicant or appellant, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the significant effects of the development on the environment”.

4.4 Paragraph 2 of Schedule 4 expands upon this by adding that the information to be provided (where appropriate) should include:

“A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the applicant or appellant which are relevant to the proposed development and its specific characteristics and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.”

4.5 There is no detailed guidance provided by Welsh Government regarding consideration of alternatives. Guidance contained in the Planning Practice Guidance portal¹ comments that:

“the 2017 Regulations do not require an applicant to consider alternatives. However, where alternatives have been considered, paragraph 2 of Schedule 4 requires the applicant to include in their Environmental Statement a description of the reasonable alternatives studied (for example in terms of development design, technology, location, size and scale) and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects”.

4.3 SITE SELECTION

4.6 In June 2020, Eren Group appointed SLR to undertake a systematic search for a suitable location for a paper mill in the north of England and Wales. The search criteria provided to SLR were as follows:

- site area –minimum size is 400,000 sq.m (40ha)

¹ <https://www.gov.uk/guidance/environmental-impact-assessment#Preparing-an-Environmental-Statement> Paragraph: 041
Reference ID: 4-041-20170728

- access to water – process water is required for production and cooling, and there will be discharge water;
- geography – a location where industry, business and municipal centres are located (to provide feedstock and outlets for finished goods);
- transport – good transport infrastructure is essential;
- site area – the minimum size is 300,000 m² (30ha) but 40 ha preferred;
- energy - the primary goal is to have CHP onsite; and
- industrial / employment land setting – the site should provide a buffer to residential properties.

4.7 SLR commenced a detailed appraisal of potential site locations based on the above criteria using a combination of GIS (geographic information systems) data and professional experience in the application of planning policy. The GIS data searches included such relevant features as drive time analysis relative to urban conurbations and potential customers.

4.8 The GIS criteria adopted for the search used a combination of ‘opportunity’ characteristics and ‘constraints’ characteristics based on a three-tier assessment process that is illustrated in **Technical Appendix 4-1**. In progressing from Tier 1 to Tier 3, the search was refined from national to local datasets. At local level, local plan policy and allocations were considered by a Chartered Town Planner familiar in such work.

4.9 At the third stage of assessment, sites were scored in accordance with the selection criteria originally proposed by the Eren Group, which had been developed further in consultation with the team. Criteria were weighted where appropriate. A sample extract from the scoring matrix in respect of land requirements is provided in **Figure 4.1**.

Figure 4.1: Extract for Scoring Matrix

Land Area and Vacancy					Land Type		
Vacant Land Area	Land Area Score	Landownership	Land Availability	Land Availability Score	Land Area and Vacancy Overall Score	Greenfield / Brownfield	Residential Proximity Score
	< 30ha = 5 30-40ha = 3 > 40ha = 1		1 = For Sale Now 5 = Future for Sale			1 = Greenfield 3 = Greenfield / Brownfield 5 = Brownfield	

4.10 The site search criteria identified by Eren Group were such as to limit the number of sites coming through the selection process due to the exacting requirements for a very large site, with access to high volumes of process water in combination with other factors such as good transport links. A ‘long list’ of around 12 sites was taken forward for discussion with local authorities and land owners. Following these discussions, a short list of four sites was adopted for further consideration.

- 4.11 The Shotton Mill Site did not appear in the original long list of sites as it was not considered available. However, in August 2020 UPM announced that the Site was being put up for sale by the then owners, UPM. From this point onwards the Site was included in the site selection process, and was considered to be the top scoring site based on the criteria being used. However, it was not until mid 2021 that Eren Group became the preferred bidder for the Site, and work on other potential sites was able to be closed down.

4.4 ALTERNATIVE TECHNOLOGIES CONSIDERED

- 4.12 Eren Group has a declared ambition to make Shotton Mill once of the most technologically advanced sites in Europe. This includes the following requirements for the technology selected:
- state-of-the art paper manufacture;
 - water resource sustainability through efficient treatment and recycling;
 - a high level of automation in internal transfer of goods; and
 - exceptional energy efficiency and self-sufficiency.
- 4.13 Eren Group is familiar with technology providers around the world, having developed similar large scale facilities in Turkey. The Applicant is currently going through the process of provider selection and has already appointed its preferred provider for the card paper machine. Other elements of the proposed development will be selected in due course in accordance with the Applicant's exacting requirements.

4.5 ALTERNATIVE DESIGN CONSIDERED

- 4.14 The design of the main elements of the proposed development is determined primarily by the function and scale of the paper manufacturing process. This results in a number of buildings that are functionally linked, in many cases with a requirement for juxtaposition for ease of transfer of raw material feeds and products.
- 4.15 As an example, the card paper mill building is the minimum size practicable to house the proposed paper machine, which is supplied on a turnkey basis by a leading manufacturer with integral drying and water management systems. The building is therefore sized to be 293m long x 76m wide x 31.5m high. This building is fed raw materials (pulp) from the Recovered Fibre Buildings and transfers finished product (reels of brown paper) to the Warehouse Building and Corrugating Building. The options for site layout are therefore intrinsically determined by the process constraints.
- 4.16 One of the determining features in the site design is the desire of the Applicant to retain any suitable buildings that could be re-used or re-purposed in the proposed development. Such buildings are shown coloured pink on **Figure 1.3** and include the Recovered Fibre Buildings, the White Paper Storage Building, the Materials Recovery Facility, and much of the existing energy infrastructure including the electricity substation and Biomass Plant. The existing location of the

existing energy facilities has led to the proposed Combined Heat and Power (CHP) facilities being located in an adjacent area of the Site.

- 4.17 One of the most important features of the Site for the proposed use is the existing water management and discharge arrangements. The existing arrangements of lagoons and the Permitted discharge point will be retained, and used in conjunction with the proposed new Effluent Treatment Facility.
- 4.18 The Applicant has considered alternative choice of materials for construction. A prime consideration for the selection is the high humidity environment associated with much of the paper making process, which relies on heat and water to convert the feedstock into paper and paper products. For aesthetic reasons, taking account of the Site setting and adjacent developments, all buildings will be clad in steel sheeting. However, the internal design of the more potentially corrosive environments is determined by the need for sustainability of materials usage and avoidance of excessive replacement.

4.6 ALTERNATIVE ACCESS CONSIDERED

- 4.19 The Site has an excellent existing vehicular access as part of the Deeside Industrial Park, with a connection via a short stretch of Industrial Park road to the A548. As a result, no alternative main vehicular access to the Site has been considered. However, two additional accesses are proposed to allow direct access to parts of the Site that were previously unused, to improve efficiency of movement within the Site. Details are provided in **Chapter 13, Traffic and Transport**.

4.7 SUMMARY AND CONCLUSION

- 4.20 The Applicant has selected the Site as part of a systematic process of site search within England and Wales. Although the Site was not available at the commencement of the site search process, it was incorporated into the search once the former owners announced its sale, and immediately performed well, ranking top of the 'long list' of sites under consideration.
- 4.21 The alternatives considered in preparing the scheme design are limited in that the functionality of the design is paramount and must take account of existing buildings and infrastructure being retained. The selection of technology is based on the client's desire establish a state-of-the art paper manufacturing facility, with a high level of resource and energy efficiency.

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5.1 INTRODUCTION

- 5.1 This Chapter of the Environmental Statement (ES) describes the approach, methodology and processes undertaken for this Environmental Impact Assessment (EIA) as required by the EIA Regulations. This chapter identifies the regulatory background of the EIA Regulations and the process required in order to undertake a robust and thorough assessment.
- 5.2 In addition to looking at the EIA process, this chapter discusses the consultation process and consultation outcomes as a result of the scoping process, discussed in section 5.3 below. A summary of the scoping report is detailed in **Table 5-1**, and **Table 5-2** details where these responses have been integrated into the technical assessments.

5.1.1 Environmental Impact Statutory Background

The Purpose of EIA

- 5.3 EIA is an important procedure for ensuring that the likely significant effects of a proposed development on the environment are fully understood, mitigation is incorporated into the design and environmental commitments are made to the delivery of the proposed development before it proceeds.
- 5.4 The term EIA describes a procedure that must be followed for certain types of development before they are given “development consent”, which in the UK includes the grant of a planning permission. The procedure is a means of drawing together, in a systematic way, an assessment of a project’s likely significant environmental effects.

European Directive

- 5.5 The EIA Regulations specify certain types of development for which EIA is mandatory (Schedule 1 projects), and categories of development where an EIA may be required (Schedule 2 projects) dependent upon the likely significance of the impacts.
- 5.6 The requirements for EIA are transcribed from the European Community Directive ‘The Assessment of the Effects of Certain Public and Private Projects on the Environment’ (85/337/EEC) as amended by Council Directive 97/11/EC, Directive 2003/35/EC and Directive 2009/31/EC (subsequently replaced by the 2011 Codified EIA Directive 2011/92/EU), which came into force as the EIA Directive in May 2014 as Directive 2014/52/EU. In Wales, EIA must be undertaken in accordance with the EIA Regulations which transposed the EU Directive (most recently Directive 2014/52/EU) into law.
- 5.7 The Town and Country Planning Act (T&CP) 1988 (SI No 1199) enacted the Directive and that was superseded by the T&CP (Environmental Impact Assessment) (Wales) Regulations 2017 (SI no 1824).

Approach to the EIA

- 5.8 The proposed development can be split into three separate parts that are physically and functionally distinct but have a number of shared facilities and will operate under the same management regime. Given the cumulative nature of the proposals and to deliver a robust approach to environmental considerations, an overarching EIA has been prepared to cover the three applications. This approach has been previously discussed and agreed with Flintshire County Council and Planning and Environment Decisions Wales (PEDW), who manage DNS applications on behalf of Welsh Government).
- 5.9 The three planning applications which this EIA covers are described in **Chapter 3 Project Description**.

Need for EIA

- 5.10 The redevelopment and expansion of the paper mill would entail the production of paper and board with a production capacity exceeding 200 tonnes per day. The proposed development therefore falls under Schedule 1 of the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017. Schedule 1 of the EIA Regulations 18(a) and 18 (b) states that an EIA is compulsory for: *“Industrial Plants for – a) the production of pulp from timber or similar fibrous materials; or b) the production of paper and board with a production capacity exceeding 200 tonnes per day.”*
- 5.11 As the proposed development falls under the Schedule 1 description for those schemes where an EIA is compulsory, a screening opinion was not sought from the relevant authorities. A scoping opinion was sought, and this is detailed in section 5.2.

5.2 DETERMINING THE SCOPE OF THE EIA

5.2.1 EIA Scoping

- 5.12 SLR submitted a Scoping Request on behalf of the Applicant in September 2021 (**Technical Appendix 5.1**) to Flintshire County Council and to PEDW under Regulation 14 of the T&CP (EIA) (Wales) Regulations 2017.
- 5.13 In accordance with the EIA regulations the Scoping Request included plans which identified the affected land; a brief description of the proposed development including its location and technical capacity and also an explanation of the likely significant effects of the proposed development on the receiving environment.
- 5.14 The Scoping Report (which accompanied the Scoping Request) allows the Applicant to clearly identify what is considered likely, at that stage of the process, to be the main significant environmental issues. Through identifying potential environmental issues, the survey work and detailed and targeted assessments can be developed. The Scoping Report (**Technical Appendix 5.1**) considered each technical environmental area and discussed what elements should or should not be scoped in based on the potential effects of the proposed development on the receiving

environment during construction, operation and decommissioning. A summary of this is presented in **Table 5-1**.

Table 5-1 Potential impacts as identified within the Scoping Report

Technical Discipline	Potential Impacts to be Addressed in the EIA as Identified in the Scoping Report
Landscape and Visual Impact	<p>Potential Construction Impacts</p> <p>The construction phase may result in loss and disturbance of landscape features and elements within the Site itself, e.g. as a direct result of construction requirements for access, together with potential impacts on the perception of landscape character and visual amenity. Key activities that would cause this include vegetation removal and soil stripping, together with the construction of new structures in the Tissue Machine Area and existing footprint of the Paper Mill building.</p> <p>The assessment of construction phase effects will concentrate on changes to the landscape fabric and the consequence of these. This will include the loss of landscape features and elements, the importance of these and the contribution they make to local character as well as visual amenity.</p> <p>Potential Operational Impacts</p> <p>It is anticipated that assessment will be focussed on the 3km area surrounding the proposed development. This will include desk based and field survey work. GLVIA3 refers to effects that last for 10 to 25 years as being long term and as such the LVIA will judge effects based on this criterion.</p> <p>Scoped Out</p> <p>Landscape and visual receptors that are located beyond the proposed 3km radius study area will generally be scoped out unless any particular longer distance views are identified (such as those previously alluded to from Neston and / or Flint).</p>
Land Quality	<p>Potential Construction Impacts</p> <p>Construction has the potential to give rise to contamination of the ground through the following, causing new ground contamination due to the failure to adequately control the storage, transfer and use of polluting substances, from spills of oils/fuels used for construction vehicles and equipment. In addition to this introducing new pathways such that existing ground contamination becomes connected to a receptor where there was no connection before, as can happen when drilling or piling through contaminated land.</p> <p>The following construction effects are scoped into the EIA:</p> <ul style="list-style-type: none"> • Effects on construction workers, off-site users, groundwater and surface water associated with ground or groundwater contamination that may already exist from historical and current potentially contaminative land uses; • The potential for contamination to occur as a result of construction activities; • The potential for exposure to human health receptors (on and off site) to contaminants in dust via ingestion and inhalation as a result of construction works; and • Creation of new pollutant pathways, which will allow pathways for contamination to reach groundwater resources and sensitive ecological receptors associated with the surface water environment. <p>There is potential for likely significant effects during construction from exposure to identified contamination in shallow soils and groundwater.</p> <p>Potential Operational Impacts</p>

	<p>End users of the Site will be protected by remediated soils and / or groundwater (if required) beneath the Site to 'suitable for use' standards and by providing suitable gas protection measures within new structures (if required).</p> <p>As a result of the proposed development, two potential operational environmental effects are identified relating to ground conditions. The mechanisms are as follows:</p> <ul style="list-style-type: none"> Existing contamination: direct or indirect contamination of flora, fauna, controlled waters and building fabric due to the mobilisation of baseline contaminants during earthwork operations; and Development contamination: direct and indirect contamination of the soil and potential groundwater contamination due to leakages of fuel oils, general operational spillages and other contaminants from within the proposed development and the associated collection of surface water drainage from hardstanding areas. <p>The proposed development will be designed to avoid significant adverse effects resulting during the operational phase and construction works.</p> <p>It should be noted that the future operations at the Site will be regulated under an Environmental Permit; and whilst the EIA will assess potential environmental effects associated with future activities the permitting regime will allow for control and monitoring of potential contaminant releases as part of these operational activities.</p>
<p>Hydrology and Flood Risk</p>	<p>Potential Construction Impacts</p> <p>Increase in runoff rate and volume of surface water from the site resulting from the removal of vegetation and the compaction of the ground:</p> <ul style="list-style-type: none"> Increased downstream flood risk; Impacts on channel morphology and ecology; Mobilisation of contaminants within ground at the Site; and Decrease in water quality of surface water leaving the Site. <p>Potential contaminants introduced to the Site are:</p> <ul style="list-style-type: none"> Cementous material; Fuel, oils, and other hydrocarbons; Increase in sediment loading of water discharging from the Site, which can cause: Blockage of infrastructure downstream of the Site; Impacts on channel morphology and ecology; and Blockage of drainage channels/ infrastructure across the Site increasing flood risk both to the Site and downstream. <p>Potential Operational Impacts</p> <ul style="list-style-type: none"> Increase in runoff rate and volume of surface water from the Site due to impermeable coverage; Increased downstream flood risk; Impacts on channel morphology and ecology; Changes to the conveyance of surface water across the Site altering the flood risk both upstream and downstream of the Site. This could result in long term morphological impact on remaining channels associated with surface water outfalls, physical structure and changes in flow patterns; Decreases in the water quality of surface water being discharged from the Site associated with; Litter, dust and sedimentation, or debris entering the drainage system; Hydrocarbons and metals particularly from vehicular access to the Site;

	<ul style="list-style-type: none"> • Contaminants including lubricants etc.; • Nutrient loading from the horticultural centre; • Pollution risks associated with the discharge of process water from the Site (water will be treated via Anaerobic / Aerobic digestion; and • Variation in abstraction rates from the River Dee. <p>Scoped Out</p> <p>Given that the existing site abstracts water from the River Dee (upgradient of the Site) and it is understood the proposed development will not increase this abstraction due to increased efficiency of the new machinery, assessment of water abstraction will be scoped out.</p>
<p>Ecology and Ornithology</p>	<p>Potential Construction Impacts</p> <p>Potential impacts on birds, non-avian species and habitats are considered likely to include the following:</p> <ul style="list-style-type: none"> • Direct habitat loss: clearance of habitats and building on habitats; • Diffuse pollution sources altering the condition or type of habitats present within the Site or in adjacent designated sites or non-designated habitats or principle importance; • Disturbance to fauna, including birds, through noise and human activity; • Indirect habitat loss or fragmentation: via disturbance, or avoidance of areas during construction; and • Changes to habitats and species populations as a result of discharges of treated effluent from the operational Site. <p>The ecological impact assessment will consider all potential sources of impact and assess the implications for valued ecological features.</p> <p>Scoped Out</p> <p>The absence of great crested newts has been confirmed from a waterbody within the A4 expansion site and no other records of this species are known from within the site. It is proposed to scope out further study or mitigation for great crested newts.</p> <p>A population of Natterjack Toads is known to occur at Gronant Dunes and Talacre Warren SSSI, which is on the southern shore of the Dee Estuary. This population is one of the designated features of interest for The Dee Estuary Ramsar. The population is more than 20km from the Site and no functional connections have been identified. It is proposed to scope out any impacts to natterjack toads.</p>
<p>Noise and Vibration</p>	<p>Potential Construction and Operational Impacts</p> <p>The proposed development will consist of the construction of new buildings on the Site and the operation of an extended papermill operating on a 24/7 basis.</p> <p>The potential sources of noise and vibration impact include:</p> <ul style="list-style-type: none"> • The noise and vibration impacts of the proposed construction operations; • The noise impacts of the operation of the extended Site, including during the more sensitive night-time period; and • The noise impact of increased vehicle movements associated with the development proposals. <p>Scoped Out</p> <p>It is envisaged that an operational vibration assessment would not be required as part of the noise and vibration assessment consequently, it is proposed that this is scoped out of the EIA.</p>

<p>Air Quality</p>	<p>Potential Operational Impacts</p> <p>The Air Quality chapter to the ES will assess the potential emissions to air and the effects on surrounding air quality that may arise during the construction and operational phases of the proposed development. The following key air quality issues will be addressed:</p> <ul style="list-style-type: none"> • Sensitive residential properties are located within the vicinity of the Site and may be affected by the generation of dust and emissions from road traffic and on-site plant during construction works; • The Site is likely to generate additional traffic flows on the local road network and therefore there is potential for change in air pollutant concentrations at existing receptor locations as a result of development trips associated with the operation of the scheme; • The proposals are likely to generate additional combustion emissions associated with the increased energy demand of the development proposals during the operational phase of the scheme; • The proposals include for an effluent treatment plant, for which there is the potential for odour emission during the operational phase of the scheme; <p>The principal air pollutants of concern with respect to the development will be:</p> <ul style="list-style-type: none"> • Nitrogen dioxide (NO₂), from road vehicle emissions, on-site energy generation / combustion plant emissions and construction plant; • Particulate matter with an aerodynamic diameter of less than 10µm (PM₁₀) and less than 2.5µm (PM_{2.5}) from road vehicle emissions and construction plant; • Odour from the operation of the on-site effluent treatment plant; • Dust from construction phase activities; and • Cumulative impacts between both the traffic and combustion emissions and any other nearby relevant developments. <p>Scoped Out</p> <p>Other than nitrogen dioxide (NO₂), from road vehicle emissions, on-site energy generation / combustion plant emissions and construction plant, any impacts associated with other air pollutants are expected to be negligible and can be scoped out.</p>
<p>Traffic and Transport</p>	<p>Potential Operational Impacts</p> <p>Receptors of greatest sensitivity include schools, colleges, playgrounds, accident clusters, retirement homes and roads without footways that are used by pedestrians. The industrial nature of the Site location results in the majority of these local receptors being located a significant distance from the Site. The short distance to access the strategic road network is expected to result in very limited exposure of the receptors to development traffic.</p> <p>Scoped Out</p> <p>At this stage it is not proposed that any matters are scoped out. This is subject to the ongoing refinements to the development proposals and quantification of the trip generation.</p>
<p>Cultural Heritage</p>	<p>Included in other Environmental Issues</p> <p>Further assessment of potential indirect impacts would be considered disproportionate, and it would be appropriate for this aspect to be scoped out of the Cultural Heritage EIA.</p>
<p>Socio-Economic</p>	<p>The proposed development is likely to result in economic gains with a number of jobs being created directly through the construction and operational phases of the paper mill. Indirect jobs will also be created in the supply chain through the supply of goods and services, which will benefit local businesses.</p> <p>The current estimate is that the proposed development, when operational, will require over 800 full time equivalent (FTE) roles encompassing a range of skills and experience. This will include existing staff at the site,</p>

<p>of whom there are approximately 190 staff members. Training will be provided to facilitate the transition to the new technology and processes.</p> <p>Beneficial socio-economic effects are therefore also likely to result from skills development, education and wellbeing.</p> <p>The assessment will also take into account the impact of the proposed development on land use and community assets, including recreational receptors.</p> <p>Scoped Out</p> <p>It is proposed to scope out the following matters from the assessment:</p> <p>Impact of construction on demand for housing, schools and health services - the construction phase is expected to be relatively short term that would not lead workers to relocate to the area with their families. There is therefore not expected to be an influx of workers seeking housing, schools and health services as a result of the construction of the proposed development.</p>
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- 5.15 Following the submission of the Scoping Request, Flintshire County Council and PEDW undertook consultation on the proposed development and the approach to the assessment with the appropriate statutory authorities.
- 5.16 Following consultation with the statutory authorities, Flintshire County Council and PEDW compiled a Scoping Opinion/Direction for the Applicant to inform the assessments and approach to mitigation (as required). The Scoping Opinion was received on the 05/11/21 from Flintshire County Council and a Scoping Direction from PEDW on the 26/11/21. The Scoping Opinion and Scoping Direction can be found in **Technical Appendix: 5.2** of this ES.
- 5.17 **Table 5-2** details the consultation responses received and where these are addressed in the ES.

Ref. in Scoping Report	Comment	Response in ES
Principal of Development		
1.1.5	The development of the Main Site will require removal of some of the existing buildings. Although the paragraph continues stating that the demolition is not part of the current project, it appears that the removal of the existing building is required as a consequence of the redevelopment project. For the avoidance of confusion, PEDW requires that any construction and demolition activity required for the redevelopment of the Site is considered as part of the EIA process and addressed accordingly in the ES.	Demolition of any existing buildings prior to construction of the proposed development has been included in the assessments where relevant. Demolition included to the extent that works are not completed prior to submission.
2.3.1	The SR states that access to the Site is obtained from the A548. This Scoping Direction has been prepared on this basis. It is noted that a level crossing is located in the vicinity of the Site but no mention is made of its use at this time. The Applicant is reminded that, should that situation change, in accordance to Schedule 5 of the Developments of National Significance (Procedure) (Wales) Order 2016, they may be required to consult the operator i.e. Transport for Wales.	The level crossing is located off a disused track to the north east of the site. Site access will be from the roundabout off the A548 to the northwest of the site. There is no intention to use this level crossing for any construction or operational activities.
Section 3	All the elements of the project should be described in detail. The ES should include diagrams explaining the production processes. Emissions (including noise, air quality and lighting) and effluents should be described both qualitatively (composition) and quantitatively. Where material will be imported, this should be clearly described in the ES, including volumes and measures of transportation.	Following scoping, further details of both the layout and operation of the proposed development are available. Chapter 3 presents an updated project description, including process diagrams to illustrate how the plant development will operate.
Section 3	Production and disposal of waste (including sludge) during operations should be assessed as part of the ES. A dedicated chapter is required.	A dedicated waste chapter has been presented in Chapter 14 of the ES.
Section 3	The SR does not include any details regarding demolition and construction of the Proposed Development. The ES should contain details of the construction operations, duration and materials to be imported. An outline Construction and Environmental Management Plan (CEMP) is required as part of the ES. The ES should include details of the volumes of materials required during construction. The production of waste during construction should be considered. This information should inform aspects assessment consistently throughout the ES.	An outline CEMP has also been develop as presented in Technical Appendix 5.3 . Completion of the CEMP will be the responsibility of the main works contractor, which is yet to be appointed, however the final CEMP will build upon the draft provided and will contain clauses to ensure the environmental management of the project that are substantially in accordance with those presented herein.

Landscape and Visual Effects		
6.1.2.1	The SR notes that the assessment will be focused within 3km of the Site. Figures SM/SR5.1 and 5.2 provided with the SR indicate that the proposed development visibility will extend beyond 3 Km. As such, the proposed area of survey appears limited. The Applicant is recommended to liaise with the relevant consultees on an appropriate radius.	Following the advice received from PEDW, the project team have worked closely with the landscape officer at Flintshire County Council (December 2021 and January 2022) to agree a wider study area (5km) and a series of agreed representative view points.
6.1.2.5	See section 6.4 of this Scoping Direction. PEDW disagree that at this stage it is possible to assume that an in depth assessment of the cumulative impact is not required. The proposed buildings and structures will be higher than those surrounding. Without a full assessment it is not possible to reach a conclusion, at this stage	A cumulative assessment is provided in Chapter 7 Landscape and Visual and Chapter 17 Cumulative Effects.
6.5.4	The SR notes that no assessment of plumes will be carried out. The justification for this is unclear. The proposed development will include several stacks which will generate a plume that should be considered as part of the assessment. The results should also inform the ecological assessment.	Please see Chapter 7 Landscape and Visual, Chapter 10 Ecology and Ornithology and Chapter 12 Air Quality.
Land Quality		
7.1.2 & 7.1.3	PEDW notes the list of potential contamination sources within the Main and Extension sites. It is also noted that groundwater is assumed to be at a depth of approximately 4 to 5m below ground and that tidal influence from the Dee Estuary is also assumed. PEDW recommends that a Site Conceptual Model is presented in the ES and details of the Site Investigation provided. The significance of the impact should be clearly identified. Mitigation and remediation measures should be outlined, along with methods of disposal of contaminants. Due to the extent of the potential remediation works these should be considered in the description of the construction works and considered as part of other aspect assessments where relevant, including but not limited to ecology, noise and waste.	Please see Chapter 8 and Technical Appendix 8.1 which provides a commentary of the Land Quality in the area.
7.4.3.3	Paragraph 7.4.3.3 states that the proposed development will be designed to avoid significant adverse effects resulting from operations. Any designed measures should be clearly identified and residual impact addressed. See also section 6.4 of this Scoping Direction.	Please see Chapter 8 and Technical Appendix 8.1 which provides a commentary of the Land Quality in the area where mitigation is addressed, and residual impact identified.

Table 6.1	The potential effects of remediation, construction and operational works on the nearby nature conservation sites (i.e. Dee Estuary SSSI/Ramsar/SPA/SAC, Shotton Lagoons and Reedbeds SSSI and Inner Marsh Farm SSSI) should be considered. Any potential for pollutant leakage into the nature conservation sites should be addressed and the significant of the potential impact identified. The Applicant should consider that remediation works themselves could affect sensitive ecological receptors and thus should be part of the assessment. See also comments at Appendix 1.	Please see Chapter 8 and Technical Appendix 8.1 which provides a commentary of the Land Quality in the area where mitigation is addressed, and residual impact identified. Chapter 10 provides additional information on the conservation sites.
Table 6.1	PEDW agrees that the remediation strategy has the potential to create waste. This should be addressed in the required waste chapter.	Please see Chapter 14 of the ES.
Hydrology and Flood Risk		
8.1.2.1	There is a vast literature on the effects of pulp and paper mill effluent discharge on fish population and reproduction. The assessment should consider the qualifying features of the Dee Estuary SAC/SPA/Ramsar/ SSSI site and the potential effect the effluent components may have on the nature conservation objectives of this internationally important site. See also comments from Flintshire County Council and NRW at Appendix 1.	Please see Chapter 9 Hydrology and Flood Risk.
8.2.2	The Hydrology and Flood Risk chapter should also be informed by the Ecological assessment.	Noted, the ecology chapter has informed the Hydrology and Flood Risk Chapter.
8.4.2	Where mitigation measures are proposed as part of the project design, the residual impacts should still be considered.	These will be identified in the assessment.
Ecology and Ornithology		
9.1.2	PEDW is broadly in agreement with the list provided at paragraph 9.1.2. Diffuse pollution sources should also consider emissions. Disturbance to fauna (including birds) should also include lighting and plumes.	Examination of disturbance to fauna including the interest features of European Sites will give consideration to lighting. The effect of emissions (plumes) from the Site will be considered in the air quality assessment and HRA as potential indirect effects and an assessment of the potential for nutrient enrichment of habitats (on which the fauna rely) will be considered.

<p>9.1.1.4</p>	<p>Any disturbance to bird species which are qualifying features of the Dee Estuary SPA and Ramsar occurring within the Site ZOI should be clearly identified. Any functionally linked habitat should be considered as part of the Shadow Habitat Regulations Assessment and cross-referenced in the ES.</p>	<p>The application will contain a Stage 1 Habitats Regulations assessment. If Likely Significant Effects are concluded, then further work will be undertaken to support a Stage 2 Habitats Regulations assessment (or shadow HRA).</p>
<p>9.1.1.8, 9.1.2.1 and 9.1.3.1</p>	<p>It is not possible to agree with any of these statements at this stage until the potentially affected bird species and the Site ZOIs are identified.</p> <p>Construction works have the potential to affects birds depending on the species, time of the year and the level of noise and frequency of construction activities. The ZOI may be different depending on the species considered and may be larger than a 300m radius. Operational lighting and plumes may also affect protected species (including but not limited to birds).</p> <p>The Applicant is also reminded that unlawfulness is not a definition of significance. Significant impacts may arise from lawful activities and should be considered.</p>	<p>Noted, will be address within the EclA, please see Chapter 10 Ecology and Ornithology.</p>
<p>9.2.1.2 and 9.2.2.1</p>	<p>See NRW comments on data sources and field surveys at Appendix 1. It is not clear how the surveys have been conducted as no methodology is provided. Timing of the surveys should be clear in the ES, frequency of visits and duration, location of vantage points and methods of observation. Without any of this information is not possible to understand whether the survey effort is proportionate and adequate to have correctly identified species present. Surveys conducted may be suboptimal, thus it is not possible at this stage to exclude the presence of the Dee Estuary</p>	<p>Noted, please see Chapter 10 Ecology and Ornithology.</p>
	<p>SPA/Ramsar qualifying features birds. It is not clear at this stage whether the Site is functionally linked to the Internationally important nature conservation site. This should be addressed in the ES.</p>	<p>Further consideration with be given in the Stage 1 Habitats Regulations assessment and cross referenced in the ES.</p>
<p>9.4.1.1</p>	<p>The assessment should be informed by and prepared along with the Land Quality assessment, the Air quality Assessment, the hydrological assessment, the noise assessment, transport assessment and the LVIA. No information is provided regarding the potential impact of air quality emissions on susceptible habitats, not just from the stacks but as a results of the volume of traffic connected with the operation of the Site. Main transportation routes should also be considered with regards to the effect of air quality pollutants on sensitive habitats. Traffic disturbance on notable and protected species should be considered. The effects of pollution from Site construction,</p>	<p>Noted, this is within the scope of the Air Quality and Ecological assessments. Examination of both site-based emissions and road network emissions will be undertaken.</p> <p>The effects of noise on sensitive receptors will also be assessed.</p>

	remediation and operation (including effluent) should form part of the assessment. Noise and vibration disturbance during construction and operation should be also addressed in the ES.	
9.4	The SR mentions the Dee Estuary, but no other nature conservation sites potentially affected by the Proposed Development are considered in the SR. It is not clear the extent of the Study Area which will be considered as part of the assessment but PEDW notes the proximity of several nationally and locally important sites which could be affected by the proposal. The SR states that the CIEEM guidance will be followed thus the ES should clearly identify nature conservation sites potentially affected by the proposal and the potential impacts arising from the proposed activities. Where significant impacts are identified, mitigation measures should be proposed and their effectiveness addressed in the ES.	Addressed within Chapter 10 Ecology and Ornithology.
9.5	For the reasons listed above, PEDW disagrees that Likely Significant Effects (LSE) to the Dee Estuary SPA/Ramsar/SAC/SSSI can be discounted at this stage. Additionally, the Applicant is reminded that birds are not the only qualifying features of the Dee Estuary and that LSEs can also arise from pollution. See also comments at Appendix 1. A Shadow Habitat Regulation Assessment should be provided to support the application.	Noted the Stage 1 Habitats Regulations assessment will confirm whether there are LSE, the basis for these and which sites are to be considered further. Direct and indirect effects will be considered. The application will be supported with a Stage 1 Habitats Regulations screening report. The stage 2 shadow HRA will be submitted during Examination.
Noise and Vibration		
10.1.1.1	Construction operations should also include remediation works.	Noted, this will be address within Chapter 11 Noise and Vibration.
10.4.4.2	The assessment should include the effects on protected and notable species and other nature conservation sites – see above.	Noted, this will be address within Chapter 10 Ecology and Ornithology and Chapter 11 Noise and Vibration.
10.5	Not enough information has been provided in the SR to exclude operational vibrations from the assessment. A full justification should be included in the ES to explain why operation vibrations from a paper mill of this scale can be scoped out from the EIA process.	Noted, this will be address within Chapter 11 Noise and Vibration.

Air Quality		
11.1.1	Due to the volume of traffic generated by the construction and operation of the proposed development, ecological sensitive receptors along main transport route should be considered.	Noted, this will be addressed within Chapter 10 Ecology and Ornithology and Chapter 12 Air Quality.
11.1.1	See Appendix 1 comments. The Study Area is not reported in the SR. The ES should include the Study Area and how it was identified based on the characteristics of the predicted emissions levels and dispersions.	Noted, this will be addressed within Chapter 12 Air Quality.
11.1.2	PEDW disagrees with the list of principal air pollutants. Emissions from the proposed development may also include other pollutants such as ammonia, sulphur dioxide and VOCs. Sensitive habitats including protected sites can be susceptible to increase pollution from air emissions. A full assessment of the predicted pollution levels against the critical loads and critical levels of susceptible habitats and designated sites should be included in the ES.	<p>The suite of pollutants to be considered as part of the air quality assessment is informed by the following:</p> <ul style="list-style-type: none"> In relation to road traffic emissions: the Emissions Factors Toolkit (EFT) published by DEFRA, presently version 11. The EFT presents road traffic emission factors for consideration within air quality assessments, and in relation to local air quality assessment only includes emission factors for oxides of nitrogen (NO_x), particulate matter with an aerodynamic diameter of less than 10µm (PM₁₀) and less than 2.5 (PM_{2.5}). The suite of pollutants for the road traffic emissions assessment has been informed on this basis. In relation to combustion emissions: the Medium Combustion Plant Directive (MCPD). The MCPD provides associated emission limit values (ELV) for associated plant, which includes the proposed Combined Heat and Power (CHP) plant. The proposed CHP will be gas fired and, therefore, the only associated ELV of relevance relates to NO_x. The suite of pollutants for the combustion emissions assessment has been informed on this basis. <p>Notwithstanding, there is an existing biomass plant (regulated under Annex VI of the Industrial Emissions Directive) on the wider Shotton site which will be retained. These wider sources are associated with combustion emissions which include a suite of pollutants with</p>

		associated impacts on Critical Levels and the Critical Loads (i.e. with a nitrifying and acidifying potential). Where there is crossover with the proposed development, those pollutants on the wider site will additionally be modelled. The suite of pollutants to be modelled for cumulative assessment of impacts on Critical Levels and the Critical Loads include NO _x , SO ₂ , HCl and NH ₃ .
Traffic and Transport		
Section 12	The construction route and access to the site should be identified in the ES and construction traffic volumes and frequency should be provided as part of the description of the development.	Noted, this will be addressed within Chapter 13 Traffic and Transport
Cultural Heritage		
Section 13	The Applicant's attention is drawn to Cadw comments at Appendix 1 – PEDW has no further comments.	Noted, this will be addressed within Chapter 16 Other Environmental Issues
Other Environmental Issues		
15.3	A full assessment of the Waste arising from the construction and operation of the proposed development is required as discussed above.	Noted, this will be addressed within Chapter 14 Waste and Materials.
15.5	The Applicant's attention is drawn to HSE comments. It is not possible to scope out major risk at this stage due to the proximity of major pipeline. Additional information is required in the ES.	Noted, this will be addressed within Chapter 16 Other Environmental Issues

Table 5-2 Scoping Responses and Actions

- 5.18 Previous experience of industrial redevelopment and expansion schemes on brownfield sites has led SLR to identify topics for consideration in the EIA. The Scoping Opinion and Scoping Direction confirmed that the following assessments should be included within the ES:
- Chapter 7 - Landscape and Visual Impact;
 - Chapter 8 - Land Quality;
 - Chapter 9 - Hydrology and Flood Risk;
 - Chapter 10 - Ecology and Ornithology;
 - Chapter 11 - Noise and Vibrations;
 - Chapter 12 - Air Quality;
 - Chapter 13 - Traffic and Transport;
 - Chapter 14 – Waste and Resources;
 - Chapter 15 - Socio Economic;
 - Chapter 16 - Other Environmental Issues;
 - Chapter 17 – Cumulative Effects Assessment

5.3 ENVIRONMENTAL STATEMENT

- 5.19 For each topic that is identified as requiring further study, a detailed technical assessment has been carried out in accordance with the scope and methodology agreed with relevant consultees. Each technical assessment is carried out by an appropriately qualified consultant to prevailing technical standards and reported in a dedicated ES.
- 5.20 The technical assessments provide a detailed assessment of potential impacts, identification of mitigation measures and description of the significance of residual effects (those remaining after the mitigation measures have been incorporated). The ES identifies direct and indirect effects, positive (beneficial) and negative (adverse) effects, and seeks to identify, as far as possible, the duration of such effects, whether short term, long term, permanent, temporary, periodic, etc. during the construction and operational phases of the proposed development. The results of each technical assessment is reported in the ES and is accompanied by technical appendices and illustrative material where reasonable.

5.3.1 Approach to Assessment

- 5.21 The assessment methodology is presented in each technical chapter and has followed the relevant technical guidance such as the Guidelines for Landscape and Visual Impact Assessment (GLVIA3).

5.22 In addition, each technical assessment follows the general methodology as per **Table 5-3** below.

Table 5-3 – Technical Assessment Scope

Technical Assessment	Scope
<p>Planning Policy and Legislative Compliance</p>	<p>Relevant legal considerations or standards for the impact assessment, together with national, regional, and local policy and industry guidance that has informed the assessment.</p>
<p>Assessment Methodology and Significance Criteria</p>	<p>The methodology, technical, spatial, and geographic scope (study area) of the assessment, with reference to any published methodological standards, professional guidelines, and best practice that are particular to the topic.</p> <p>The comments raised during scoping/ consultation process and a commentary on how the comments have been addressed within the assessment.</p> <p>How baseline conditions have been assessed (e.g. site visits, surveys, review of publicly available data) and the scale of sensitivity and magnitude adopted within the assessment.</p> <p>How impact significance has been assigned (e.g. whether a matrix or some other approach has been adopted).</p> <p>Any assumptions or limitations.</p>
<p>Baseline Conditions</p>	<p>The baseline conditions section of the technical assessment identifies the key receptors a brief description of those receptors and the sensitivity attributed to each receptor.</p>
<p>Assessment of Effects</p>	<p>The assessment of potential effects/ impacts that are predicted to occur during the construction and operation of the proposed development considers the activities and physical elements of the development that are likely to give rise to particular impacts. It considers and identifies the receptor(s) that are likely to be affected.</p> <p>Any specific design principles or mitigation measures that have already been incorporated into the design of development in order to avoid or minimise the environmental effects (i.e. ‘embedded mitigation’) are described and the significance of the effect (including consideration of any embedded mitigation measures) are detailed.</p> <p>The significance criteria applied to the environmental effects is in accordance with the relevant methodologies. Assigning significance in this way ensures consistency across the technical assessments.</p>
<p>Mitigation and Monitoring</p>	<p>The evolution of the design has been informed by the environmental impacts that will require mitigation and wherever possible enhancement has been integrated into the design. The specific mitigation and enhancement measures included for the proposed scheme in response to potential environmental impact is identified within the individual technical assessments.</p>

	This section includes details of additional (bespoke) mitigation and/or enhancement measures being proposed.
Residual Effects	This section includes details of the residual effect following the implementation of mitigation/ enhancement measures; and the significance of the residual effect and whether it is adverse or beneficial, short, medium or long-term, direct or indirect, permanent or temporary, and reversible or irreversible.

5.3.2 Assessment of Decommissioning Impacts

- 5.23 As detailed within the Scoping Report, the environmental impacts arising from the decommissioning works are likely to be of a similar nature, but smaller in scale and geographical extent to construction impacts.
- 5.24 The scoping direction from PEDW requested that the decommissioning environmental impacts should be addressed within the technical assessments. This has been addressed as far as practicable within the relevant assessments.

5.3.3 Cumulative Effects Assessment

- 4.5.1. In accordance with the EIA Regulations, the EIA includes an assessment of any direct and indirect cumulative effects arising from the proposed development when considered alongside any other developments in the area surrounding the Site. The objective is to identify any combined effects from the proposed development or effects from several developments which, whilst individually the effects may be insignificant, when considered together they could cause a significant direct or indirect effect requiring mitigation.
- 4.5.2. In relation to other development, best practice dictates that cumulative assessments of this nature should have regard to those schemes which are ‘reasonably foreseeable’ (i.e. usually those under construction, with an extant planning permission or are subject of a suitable development plan allocation). The assessment is only capable of being carried out based on the information available at the time of assessment.
- 4.5.3. Each technical assessment also provides an assessment of type 2 cumulative effects (see Chapter 17 Cumulative Effects for further detail). Chapter 17 looks at ‘in combination’ effects on a receptor e.g. where landscape and ecology have a major adverse impact upon the same sensitive receptor.
- 4.5.4. The assessment focuses on effects only where there is the potential for significant cumulative effects and, for this development, an initial review of potential developments requiring review has therefore focused on those developments which due to their proximity or scale are most likely to give rise to cumulative effects. Consideration is also be given to the areas and / or receptors where cumulative effects are most likely.
- 4.5.5. The cumulative assessment therefore includes a review of the potential for effects when the proposed development is considered alongside ‘reasonably foreseeable’ developments located within the vicinity of the Site. The relevant study area for assessing cumulative effects is determined relative to each individual technical discipline.

5.3.4 Non-Technical Summary

- 5.25 As required by the EIA Regulations a Non-Technical Summary (NTS) has been produced.
- 5.26 The NTS is an important document as it provides a concise summary and account of the ES and explains the findings of the technical assessment in non-technical language.

5.4 SUMMARY

- 5.27 This chapter of the ES has identified and described the EIA process and how the approach taken within the technical assessment complies with the relevant legislation that governs the requirements of EIA.
- 5.28 Consultation with stakeholders has been undertaken through the scoping process and this has informed the scope of the ES. This chapter identifies where the consultee comments have been addressed and where it has not been possible to address consultee comments, a narrative has been supplied.

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6.1 INTRODUCTION

- 6.1 This chapter of the Environmental Statement (ES) outlines the policy and guidance that is relevant to the proposed development. The technical assessments detail the policy and guidance that is relevant to their technical disciplines.
- 6.2 This chapter identifies the general planning policy and guidance relevant to the proposed development. Consideration of how the proposed development complies with planning policy and guidance is undertaken in the Planning Statements that accompany the planning applications.

6.2 THE DEVELOPMENT PLAN

- 6.3 General conformity with the Development Plan is the primary mechanism for determining the appropriateness of proposals within planning applications. The starting point in assessing the appropriateness of the development proposals is Section 38 (6) of the 2004 Planning Act which states:

“If regard is to be had to the development plan for the purpose of any determination to be made under the Planning Acts the determination must be made in accordance with the plan unless material considerations indicate otherwise”.

- 6.4 The Development Plan is defined by Section 38(3) of the Planning and Compulsory Purchase Act 2004 (in Wales) as:
- “the National Development Framework for Wales;*
 - the strategic development plan for any strategic planning area that includes all or part of that area, and*
 - the local development plan for that area.”*

The Development Plan for the application comprises the following:

- Future Wales – The National Plan 2040 – National Development Framework (2021).
- Flintshire County Council Unitary Development Plan 2000-2015 – Written Statement (2011).
- Flintshire County Council Unitary Development Plan 2000-2015 – Proposals Map (2011).

- 6.5 The emerging Flintshire Local Development Plan has been submitted for examination and consequently weight, having regard to the nature of any outstanding objections, can therefore be afforded to the policies contained within the emerging Plan.

6.3 NATIONAL PLANNING POLICY

- 6.6 Welsh National Planning Policy is made up of Future Wales – The National Plan 2040, Planning Policy Wales (PPW), Technical Advice Notes (TANs), and circulars and policy clarifications letters.

6.3.1 Future Wales – The National Plan 2040

- 6.7 Future Wales – The National Plan 2040 (FWNP) was published in February 2021 and sets out the national development framework for the direction of development in Wales to 2040. It forms part of the statutory development plan meaning it will play a significant role in planning decision making and will form the foundation for regional and local planning in the future.
- 6.8 FWNP sets out a strategy for addressing key national priorities through the planning system, including sustaining and developing a vibrant economy, achieving decarbonisation and climate-resilience, developing strong ecosystems and improving the health and well-being of our communities. The Plan links back to the Well-being of Future Generations (Wales) Act 2015 and recognises the obligations as a result of that Act.
- 6.9 Policies relevant to the proposed development are listed below:

Policy 1 – Where Wales will grow

- 6.10 FWNP Policy 1 supports sustainable growth within Wales. It identifies three National Growth Areas where there will be growth in employment and housing opportunities and investment in infrastructure. Significantly, Wrexham and Deeside is one of the National Growth Areas alongside Cardiff, Newport and the Valleys, and Swansea Bay and Llanelli. They are considered to be internationally and nationally significant places and FWNP promotes their continued growth and regeneration, and they are identified as the focus for large scale employment opportunities and housing growth.

Policy 2 – Shaping Urban Growth and Regeneration – Strategic Placemaking

- 6.11 FWNP Policy 2 advises that the growth and regeneration of towns and cities should positively contribute towards building sustainable places that support active and healthy lives, with urban neighbourhoods that are compact and walkable, organised around mixed-use centres and public transport, and integrated with green infrastructure.

Policy 3 – Supporting Urban Growth and Regeneration – Public Sector Leadership

- 6.12 FWNP Policy 3 advises that The Welsh Government will play an active, enabling role to support the delivery of urban growth and regeneration. It highlights that *“a strengthened public sector role in assembling land and enabling development is essential to realise our growth and regeneration aspirations”*.

Policy 8 – Flooding

- 6.13 FWNP Policy 8 advises that flood risk management that enables and supports sustainable strategic growth and regeneration in National and Regional Growth Areas will be supported. It goes on to highlight that projects should not have adverse impacts on international and national statutory designated sites for nature conservation and the features for which they have been designated.

Policy 9 – Resilient Ecological Networks and Green Infrastructure

- 6.14 FWNP Policy 9 aims to ensure the enhancement of biodiversity, the resilience of ecosystems and the provision of green infrastructure. PPW sets out a range of policies to maintain and enhance biodiversity, promote the resilience of ecosystems, including the stepwise approach, and to maximise the provision of green infrastructure. The strategic focus of Future Wales on urban growth requires an increased emphasis on biodiversity enhancement (net benefit) in order to ensure that growth is sustainable.

Policy 11 – National Connectivity

- 6.15 The aim of FWNP Policy 11 is to encourage longer distance trips to be made by public transport, while also making longer journeys possible by electric vehicles.

Policy 12 – Regional Connectivity

- 6.16 FWNP Policy 12 advises that active travel must be an essential and integral component of all new developments. It goes on to advise that planning authorities must integrate site allocations, new development and infrastructure with active travel networks and, where appropriate, ensure new development contributes towards their expansion and improvement. LPAs must act to reduce levels of car parking in urban areas, including supporting car free developments in accessible locations and developments with car parking spaces that allow them to be converted to other uses over time. Where car parking is provided for new non-residential development, planning authorities should seek a minimum of 10% of car parking spaces to have electric vehicle charging points.

Policy 16 – Heat Networks

- 6.17 FWNP Policy 16 advises that large-scale mixed-use development should, where feasible, have a heat network with a renewable / low carbon or waste heat energy source. It emphasises that the design of new development should maximise the opportunities to accommodate a heat network.

Policy 17 – Renewable and Low Carbon Energy and Associated Infrastructure

- 6.18 FWNP Policy 17 highlights that the Welsh Government strongly supports the principle of developing renewable and low carbon energy from all technologies and at all scales to meet future energy needs. Policy 17 recognises the wealth of current and emerging renewable energy technologies that can contribute towards energy and decarbonisation targets. It also demonstrates Welsh Government's support in principle for all renewable energy projects and technologies. It emphasises that proposals should ensure there is no significant unacceptable detrimental impact

on the surrounding natural environment and local communities and that the development delivers positive social, environmental, cultural and economic benefits.

Policy 18 – Renewable and Low Carbon Energy Developments of National Significance

6.19 FWNP Policy 18 advises that proposals for renewable and low carbon energy projects qualifying as Developments of National Significance will be permitted subject to policy 17. In addition, policy 18 contains strategic spatial and detailed criteria-based policies that should be considered together in the determination of applications.

Policy 19 – Strategic Policies for Regional Planning

6.20 FWNP Policy 19 sets out the strategic policy context for regional planning and requires the delivery of Strategic Development Plans to come forward. These are expected to establish a clear strategic policy framework and provide direction for decision makers. FWNP’s policies provide a regional framework in the absence of Strategic Development Plans. FWNP is clear that “the Welsh Government will ensure decisions taken by the planning system support the delivery of these policies” and that “the development management process will need to demonstrate how Future Wales’ regional policies have been taken into account and demonstrate how they conform with Future Wales and Planning Policy Wales”.

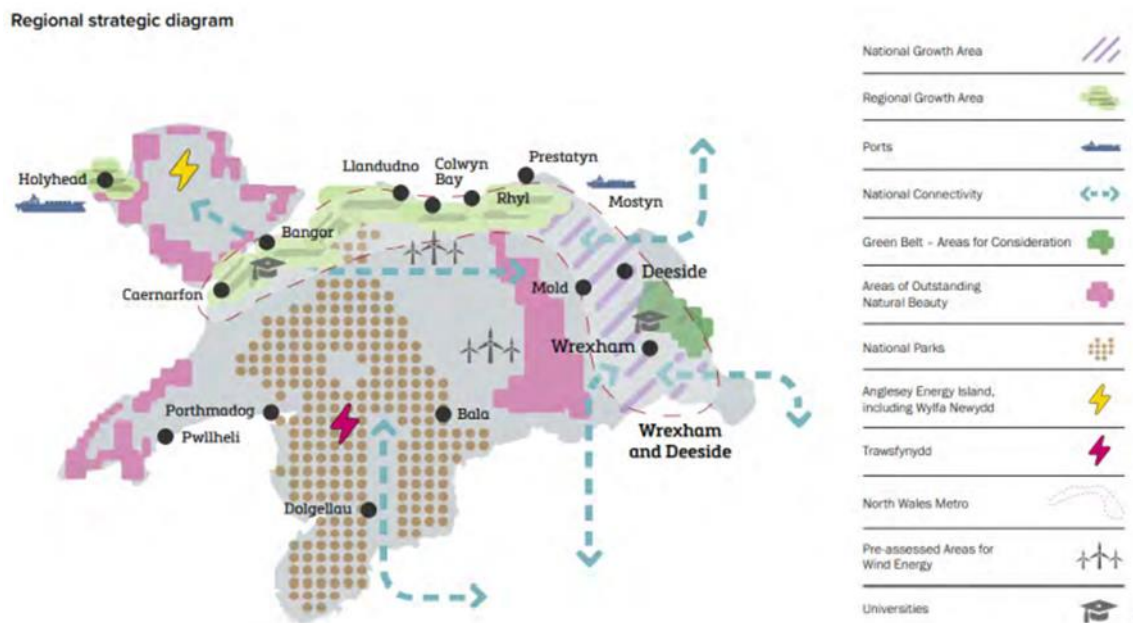


Figure 6.1 - Future Wales: Regional Strategic Diagram – the north

Policy 20 – National Growth Area – Wrexham and Deeside

- 6.21 FWNP Policy 20 reiterates that Welsh Government supports Wrexham and Deeside as the primary focus for regional growth and investment. The National Growth Area includes: Wrexham, Wrexham Industrial Estate, Broughton, Buckley, Deeside, and the Deeside Industrial Park. The role of Wrexham and Deeside within the north region and wider cross border areas of Cheshire West and Chester, and Liverpool City Region should be understood, and ensure that the areas operate as a whole and do not compete against each other.
- 6.22 The location should be the focus for strategic housing, economic growth, essential services and facilities, advanced manufacturing, and transport infrastructure. It is stated that Welsh Government will work to ensure key investment decisions support Wrexham and Deeside and the wider region and to promote and enhance the strategic role of Wrexham and Deeside. FWNP states that the Strategic Development Plan should seek to maximise opportunities arising from investment in high value manufacturing sectors.

Policy 24 – North West Wales and Energy.

- 6.23 FWNP Policy 24 advises that Welsh Government supports north west Wales as a location for new energy development and investment. It states that *“New energy related development in the region should support local and regional communities; provide jobs and investment in training and skills; and work with universities and businesses across the region and the north west of England to coordinate and maximise new investment to support the wider region”*.

6.3.2 Planning Policy Wales

- 6.24 PPW (Edition 11, February 2021) is the most recent version of PPW which was published in February 2021 to align with FWNP. It sets out the land use planning policies of the Welsh Government. It is supplemented by a series of TANs, Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales.
- 6.25 The document is separated into subject areas and chapters. The following subject areas and chapters considered to be relevant to the proposed development are:
- d) People and Places: Achieving Well-being Through Place Making;
 - e) Good Design Making Better Places;
 - f) Sustainable Management of Natural Resources;
 - g) Accessibility;
 - h) Brownfield Land;
 - i) Environmental Sustainability;
 - j) Moving within and between places: Transport;

k) Productive and Enterprising Places: Economic Development; and

l) Distinctive and Natural Places.

6.26 PPW states *“The primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales, as required by the Planning (Wales) Act 2015, the Well-being of Future Generations (Wales) Act 2015 and other key legislation and resultant duties such as the Socio-economic Duty. A well-functioning planning system is fundamental for sustainable development and achieving sustainable places”*.

6.27 Paragraph 1.18 states that *“legislation secures a presumption in favour of sustainable development in accordance with the development plan unless material considerations indicate otherwise to ensure that the social, economic, cultural, and environmental issues are balanced and integrated”*. Paragraph 1.19 outlines that *“the planning system should be efficient, effective and simple in operation”*.

6.28 In relation to decision making, Paragraph 1.20 of the PPW states that *“the planning authority must clearly state the reasons for the decision. Those proposing development also have a responsibility to provide sufficient information to enable the decision maker to make an informed judgement on whether the proposed development is sustainable (i.e. contributes to social, economic, environmental and cultural well-being)”*.

6.29 In determining applications, paragraph 1.22 requires that *“planning applications must be determined in accordance with the adopted plan, unless material considerations indicate otherwise”*.

6.30 PPW Figure 4: Key Planning Principles relates to achieving the right development in the right place and growing the economy in a sustainable manner. It goes on to say that the planning system should enable development which contributes to long term economic well-being.

6.31 Paragraph 2.27 goes on to say that planning authorities should ensure that social, economic, environmental and cultural benefits are considered in the decision-making process and assessed in accordance with the five ways of working to ensure a balanced assessment is carried out to implement the Well-being of Future Generations Act and the Sustainable Development Principle. It should be noted that, PPW states that *“there may be occasions when one benefit of a development proposal or site allocation outweighs others”*.

6.32 Paragraph 4.1.11 states that *“development proposals must seek to maximize accessibility by walking, cycling and public transport. By prioritising the provision of appropriate on site infrastructure and, where necessary mitigating transport impacts through the provision of off-site measures”*.

6.33 Section 5.4 Economic Development of PPW is directly relevant to the proposed development and states the following:

“For planning purposes the Welsh Government defines economic development as the development of land and buildings for activities that generate sustainable long term prosperity, jobs and incomes.

The planning system should ensure that the growth of output and employment in Wales as a whole is not constrained by a shortage of land for economic uses.

Economic land uses include the traditional employment land uses (offices, research and development, industry and warehousing), as well as uses such as retail, tourism, and public services. Economic land uses also include construction, energy, minerals, waste and telecommunications sectors which are also sensitive to planning policy. The Welsh Government seeks to maximise opportunities to strengthen the foundational economy, particularly the food, retail, tourism and care sectors which play such a prominent role throughout Wales; the planning system should be supportive of this aim. Similarly, growth in innovative, emerging technology and high value added sectors such as advanced engineering, renewable and low carbon energy, digital and bio-technology sectors are also strongly supported”.

- 6.34 PPW contains significant support for energy generation as part of Welsh Government’s approach to decarbonisation, whilst enhancing the economic, social, environmental and cultural well-being of the people and communities of Wales, in order to achieve a better quality of life for our own and future generations.
- 6.35 Paragraph 5.9.12 also states the following:
- 6.36 *“Planning authorities should plan positively for the use of locally generated electricity and heat to help meet the national target of one Gigawatt by 2030. They should develop policies and proposals which:*
- m) facilitate the co-location of major developments to enable the use of local heat opportunities;
 - n) facilitate the linking of renewable and low carbon energy with major new development and high energy users;
 - o) maximise the use of waste heat or other heat sources such as former mine workings; and
 - p) promote heat networks”.
- 6.37 PPW considers the impact of both statutory and non-statutory designations in relation to biodiversity and ecology. Paragraph 6.4.14 states *“statutory designation of a sites does not necessarily prohibit development, but proposals must be carefully assessed to ensure that the effect on those nature conservation interests which the designation is intended to protect are clearly understood; development should be refused where there are impacts on the features for which a site has been designated.”*
- 6.38 Section 6.6 considers impact on water resources, including water quality and flood risk. Paragraph 6.6.8 is clear that new development should *“minimise adverse impacts on water resources, including the ecology of rivers, wetlands and groundwater and thereby contributing towards ecological resilience”*. Paragraph 6.6.25 states that *“Development should reduce and must not increase, flood risk arising from river and /or coastal flooding on and off the development site itself.”*

6.3.3 Technical Advice Notes

TAN 21: Waste

- 6.39 This guidance note, published 2017, provides advice on how the land use planning system should contribute towards sustainable waste management and resource efficiency, reflecting the waste management drivers at a European Union and Wales level. The Welsh Government's overarching waste strategy for Wales, 'Towards Zero Waste - One Wales: One Planet', sets out a long term framework for resource efficiency and waste management in Wales up until 2050, taking into account social, economic and environmental outcomes. Achieving the aims in Towards Zero Waste relies on a suite of waste sector plans. These provide details on how the outcomes, targets and policies in Towards Zero Waste are to be implemented.
- 6.40 TAN 21: Waste outlines the need to develop a sustainable network of facilities for waste treatment, with particular emphasis on the need to provide facilities for re-using and recycling waste.
- 6.41 TAN 21 refers to Sustainable Waste Management and states the following: *"Sustainable development is a key functioning principle of the Welsh Government and its policies. The movement towards sustainability in relation to planning for waste should be guided first by the wider principles of sustainability contained in Planning Policy Wales, however, with specific reference to waste management land use planning should help to:*
- q) drive the management of waste up the waste hierarchy and facilitate the provision of an adequate network of appropriate facilities;
 - r) minimise the impact of waste management on the environment (natural and man-made) and human health through the appropriate location and type of facilities;
 - s) recognise and support the economic and social benefits that can be realised from the management of waste as a resource within Wales".

TAN 23: Economic development

- 6.42 TAN 23, published in 2014, states;
- "1.2.1 The economic benefits associated with development may be geographically spread out far beyond the area where the development is located. As a consequence, it is essential that the planning system recognises, and gives due weight to, the economic benefits associated with new development".*
- 6.43 In section 2: Weighing economic benefit, it states:
- "2.1.1. It should not be assumed that economic objectives are necessarily in conflict with social and environmental objectives. Often these different dimensions point in the same direction. Planning should positively and imaginatively seek such 'win-win' outcomes, where development contributes to all dimensions of sustainability".*

- 6.44 Other relevant Technical Advice Notes that are referenced as appropriate in the respective technical chapters include:
- t) Technical Advice Note 5 – Nature Conservation and Planning
 - u) Technical Advice Note 11 – Noise
 - v) Technical Advice Note 12 – Design
 - w) Technical Advice Note 15 – Development and Flood Risk
 - x) Technical Advice Note 18 – Transport.

Building Better Places (2020)

- 6.45 In July 2020 WG published its policy position on how the planning system can assist in the COVID-19 recovery period. ‘Building Better Places’ is intended to sit alongside PPW11 and is a key consideration in both plan preparation and development management. ‘Building Better Places’ expands on the letter issued to Chief Planning Officers from Julie James (Minister for Housing and Local Government) in July 2020 which acknowledges that the economic consequences of the COVID-19 pandemic are predicted to be severe and felt across all sectors, including those in construction and the built environment.
- 6.46 ‘Building Better Places’ emphasises both the primacy of the plan led system in Wales but also the need to have places and place-making at the heart of the recovery process. The policy agenda seeking to deliver better places and placemaking develops the principles already enshrined in PPW11. The pandemic has highlighted the importance of the need for good quality places for people to live, work and relax.
- 6.47 ‘Building Better Places’ seeks to ensure that the economic hardship owing to the pandemic does not outweigh the above principles and policies. It is clear that an immediate supply of development land is essential if we are to build the better places envisaged by Welsh Government and lead the recovery that is desperately required. New development delivering positive social and economic outcomes as well as addressing climate change concerns needs to be happening on the ground in the short term and cannot simply await the completion of the Flintshire local development plan (LDP) review process in five years’ time.
- 6.48 Welsh Government has recognised this issue and in respect of development management, ‘Building Better Places’ states *“PPW and the NDF can be used directly in the decision making process. The WG will support decisions taken in this context, particularly in the short-term until an LDP is adopted”*. This is a very important concession and allows for new development in the short term that truly embrace the principles and policies of delivering better places and placemaking.
- 6.49 The guidance includes a Welsh Government commitment to follow through on infrastructure obligations which will go a long way in ensuring that the developments envisioned are delivered and the wider public benefits are maximised.

- 6.50 It also emphasises that development management decisions should focus on creating healthy, thriving active places with a focus on a positive, sustainable future for Welsh communities. The planning system has an important role in supporting healthier lifestyles and reducing inequalities.

6.4 LOCAL PLANNING POLICY

- 6.51 In the course of pre-application discussions, the Flintshire County Council advised that they are expecting the Inspector's Report on the deposit LDP in October 2021 with the potential adoption by June 2022. Relevant policies within both the LDP and Flintshire Unitary Development Plan (FUDP) are listed below.

6.4.1 Flintshire Unitary Development Plan

- 6.52 The FUDP, adopted September 2011, is the adopted development plan for the 15 year period 2000 – 2015. The aim of the FUDP is to provide a framework for making rational and consistent decisions on planning applications and to guide development to appropriate locations in Flintshire.
- 6.53 The FUDP identifies sites where new housing, employment and other development can take place, as well as setting out policies to protect important countryside, habitats, resources and heritage. Although the adopted FUDP became time expired at the end of 2015 it remains the adopted development plan for the County. Regard will need to be had to ensuring that the Plan is compliant with up to date Welsh Government guidance in Planning Policy Wales, Technical Advice Notes and any other relevant guidance.
- 6.54 The policies of most relevance to the proposed development are set out below. Although the adopted FUDP became time expired at the end of 2015 it remains the adopted development plan for Flintshire County Council until such time that the emerging LDP is adopted.
- 6.55 The Proposals Map from the adopted FUDP indicates the following for the Site:

EM1 General Employment Land Allocations

The following sites, as defined on the proposals map, are allocated for B1, B2 and B8 employment uses, unless otherwise stated provided that the proposal:

- i. is of an appropriate type and scale for both the site and its surroundings;*
- ii. will not unacceptably harm residential or other amenity or restrict neighbouring land uses;*
- iii. provides satisfactory on-site parking, servicing and manoeuvring space and that the highway network (including access and egress) is adequate to safely cater for the type and volume of traffic generated by the proposal; and,*
- iv. has no significant adverse impact on the integrity of nature conservation sites, the landscape and historic features.*

- 6.56 Allocation EM1(10) Land to North of Shotton Paper is the proposed Expansion Land, also known as the A4 land.

EM3 - Development Zones and Principal Employment Areas

Within development zones and principal employment areas, as defined on the proposals map, the following types of employment development will be permitted:

- i. B1 business use;*
 - ii. B2 general industry;*
 - iii. B8 storage and distribution.*
- Provided that:*
- iv. the site is not allocated for a specific employment use by virtue of policy EM1 or EM2;*
 - v. the proposal is of an appropriate type and scale for both the site and its surroundings;*
 - vi. the proposal will not have a significant adverse impact on residential or other amenity or unacceptably restrict neighbouring land uses;*
 - vii. the proposal provides satisfactory on site parking, servicing and manoeuvring space and that the highway network (including access and egress) is adequate to safely cater for the type and volume of traffic generated by the proposal; and*
 - viii. the proposal has no significant adverse impact on the integrity of nature conservation sites, the landscape and historic features.*

- 6.57 The Site is allocated for employment development by virtue of EM1.10 and EM1.11 and is allocated for B1, B2 and B8 employment development. The Site is also within the Deeside Development Zone in policy EM3, which again permits employment development. The proposals are for B1, B2 and B8 employment uses. The existing use of the site is mainly industrial and surrounding uses are of a similar nature. The development is therefore considered to be appropriate for the area and is of an appropriate type and scale for the site and surroundings.

Written Statement

- 6.58 The written statement of the FUDP contains a number of strategic, general and topic specific policies of relevance to the proposed development as outlined below. The strategic policies within the Plan are the key guiding policies on major issues or topic areas and provide a strategic policy framework for the more detailed policies in Part II of the Plan.
- 6.59 The relevant FUDP strategic policies are as follows:

STR1: New Development

Policy STR1 list 7 criteria that new development must comply with. The criteria relates to factors such as design, the natural environment, maximising the efficient use of resources and pollution. Of particular relevance is Criteria 1 which advises that development should be generally located within existing settlement boundaries, allocations, development zones, principal employment areas and suitable brownfield sites and will only be permitted outside

TR2 Transport and Communications

Policy STR2 encourages development that promotes a safe, efficient and integrated transport and communications system and improves accessibility throughout the County. It states that new development will be expected to incorporate means of travelling other than the private car.

STR3: Employment

Policy STR2 encourages a range of employment uses through the provision of 300 ha of employment land over the Plan period. It advises that employment should be generated mainly within or adjoining existing settlements, in principal employment areas, development zones, on allocated sites and suitable brownfield sites and through the sensitive conversion of rural buildings and other appropriate rural diversification initiatives. It also places an emphasis on retaining existing buildings and expanding existing firms and business.

STR7: Natural Environment

Policy STR7 aims to safeguard the natural environment of Flintshire. It advises that development must:

- protect the open character and appearance of strategic green barriers around and between settlements;
- protect and enhance the character, appearance and features of the open countryside and the undeveloped coast;
- protect and enhance areas, features and corridors of nature conservation, biodiversity and landscape quality both in urban and rural areas, including urban greenspace;
- protect and enhance the Dee Estuary;
- protect and enhance the water environment; and
- protect of the quality of land, soil and air.

GEN1: General Requirements for Development

This policy's ultimate aim is to ensure the development of sustainable communities, by ensuring that proposals for development are submitted with the highest standards of quality and design possible, are carried out in a responsible and appropriate manner, and have the minimum adverse impacts on the physical, social and economic environment around them.

GEN5: Environmental Assessment

Policy GEN5 stresses that development proposals that are likely to have a significant impact on the environment and do not require formal assessment under other legislation must be accompanied by suitable supporting environmental impact information.

D3: Landscaping

Policy D3 states that “new development will be required, where appropriate, to include a hard and soft landscaping scheme”.

TWH1: Development Affecting Trees and Woodlands

Policy TWH1 is intended, where appropriate, to protect trees and woodlands which are attractive features making a significant contribution to the diversity of the landscape and wildlife and to the quality of the people who live and work in the area.

The policy protects important trees, groups of trees and woodlands situated on development sites which are often at greater risk of being damaged or destroyed than trees elsewhere. In addition, the policy aims to ensure that retained trees are not compromised in the long term as a result of poor development layout and design around them.

WB1: Species Protection

Policy WB1 advises that development which would have a significant adverse effect on important species or their habitats will not be permitted unless appropriate measures are taken to secure their long term protection and viability.

WB2: Sites of International Importance

Policy WB2 states that “*development will not be permitted unless:- it is demonstrated that it will not have a significant adverse effect on any Ramsar Site or Natura 2000 site (including SPAs, potential SPAs, SACs, candidate SACs); or*

it is demonstrated, following appropriate assessment, that it will not adversely affect the integrity of any Ramsar or Natura 2000 site”.

WB5: Undesignated Wildlife Habitats

Policy WB5 states that “*development will be permitted only if it will not have a significant adverse effect on wildlife and habitats of local importance.*”

WB6: Enhancement of Nature Conservation Interests

Policy WB6 encourages the incorporation within development proposals of measures which improve the nature conservation value of an area.

L1: Landscape Character

Policy L1 advises that new development must be designed to maintain or enhance the character and appearance of the landscape. The policy seeks to ensure that the particular character and features of each landscape will be protected from development or to ensure that those identified character features are protected or retained within new development.

AC3 Cycling Provision

Policy AC3 highlights that adequate provision for cyclists in new development should be provided.

AC13: Access and Traffic Impact

Policy AC13 states that *“Development proposals will be permitted only if:*

- approach roads to the site are of an adequate standard to accommodate the traffic likely to be generated by the development without compromising public safety, health and amenity; and*
- safe vehicular access can be provided by the developer both to and from the main highway network”.*

6.4.2 Draft Flintshire Local Development Plan 2015 – 2030

- 6.60 The draft LDP will supersede the FUDP once adopted and form the basis for decisions on land use planning for the County of Flintshire. The LDP is expected to be adopted in Spring 2022. The Council has prepared its LDP in accordance with national planning policy and guidance. The LDP provides a clear land use planning framework to address issues and opportunities facing Flintshire, aiming to provide certainty for its communities and a sound and consistent basis for making planning decisions.
- 6.61 Relevant LDP strategic policies are listed below, and are supported by detailed development management policies:
- y) STR1: Strategic Growth
 - z) STR2: The Location of Development
 - aa) STR4: Principles of Sustainable Development, Design and Placemaking
 - bb) STR5: Transport and Accessibility
 - cc) STR7: Economic Development, Enterprise and Employment
 - dd) STR8: Employment Land Provision
 - ee) STR13: Natural and Built Environment, Green Networks and Infrastructure

ff) STR14: Climate Change and Environmental Protection

gg) STR15: Waste Management.

6.4.3 Other Local Policy

Deeside Plan (2015-2020)

- 6.62 The Deeside Plan sets out a vision for the growth of Deeside for 2015-2020 and beyond. It identifies the key strengths and weaknesses of Deeside and core areas of improvement: Economic, transport, housing, skills and employment, as well as environment. Objective 1 of the plan relates to Economic Growth, and seeks to raise competitiveness and productivity, support large – scale investment opportunities through flexible policy frameworks and targeted delivery and investment plans, reinforce the areas role as a major economic driver of the northern powerhouse, attract investment.
- 6.63 Planning is seen as key to delivering the objectives of the Deeside Plan and emphasises the need for growth and development to take place whilst the LDP is progressed to adoption. The objective is to gain momentum in delivering growth.

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7.1 INTRODUCTION

- 7.1 This chapter of the Environmental Statement (ES) considers the potential effects of the proposed redevelopment and expansion of paper manufacturing and development of combined heat and power at Shotton Paper Mill on landscape and visual receptors. The proposals are referred to as the proposed development within the remainder of this chapter.
- 7.2 The chapter is supported by the following technical appendices:
- 7.1: Methodology;
 - 7.2: Assessment of Potential Landscape Effects;
 - 7.3: Assessment of Potential Visual Effects; and
 - 7.4: Tree Survey.
- 7.3 Landscape, is defined in the European Landscape Convention, as:
- “An area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors”, (Council of Europe, 2000).*
- 7.4 Landscape does not apply only to special or designated places, nor is it limited to countryside.
- 7.5 Visual effects are the effects of change and development on the views available to people and their visual amenity. Visual receptors are the people whose views may be affected by the proposed development.
- 7.6 The Site lies within the Deeside Industrial Park, within the existing Shotton paper manufacturing facility and the adjoining vacant brown field land. A full description of the Site setting can be found in **Chapter 2: Site Setting and Description**.

7.2 APPROACH AND METHODOLOGY

- 7.1 This assessment has been carried out by an experienced Chartered Landscape Architect in accordance with the Guidelines for Landscape and Visual Impact Assessment (GLVIA3)¹. The detailed methodology used in the assessment is contained within **Technical Appendix 7.1** of this chapter. The assessment of landscape and visual effects are addressed in **Technical Appendices 7.2 and 7.3** respectively. The assessment is based upon a desk top study of relevant plans, guidance and character assessments, as well as a thorough Site visit.

¹ Guidelines for Landscape and Visual Impact Assessment - 3rd Edition: The Landscape Institute and Institute of Environmental Management and Assessment (April 2013)

7.2.1 Consultation

- 7.2 A record of consultation undertaken prior to the assessment can be found in **Chapter 5: Consultation and EIA Methodology**. In addition, on commencement of the assessment, consultation was undertaken with Flintshire County Council (FCC) on 1 December 2021 and 31 January 2022 to agree the extent of the Study Area and location on viewpoints to be assessed.

7.2.2 Data sources and guidance

- 7.3 The following data sources have been used for the desk-based research associated with the production of the LVIA:

- Publicly available aerial imagery (Google Earth Pro and Bing);
- Ordnance Survey (OS) mapping at 1:25,000 scale;
- Published landscape character assessments;
- LANDMAP maps and surveys; and
- Environment Agency National LIDAR Programme and Natural Resource Wales Composite Digital Elevation Data at 1m spatial resolution.

- 7.4 The assessment has been undertaken in accordance with the following current best practice for landscape and visual assessment:

- Guidelines for Landscape and Visual Impact Assessment, Third Edition, IEMA/LI 2012;
- GLVIA3 Statement of Clarification 1/13, Landscape Institute, 2013;
- An Approach to Landscape Character Assessment, Natural England, 2014;
- Using LANDMAP in Landscape and Visual Impact Assessments GN46, Natural Resource Wales, 2013;
- Visual Representation of Development Proposals, Technical Guidance Note (TGN) 06/19, Landscape Institute, 2019; and
- Assessing landscape value outside national designations, Technical Guidance Note (TGN) 02/21, Landscape Institute, 2021.

7.2.3 Study Area

- 7.5 GLVIA3 recommends that the Study Area should cover the geographical area from which the proposed development would potentially be visible. The Study Area should also be proportionate to the proposed development itself and may include refinement by professional judgement, being mindful that the purpose of the Landscape and Visual Impact Assessment (LVIA) is to identify the potential for significant landscape and visual effects.

- 7.6 In the case of the proposed development, the Study Area of the assessment was defined by a combination of three separate Zones of Theoretical Visibility (ZTVs) for development within the Main Site, A4 land and Combined Heat and Power (CHP) Site, professional judgement and field

survey verification. The combination of these factors has resulted in a Study Area 5 km from the Site boundary being agreed with FCC on 31 January 2022 (see **Figure 7.1 Topography and Lidar Extents**). The ZTVs are presented in **Figures 7.2 to 7.4**.

7.2.4 Approach and methods

- 7.7 The site visits were undertaken on 9 December 2021 and 14 January 2022 to validate the Study Area's landscape character; record the key landscape and visual characteristics of the Site; and record the view (or absence of a view) from the agreed representative viewpoints in accordance with TGN 06/19.
- 7.8 The site visit was conducted when general climatic conditions were dry and mild, and visibility was good. The deciduous vegetation was not in leaf and as such views are considered to represent a 'worst case' scenario. Due to the project programme, it has not been possible to record visibility or visual effects over multiple seasons or during a wide range of light and weather conditions.
- 7.9 The objectives of the LVIA are as follows:
- to identify, evaluate and describe the current landscape character of the Site and its surroundings and also any notable individual landscape elements and features within the Site;
 - to determine the sensitivity of the landscape to the type of development proposed;
 - to identify potential visual receptors (i.e. people who would be able to see the development) and evaluate their sensitivity to the type of changes proposed; and
 - to identify and describe any changes to landscape receptors and visual amenity that might arise from the development, to evaluate the magnitude of such change, and to evaluate the overall scale of effects.
- 7.10 Due to the scale and mass of the proposed development; its buildings and the height of the CHP stacks, there is no feasible landscape mitigation which could reduce the magnitude of landscape and visual effects at opening for the majority of receptors. The landscape character at a site level will always remain characterised by its fundamental role as an industrial facility. Therefore, following the implementation of the Landscape Masterplan (refer to **Figure 7.23**), anticipated future landscape and visual effects would remain unchanged from Operation (Year 0), and as such no additional or secondary mitigation measures have been proposed. An Assessment of Landscape Effects (15 years after Operation commences opening) has not been assessed separately.
- 7.11 The detailed methodology is set out in **Technical Appendix 7.1**.

7.2.5 Planning Context

- 7.12 The planning policy context has been set out in **Chapter 6: Policy and Guidance**. Planning policy relating to the landscape and visual implications of proposed development can be found in the following documents:

- Planning Policy Wales (edition 11, February 2021);
- Flintshire Unitary Development Plan (September 2011) and
- The Cheshire West and Chester Local Plan (July 2013).

7.2.6 Assessing Significance

- 7.13 The relationship between the sensitivity of receptors and the magnitude of change allows the relative significance of predicted effects to be defined. **Figures 7.4 and 7.6 of Technical Appendix 7.1** are illustrative aids to describe this relationship and demonstrate the relative level of significance of any predicted landscape / visual effects to be categorised.
- 7.14 For the purposes of this LVIA effects of moderate or major significance are significant (in accordance with para 3.34 GLVIA3).

7.2.7 Residual Effects

- 7.1 As no additional mitigation measures beyond primary measures integrated into the development proposals are feasible, the residual effects associated with the proposed development are reported within the assessment at Operation (Year 0) Operation.

7.2.8 Cumulative Effects Assessment

- 7.2 Chapter 17: Cumulative Effects identified the projects considered for potential cumulative effects with the proposed development.

7.3 BASELINE LANDSCAPE CONDITIONS

7.3.1 National Character Areas

- 7.3 National level landscape character areas provide a useful overview and context to more detailed local authority studies are illustrated on Figure 7.7, the Study Area for the LVIA crosses the England/Wales border and as such National Landscape Character Area Wales (NLCA) and National Character Areas (NCAs) are relevant.
- 7.4 The majority of the Study Area falls (approximately two-thirds) within NLCA 13: Deeside and Wrexham with the remainder being located within NCA 59: Wirral.
- 7.5 Given the large scale of the NLCA and NCA and the relatively small area the proposed development occupies within a context of existing large scale industrial development and infrastructure, it is considered that there is no potential for significant effects on their landscape character and therefore the NLCA and NCA are not assessed within the LVIA.

7.3.2 Local Landscape Character

- 7.6 **Figure 7.8** illustrates the regional level landscape character assessment relevant to the Study Area based on the Landscape Visual and Sensory class 3 areas sourced from LANDMAP and Landscape Character Area (LCAs) sourced from the Cheshire West and Chester Landscape Strategy, 2016.

LANDMAP Visual and Sensory Aspect Area

- 7.7 The data from the ‘Visual and Sensory’ LANDMAP aspect (Class 3 aspect) has been filtered in accordance with *Using LANDMAP in Landscape and Visual Impact Assessments GN46*². These Class 3 aspects have been grouped together, based on their values, along with consideration of the geological landscape, landscape habitats, visual and sensory receptors, the historic landscape as well as cultural services to form the LCAs listed below.

Urban LCA

- 7.7 The Site is located within the Urban landscape character area of the Visual and Sensory Class 3 LANDMAP definition, within the UID code FLNTVS021. This is referred to as a Garden City coastal and estuary urban area. Key features of area include an *“extensive, often linear and interconnected urban area along the edge of the coast & estuary, with larger towns, sprawling suburban edges and large scale heavy industry including docks”*.
- 7.8 Its scenic value is designated by LANDMAP as being Low, with an overall evaluation of visual and sensory value of Low.

Flat Open Lowland Farmland LCA

- 7.9 North of the Site, and directly adjacent to its northern boundary, is the Flat Open Lowland Farmland LANDMAP landscape character area which includes the following relevant descriptions:
- *“An open strip of coastal and estuary levels with diverse mixture of urban fringe uses drained by ditches with wetland. The area includes a reservoir used for recreation, a rifle range, tidal marshland and reclaimed pasture. There is no settlement and limited access. The area has the feeling of a raw, slightly threatening landscape and is open and exposed. Rectilinear fertile arable & pastoral farmland.*
 - *The area is spoilt slightly by minor intrusive development. The urban fringe and wetland uses are distinctive but are modified by man to excess.*

² Using LANDMAP in Landscape and Visual Impact Assessments GN46, Natural Resources Wales (2021)

- *The area is generally of consistent character and is productive although it is spoilt slightly by minor intrusive development.*
- *An extensive, often linear and interconnected urban area along the edge of the coast & estuary, with larger towns, sprawling suburban edges and large scale heavy industry including docks”.*

7.10 Its scenic value is designated by LANDMAP as being Low across the majority of the area, rising to Moderate at its western extent, with an overall evaluation of visual and sensory value of Low to Moderate.

Lowland Wetlands LCA

7.11 To the northwest of the application site is the Lowland Wetland LANDMAP landscape character area and is referred to as an *“extensive area of Dee estuary salt marsh”*.

7.12 Its scenic value is designated by LANDMAP as being high, with an overall evaluation of visual and sensory value of Outstanding.

Intertidal LCA

7.13 To the west of the application site is the Intertidal LANDMAP landscape character area. This is referred to as the *“Intertidal Zone - a unique and expansive natural intertidal area of the Dee Estuary composed of mud flats, sand banks, and saline water with a distinct and intricate dendritic patterning and strong textures.”*

7.14 Its scenic value is designated by LANDMAP as being High, with an overall evaluation of visual and sensory value of High.

Mosaic Rolling Lowland LCA

7.15 To the southwest of the application site is the Mosaic Rolling Lowlands LANDMAP landscape character area. This is referred to as being *“gently sloping & rolling lowland estuary edge with distinct east/west grain and mosaic of wooded linear stream valleys, traditional & improved farmland, and a linear settled & urban fringe lower edge; and an overall estuarine influence”*.

7.16 Its scenic value is designated by LANDMAP as being Moderate, with an overall evaluation of visual and sensory value of Moderate.

River LCA

7.17 To the south of the application Site is the River LANDMAP landscape character area. This is noted as being the River Dee *“A dead straight, highly modified, tidal and wide stretch of river with grass embankments either side. There is access of the southern side of the river. The area is open and exposed. The water is muddy brown”*.

- 7.18 Its scenic value is designated by LANDMAP as being Moderate, with an overall evaluation of visual and sensory value of High.

Cheshire West and Chester Landscape Strategy, 2016

- 7.19 The Cheshire West and Chester Landscape Strategy contains the following LCAs relevant to the Study Area.

LCA 4d: Burton & Shotwick Drained Marsh

- 7.20 The Burton & Shotwick Drained Marsh is a very narrow, elongated LCA marking the transition between the *Undulating Enclosed Farmland* and the low lying Dee levels. It straddles the national border, the western edge of the LCA marking the English/Welsh boundary.

Key Characteristics

- *“Very flat, low lying landscape (up to 5m AOD) of former tidal marsh alongside the Dee Estuary, contrasting with farmland sloping down from the east;*
- *Lack of trees provides an open, exposed, windswept landscape;*
- *A number of rights of way cross the area and National Cycle Route (NCR)5 follows a disused railway (now the Chester Millennium Greenway) near the southern end; and*
- *The flat, open landscape provides clear views across the Dee Estuary to the hills of north Wales to the west and to the Shotton industrial area where Connah’s Quay power station and the Dee Bridge are visually prominent.”*

Perceptual/Visual Sensitivities, Qualities and Value

- *“The flat landform and long panoramic views contribute to the perception of a large scale, exposed landscape;*
- *The absence of any development and roads provides a remote landscape, but the presence of the A550 and railway bring noise and movement to the area; birds and aircraft using the Hawarden (Chester) Airport also contribute to noise and movement;*
- *No prominent skyline, but the Deeside / Shotton industrial area including Connah’s Quay power station, pylons and the Dee Bridge are visually dominant;*
- *The flat, open landscape provides clear views across the Dee Estuary to the hills of north Wales to the west;*
- *Topography and woodland in the Undulating Enclosed Farmland limit views to the east; and*
- *The open character means there is little opportunity for screening any large scale elements or for mitigating visual impact without the mitigation measures in themselves being highly visible - making it a visually sensitive landscape.”*

LCA 6b: Neston

7.21 The Neston Enclosed Farmland LCA is a very small character area enclosed to the north, east and south by the built-up suburbs of Neston. To the west lies the Dee Estuary, a contrasting area of open Mudflats and Saltmarsh.

Key Characteristics

- *“A low lying area (0-20m AOD) which slopes gently westwards down towards the coast;*
- *Designated at the county level as part of the Dee Coastal Area of Special County Value (ASCV) by the former Ellesmere Port and Neston Borough Council for its high landscape quality;*
- *Panoramic views westwards across the Dee Estuary towards north Wales and the Clwydian Hills from most parts of the character area, including from a popular footpath that follows the shore line;*
- *Other rights of way along field boundaries and Old Quay Lane provide access between the estuary inland to Neston, including links to the Sustrans NCR 56 Wirral Way Recreational Route / Wirral Country Park (disused railway);*
- *Extensive views to the south towards the Shotton industrial area where both the Connah’s Quay power station and the dramatic new Dee Bridge are conspicuous; and*
- *Tall structures at the sewage works and Neston Church provide visual landmarks inland.”*

Perceptual/Visual Sensitivities, Qualities and Value

- *“A quiet, peaceful landscape despite being close to Neston;*
- *However, the character area is distinctly west facing with open, panoramic views across the Dee Estuary into north Wales and the Clwydian Hills;*
- *Extensive views to the south towards the Shotton industrial area where both the Connah’s Quay power station and the dramatic new Dee Bridge are conspicuous; and*
- *Tall structures at the sewage works and Neston Church provide visual landmarks inland.”*

LCA 6c: Neston to Saughall

7.22 The Neston to Saughall Enclosed Farmland LCA extends from Neston in the west to Saughall in the east. The A540 defines its northern boundary. To the south the ground falls more steeply on the Ness, Burton, Puddington & Shotwick Slopes Enclosed Farmland before flattening out on the Burton and Shotwick Drained Marsh.

Key Characteristics

- *“Area to the north of Burton is designated at the county level as part of the Dee Coastal Area of Special County Value (ASCV) by the former Ellesmere Port and Neston Borough Council for its high landscape quality;*

- *Conservation Areas at Burton, Puddington and Shotwick, with numerous listed buildings including Puddington Old Hall and Shotwick Hall; the site of Shotwick Castle and a heavy anti-aircraft gun-site at Puddington are Scheduled Monuments;*
- *Urbanising influence of Neston and Saughall on the boundaries of the area, together main road corridors (A540, A550 and A5117); road junctions are particularly intrusive with commercial development such as petrol stations, car showrooms at Two Mills, garden centre etc.;*
- *Recreational opportunities provided by access through Burton Wood nature reserve managed by the National Trust, the Wirral Country Park and Sustrans NCR 56 Wirral Way Recreational Route (dismantled railway), NCR 563 alongside the A5117, and equestrian facilities at Haddon House (The Wirral Riding Centre);*
- *Electricity power lines cross the southern half of the area from the Deeside power stations and are visually prominent; and*
- *From the southern boundary there are expansive views westward across the Dee estuary towards north Wales and the Clwydian Hills; also views to the south towards the Shotton industrial area where both the Connah's Quay power station and the dramatic new Dee Bridge are visible."*

Perceptual/Visual Sensitivities, Qualities and Value

- *"Generally a quiet, rural landscape but with features that detract from the overall sense of tranquillity whilst providing sensitive visual receptors, in particular the main 'A' roads and the presence of settlements on the edge of the character area;*
- *Landscape scale, enclosure and views are dependent on location; from small scale enclosure where views are limited by hedgerows, trees and woodland, to larger scale open views from the southern boundary westward across the Dee estuary towards north Wales and the Clwydian Hills;*
- *Also views to the south towards the Shotton industrial area where both the Connah's Quay power station and the dramatic new Dee Bridge are visible;*
- *Electricity power lines cross the southern half of the area from the Deeside power stations and are visually prominent; and*
- *The presence of woodland and hedgerow trees means there is some potential for mitigating visual impact without the mitigation measures in themselves having an adverse effect on the character of the landscape."*

LCA 6d: Ness, Burton, Puddington & Shotwick Slopes

- 7.23 The Ness, Burton, Puddington & Shotwick Slopes Enclosed Farmland LCA extends from Neston in the west to Shotwick in the east. The southern edge of the Burton to Shotwick Enclosed Farmland defines its northern boundary. To the south the ground flattens out to the Burton and Shotwick Drained Marsh and the mudflats of the Dee Estuary.

Key Characteristics

- *“Area to the south and west of Burton is designated at the county level as part of the Dee Coastal Area of Special County Value (ASCV) by the former Ellesmere Port and Neston Borough Council for its high landscape quality;*
- *Conservation Area at Ness, and at Burton, Puddington and Shotwick on the edge of the character area, with numerous listed buildings including Puddington Old Hall and Shotwick Hall; the moated site of Shotwick Castle and Ice House at Burton are Scheduled Monuments;*
- *Ness Botanic Gardens and parkland at Burton Manor are on the English Heritage Register of Historic Parks and Gardens;*
- *Recreational opportunities provided at The Mere fishing ponds and RSPB Burton Mere Wetlands reserve with a mosaic of wetland habitats important for birds including internationally designated Ramsar site;*
- *A popular coastal footpath provides an opportunity to experience the Dee Estuary close-to*
- *Electricity power lines cross the southern end of the area from the Deeside power stations and are visually prominent; the Bidston to Wrexham railway passes through the western end of the area but is inconspicuous in the landscape;*
- *Views to the north are limited by the wooded ridge north of Burton; views east are limited by the elevated southern edge of the Burton to Shotwick Undulating Enclosed Farmland; and*
- *Expansive views westward across the Dee Estuary towards north Wales and the Clwydian Hills; also views to the south towards the Shotton industrial area where both the Connah’s Quay power station and the dramatic new Dee Bridge are visible.”*

Perceptual/Visual Sensitivities, Qualities and Value

- *“A medium to large scale landscape with an open windswept appearance;*
- *Electricity power lines cross the southern end of the area from the Deeside power stations and are visually prominent; the Bidston to Wrexham railway passes through the western end of the area but is inconspicuous in the landscape;*
- *Views to the north are limited by the wooded ridge north of Burton; views east are limited by the elevated southern edge of the Burton to Shotwick Undulating Enclosed Farmland; and*
- *Expansive views westward across the Dee Estuary towards north Wales and the Clwydian Hills; also views to the south towards the Shotton industrial area where both the Connah’s Quay power station and the dramatic new Dee Bridge are visible.”*

LCA 6e: Capenhurst Plateau

- 7.24 The Capenhurst Plateau Enclosed Farmland LCA is an almost flat area of land surrounding the Capenhurst industrial complex to the west of Ellesmere Port. The A540 forms the western boundary to the character area, a transitional area with a poorly defined boundary with the Burton to Shotwick Enclosed Farmland further west. The Willaston Enclosed Farmland lies to the north and the lower lying Saughall to Waverton Plain to the south beyond the A5117.

Key Characteristics

- *“Close proximity to Ellesmere Port and other urban influences, including major transport corridors and industrial areas, has a significant effect on the character of the landscape;*
- *The A540, A550, A5117 and the Birkenhead-Chester railway are major, visually intrusive transportation corridors affecting the character of the area; and*
- *The huge Capenhurst industrial complex lies at the heart of the area and is the focus for numerous electricity pylons and overhead power lines which are more visually intrusive than the industrial buildings themselves.”*

Perceptual/Visual Sensitivities, Qualities and Value

- *“Generally perceived as a pleasant agricultural landscape, but heavily influenced by 20th century industrial development, busy transport infrastructure, modern residential suburbs on the edge of Ellesmere Port, and other man-made influences that significantly affect views and tranquillity (although the Capenhurst industrial complex is relatively well screened);*
- *Electricity pylons are visually intrusive features on the skyline in many views from within and beyond the character area;*
- *Distant views are not a feature of this landscape, unlike other character areas within the same character type; and*
- *The presence of woodland and hedgerow trees means there is some potential for mitigating visual impact without the mitigation measures in themselves having an adverse effect on the character of the landscape.”*

LCA 16b: Dee Estuary

7.25 The Dee Estuary LCA is an area of inter-tidal mudflats and salt-marsh along the western coastline of the Wirral peninsular. Its eastern boundary is sometimes defined by embankment and walling where it meets permanently dry land at high tide level. It extends northwards beyond the administrative borough boundary into The Wirral.

Key Characteristics

- *“A flat, open and expansive landscape of mudflats, and saltmarsh alongside the Dee Estuary;*
- *Recognised as an internationally important site for wildfowl (protected by SSSI, SPA, SAC and Ramsar designations). It is largely owned and managed by the RSPB;*
- *A remote and peaceful landscape relatively undisturbed by humans and of international importance for nature conservation;*
- *Public access is largely limited to the edge of the area (access is not actively encouraged by the RSPB; MOD firing range at the southern end);*
- *Large skies with long, uninterrupted views out to sea and to the Welsh hills; and*
- *Industrial works at Shotton and the Dee Bridge form a striking backdrop to the south.”*

Perceptual/Visual Sensitivities, Qualities and Value

- *“The flat open landform and long views contribute to the perception of a large scale, exposed landscape;*
- *This is a flat, open low-lying area with extensive views to the distant seaward horizon and closer, prominent and dramatic Welsh hills;*
- *The sloping landscape of landward LCAs (Wirral, Neston, Burton to Shotwick - amongst others) afford extensive views into and across the area; and*
- *The open character means there is little opportunity for screening any large scale elements or for mitigating visual impact without the mitigation measures in themselves being highly visible - making it a visually sensitive landscape.”*

7.3.3 Designated Landscapes

Nationally Designated Landscapes

Registered Parks and Gardens

- 7.26 Registered Parks and Gardens are considered as a landscape designation at a national level and are reviewed and assessed in **Technical Appendix 7.2**. The following Grade II sites are located within the Study Area:
- Ness Botanic Garden Registered Park and Garden (List entry reference 1001364) is located approximately 3.3 km to the north of the Site; and
 - Barton Manor Registered Park and Garden (List entry reference 1001422) is located approximately 1.5 km to the north of the Site.

Locally designated Landscapes

- 7.27 The Flintshire Unitary Development Plan (FUDP) recognises distinct areas within the local authority boundary which are *“demonstrably special in their landscape character and scenic value”* and are designated as Areas of Significant Local Environmental Value (ASCV), as illustrated on **Figure 7.8: Regional Landscape Character and Designations** and described within Local landscape designations: Areas of Special County Value in Cheshire West and Chester.
- 7.28 The Dee Coastal Area ASCV is located to the north of the Site and comprises three separate areas – north, central and south. It’s general description states that *“These areas offer expansive panoramic views towards the north, west and south over the coastal mudflats and the Dee Estuary to the steeply rising Flintshire hills and conspicuous industry of Connah’s Quay.”*
- 7.29 The ASCV’s component parts all fall within Landscape Character Type (LCT) 6: Enclosed Farmland. The northern section falls within LCA 6a: Willaston. The central area occupies the whole of LCA 6b:

Neston. The southern area comprises a small coastal strip within LCA 6d: Ness, Burton, Puddington and Shotwick Slopes, with the remainder falling within LCA 6c: Neston to Saughall.

7.30 The northern area lies outside the Study Area and therefore is not considered within the LVIA, a summary of the relevant special landscape qualities of the central and southern are summaries below.

Dee Coastal Area ASCV – Central

- *“Panoramic views westwards across the Dee Estuary towards north Wales and the Flintshire Hills from most parts of the character area, including from the popular coastal footpath that follows the shoreline;*
- *A quiet, peaceful landscape despite being closely ‘surrounded’ by Neston;*
- *Small woodland blocks influence views to the coast and prominence of the town; and*
- *Other rights of way along field boundaries and Old Quay Lane provide access between the estuary inland to Neston, including links to the Sustrans NCR 56 Wirral Way Recreational Route / Wirral Country Park (disused railway).”*

Dee Coastal Area ASCV – Southern Area

- *“Panoramic views westwards across the Dee Estuary towards north Wales and the Flintshire Hills from many parts of the area, but sometimes screened inland by woodland, dense hedgerow network and topography;*
- *A more extensive tract than the central and northern Dee Coastal ASCV areas, comprising a mosaic of mixed farmland and woodland, punctuated with designed landscapes and historic sites and buildings;*
- *A gently falling topography from east to the coastal fringe, with undulating landform;*
- *Conservation Areas at Ness and at Burton with high concentrations of listed buildings such as Burton Manor;*
- *Ness Botanic Gardens and parkland at Burton Manor are on the English Heritage Register of Historic Parks and Gardens; and*
- *A popular coastal footpath provides opportunities to experience the Dee Estuary and its special landscape and ecological interest in relative tranquillity.”*

Conservation Areas

7.31 Whilst Conservation Areas (CA) are not considered landscape designations, they are relevant in terms of the potential for the proposed development to impact on views in and out of the CA. As such, they are reviewed and assessed in **Technical Appendix 7.2**. The following CAs are located within the Study Area:

- *Ness CA lies approximately 3.6km to the north of the Site;*
- *Burton (Wirral) CA is located approximately 2.1km to the north of the application site;*

- *Puddington CA lies approximately 2.1km to the northeast of the Site; and*
- *Shotwick CA lies approximately 2.6km to the east of the Site.*

7.3.4 Landscape Appraisal of Site and adjacent area

- 7.32 The topography of the Site and adjacent area is predominantly flat and low lying. The broad mouth of the Dee Estuary and low-lying ground builds from intertidal mudflat to marsh, flood meadow and wide valley floor. To the north of the estuary the land rises more gradually, to the southwest the land rises to over 120m AOD around New Brighton.
- 7.33 The vegetation pattern varies across the Study Area, with a clear distinction between the estuarine landscape and more elevated areas that create the broad valley feature. As described above, the estuary itself is a wild and open space with subtle changes in level defining areas of marsh from the mudflats and open water. As the landform rises agricultural begins to dominate, with hedgerows and small blocks of woodland providing structure to a relatively intimate scale rural landscape. Field compartments are quite small, but the underlying topography results in views extending out to the wider landscape.
- 7.34 The river Dee is heavily modified and follows a defined linear route before it meets the estuary. As such this section of the Dee within the study area is considered to have lost some of its 'natural characteristics'.
- 7.35 There are several major 'A' roads that cross the Study Area; these include the A548 which follows the estuary through Flint and Connaught's Quay before joining up with the A494 east of the application Site. Other 'A' roads include the A540 and A550 which cross over and subsequently link up to the A5117 on the eastern side of the A55.
- 7.36 The settlement pattern varies significantly between the northern and southern sides of the estuary, with the northern side including small villages such as Burton, Puddington and Shotwick, which are generally set back from the lower lying areas; the exception to this being Neston which extends up to the banks of the estuary. Outside of these villages there are a number of medium sized farmsteads and large country houses which can be accessed by the narrow local road network. To the south of the estuary settlements are much larger and extend up to the banks of the river Dee albeit with a degree of separation provided by industrial land uses and the road / railway corridor. Shotton, Connaught's Quay and Flint are quite densely populated with narrow and often congested streets. These settlements have quite clearly defined edges, and on leaving the conurbation minor roads lead to an intimate rural landscape with hedge-lined lanes and scattered farmsteads.
- 7.37 Deeside Industrial Park lies to the northeast of Shotton urban area and is characterised by large to medium sized 'shed' type development. Immediately to the north of Shotton and Connaught's Quay is an area historically used for heavy industry, with the Tata Steel Work and Shotton Paper Mill.

7.4 BASELINE VISUAL CONDITIONS

7.38 The potential visibility of the proposed development was determined by desktop assessment and analysis of topography and OS mapping data and validated by field survey.

7.39 The ZTVs illustrated on **Figures 7.2 to 7.5** show the potential visibility for the proposed development. The basic pattern of theoretical visibility matches well with observations taken in the field. In terms of topography and existing landscape features (such as buildings and vegetation) the potential visibility is restricted by the following landscape components:

- the highway embankments of the A548 immediately adjacent to the north of the A4 land;
- the large-scale industrial buildings within the Tata Steel Works to the south of the Site;
- development within the Deeside Industrial Park to the east of the Site;
- large scale power related development at Connah’s Quay;
- urban development within Shotton and Connah’s Quay to the south of the Study Area;
- woodland to the north and south of Burton;
- woodland within the southwest of the Study Area; and
- linear woodland and tree lined fields boundaries within the surrounding landscape.

7.40 Field work identified that the large-scale developments adjacent to the Site and embankments of the A548 are a major contributing factor in minimising the visibility of the lower-level elements of the proposed development within the Study Area.

7.41 As noted, earlier viewpoint selection was based on consultation with Flintshire FCC on 31st January 2022. The viewpoints selected for use in the LVIA represent a range of views and receptor types within the Study Area with ‘micro sitting’ of views to demonstrate the greatest level of visibility, i.e., the worst-case scenario. The final viewpoints selected for the assessment are summarised in **Table 7-1**.

Table 7-1
Viewpoint Locations

Viewpoint Reference	Viewpoint Name	Distance to site*	Easting	Northing	Elevation (m AOD)
A	Station Road, Burton	2.4	331236	374243	32.1
B	Burton Mere Wetlands	1.6	331430	373437	8.8
C	Shotwick	2.7	333663	371790	11.1
D	Garden City	2.4	332619	369514	4.5
E	Wales Coastal Path, near Golftyn	1.2	329548	369891	3.2
F	Mold Road, Wepre	2.0	329398	369072	35.8

Viewpoint Reference	Viewpoint Name	Distance to site*	Easting	Northing	Elevation (m AOD)
G	Wepre Lane	3.0	328899	368174	72.1
H	Northop Hall	4.4	326549	368093	116.0
I	Paper Mill Lane, Oxenholt	3.4	326483	370860	37.0
J	Wales Coast Path near Flint Castle	5.5	324692	373457	7.1
K	Weighbridge Road (A548)	0	329857	371837	14.5
L	Nessholt	4.1	329185	375755	6.1

7.5 PROPOSED DEVELOPMENT

7.15 The main elements of the proposed development are as follows and detailed in full within **Chapter 3: Project Description**.

7.16 The proposals comprise the following elements:

- The Main Site - The Shotton paper mill site will be largely redeveloped; works will include the construction of a *Cardboard Paper Machine building, Corrugating Machine building, Fibre Storage Tanks, Warehouse buildings, Dispatch building, Chemical building, Truck Loading building, Converting building, Auxiliary Facilities, Reel Storage building, and Effluent Treatment Facility comprising Anaerobic Digestion*. Certain existing plant and infrastructure within the Main Site will be retained as an integral part of the redeveloped site, including *the Biomass Plant and existing CHP boilers, Wood Preparation facility, the Recovered Fibre (recycled paper) Warehouses, and Water Treatment Lagoons*.
- The A4 land - will include the construction of *three Tissue Machine buildings, Reel Storage building, Converting building, Pulp Storage building, Finished Goods Warehouse and Truck Loading building*; and
- The CHP Site – the construction of a new *gas-fired CHP facility with four stacks, back-up diesel generators and associated electrical equipment*.

7.5.1 Landscape and Visual Mitigation and Impact Avoidance Measures

7.42 The proposed development has been developed to include a range of primary mitigation measures such as the retention of existing trees and hedgerows as far as feasible and the development of a Landscape Masterplan (see **Figure 7.23, Technical Appendix 7.4** provides the Arboricultural Report). However, given the nature of the proposed development, in particular the height of the stacks and the scale and mass of the proposed buildings and structures, there is no feasible additional landscape mitigation within the Site which could further mitigate the landscape and visual effects of the proposed development.

7.43 The following impact avoidance measures have been incorporated into the design or are standard construction or operational based procedures. These have therefore been considered during the assessment process described in this chapter:

- suitable materials will be used, where possible, in the construction of structures to reduce reflection and glare and to assist with breaking up the massing of the buildings and structures. It is understood the large buildings and structures will predominantly be coloured RAL 9003 (Goose Wing Grey);
- lighting required during the construction and operation stages of the proposed development will be designed to reduce unnecessary light spill outside of the Site;
- the existing vegetation adjacent to the Site, and retained within the Site will be protected to the guidelines with BS5837:2012 to prevent construction impacts; and
- mitigation measures will be implemented during the construction phase as set out in the Outline Construction Environment Management Plan (CEMP), see **Technical Appendix 5.3**, in order to limit impacts on the landscape and visual resource.

Lighting

7.44 The effects of lighting have been reviewed as part of the LVIA, to determine its effects on the landscape character of the Site and the Study Area. The potential visual impact of lighting has also been considered on the relevant viewpoints around the proposed development that may be affected, with reference to The Institution of Lighting Engineers report, Guidance Notes for the Reduction of Obtrusive Light. The following assumptions have been made with regards to the extent of lighting within the proposed development:

- the external lighting installation will adhere to the guidance of the CIBSE Lighting Guide 6: The outdoor environment;
- measures will be implemented to minimise the potential for obtrusive glare, upward light spill and light trespass; and
- temporary construction site lighting would be necessary to enable safe working on the construction site in hours of darkness.

7.6 LIKELY IMPACTS AND EFFECTS

7.45 The proposed development would introduce a number of new and large-scale elements into the landscape, creating the potential for landscape and/or visual effects. Potential impacts relate to the visibility of new features, including how this could affect perceptual qualities of the landscape and visual amenity against the baseline situation (the existing development within Shotton paper mill within the Main Site and undeveloped land within the A4 land).

7.6.1 Temporary Construction Impacts

7.46 The potential for temporary impacts on the landscape and visual resource of the 5km Study Area may arise from:

- construction of the proposed development on the landscape resource within the Site;
- potential effects to landscape character or visual amenity within the Study Area as a result of visibility of construction activities or the development during construction;
- stockpiling of materials;
- security fencing (e.g., Heras or similar) to secure the construction site;
- temporary lighting;
- site welfare and security facilities; and
- the presence and storage of temporary Site infrastructure such as site traffic, cranes, construction compounds and use of machinery.

7.6.2 Long Term, Operational and Permanent Impacts

7.47 The potential for long term, operational and permanent impacts on the landscape resource of the Study Area may arise from:

- change in landscape character through increases in the extent, scale and/or massing of buildings and structures, and the introduction on new light sources; and
- potential positive change through the creation of new landscape features, including planting and habitat enhancement as part of any landscape mitigation proposals.

7.48 The potential for long term, operational and permanent impacts on views and the visual amenity within the Study Area may arise from:

- change in nature or composition of views through introduction of the proposed development including tall structures, security fencing, lighting, areas of hardstanding;
- obstruction or removal of existing features or elements within the view;
- introduction of development that would become the focus of views to existing or proposed developed elements; and
- the introduction of temporary large-sale maintenance activities involving tall plant such as cranes.

7.49 The nature and level of these effects could vary over time, with the key influencing factor being any incorporated mitigation such as reinforcement of peripheral woodland planting (see mitigation section). As the woodland planting matures it is likely to aid the integration of the proposed development and reduce its relative prominence. Another key consideration in terms of visual mitigation will be the appearance of the building in terms of both architectural form and colour, particularly given that extension of the plant offer opportunity to create a new façade to the Site from views to the north.

- 7.50 The proposed development within the Main Site will have the greatest intervisibility with areas west, north and east of the Site, being substantially screened by the Tata Steel Works to the south.
- 7.51 The main areas of intervisibility between development within the Site and the Study Area would be to the west and north.
- 7.52 Due to the comparative height of the CHP stacks relative to other structures, intervisibility would extend across a large portion of the Study Area, including to the west, north, east and elevated open areas to the south.

7.6.3 Decommissioning and Demolition

- 7.53 The process and activities associated with decommissioning and demolition are considered to be of a similar nature to the construction stage, but of a smaller scale and shorter duration.

7.7 ASSESSMENT OF LANDSCAPE EFFECTS

- 7.54 The potential landscape impacts of the different elements of the proposed development relate to their intervisibility with the landscape receptors as new landscape features including how this affects their perceptual qualities and tranquillity. This will include the presence and activity of large cranes and other temporary construction plant during the construction period and plumes emitted from the stacks during operation.

Sensitivity of landscape receptors

- 7.55 The overall sensitivity of landscape receptors is assessed in **Table 7.2-3 of Appendix 7.2**.
- 7.56 Due to the national scale of the NCAs in relation to the scale of the proposed extension it is considered that these receptors have no susceptibility to the proposed development and therefore, there is no potential for significantly adverse landscape effects to occur, as such these are not considered within the assessment.
- 7.57 The Study Area includes a number of landscape receptors which have limited intervisibility with the proposed development and are therefore not assessed, these are discussed in **Table 7.2-2 of Technical Appendix 7.2**.

Magnitude of change

- 7.58 In accordance with GLVIA3, potential changes to the individual landscape receptors have been assessed in relation to the following as detailed in **Table 7.2-4 of Technical Appendix 7.2**:
- the Size and Scale of Change;
 - the Geographical Extent of Change; and

- the Duration and Reversibility of Change.

7.59 The largest landscape effects are likely to be a result from the intervisibility of the taller elements of the proposed development and construction activities such as crane movements, and how these affect the aesthetic and perpetual qualities of the landscape resource. The extent of theoretical visibility for each site is illustrated on **Figures 7.2 to 7.5** and provides a guide as to the extent of how visible the proposed development within each of the three sites will be in the Study Area.

7.7.1 Potential Construction Phase Effects

7.60 Whilst the proposed development would sit within the context of the existing Deeside Industrial Park and largely within the existing footprint of Shotton paper mill, the presence of the new development may have potential effects on the perception of landscape character. As discussed previously, intervisibility with low level activities is likely to be substantially restricted by the surrounding developments, landform and vegetation, resulting in the taller structure and temporary plant (e.g., cranes) being the main source of any effects.

Registered Parks and Gardens

7.61 As identified in **Technical Appendix 7.2**, due to a very low level of intervisibility between the receptors and the proposed development no discernible landscape effects are anticipated as a result of construction of the proposed development, and these have been scoped out of the assessment.

Conservation Areas

7.62 There are low levels of intervisibility between the CAs and the proposed development, given the existing character of outward views. As a result, it is considered that there is no potential for the receptors to experience significant adverse effects at any stage of the proposed development, and these have been scoped out of the assessment.

Local Landscape Designations

7.63 The southern area of the Dee Coastal ASCV would have a medium level of intervisibility with construction activities, restricted to the taller elements and cranes. Given the industrial context of the proposed development and short-term nature of the effects it is considered that there would be a Minor effect on landscape character during construction.

LCAs

7.64 Although aesthetic and perceptual aspects would be negatively affected by the temporary presence of cranes, they would be short-term and dynamic. As the proposed development progressed through the construction phases its influence on the surrounding landscape would increase, in particular, the introduction of new detractive features such as the CHP stacks. However, these are

current recognisable features of the existing degraded landscape, along with other large scale industrial features such as Parc Adfer Energy from Waste facility, Deeside and Connah's Quay power stations, overhead lines (OHL) and pylon and Flintshire Bridge, all located close to the Site.

- 7.65 The effects on the LCAs during construction has been assessed to be Negligible to Negligible/Minor adverse and not significant.

7.7.2 Potential Operational Phase Effects

- 7.66 Once operational the main source of landscape effects is likely to result from the intervisibility of the proposed CHP stacks and their associated plumes, and how these affect the aesthetic and perpetual qualities of the landscape resources.

Registered Parks and Gardens

- 7.67 As identified in **Technical Appendix 7.2**, due to a very low level of intervisibility between the receptors and the proposed development no discernible landscape effects are anticipated during the operation of the proposed development, and these have been scoped out of the assessment.

Conservation Areas

- 7.68 There is no intervisibility between the CAs and the application site. It is therefore assessed there would be no effect on these receptors at any stage of the proposed development, and these have been scoped out of the assessment.

Local Landscape Designations

- 7.69 The main influence of the proposed development on the landscape character of the southern area of the Dee Coastal ASCV would result from the introduction of additional stacks and their plumes to the skyline. These are typical of the existing landscape and would form a very small part of the outward view. It has been assessed that this would result in a Negligible/Minor adverse effect on the landscape character of this receptor.

LCAs

- 7.70 Although aesthetic and perceptual aspects would be negatively affected by the proposed development due to the introduction of new detractive features, in particular the CHP stacks, the existing landscape has already degraded through the presence of similar largescale features such as Parc Adfer Energy from Waste facility, Deeside and Connah's Quay power stations, OHL and pylon and Flintshire Bridge, all located close to the Site and forming the context of the additional features.
- 7.71 The effects on the LCAs during operation has been assessed to be Negligible to Negligible/Minor adverse and not significant.

7.7.3 Cumulative Effects Assessment

- 7.72 Cumulative effects arise as a result of a number of developments, which individually might not be significant, but when considered together could result in a significant cumulative effect on a common receptor and would include developments separate from and related to the proposed development. The following projects have been identified for consideration of cumulative effects:
- Logik Advanced Gasification Plant – Erection of an advanced gasification plant and associated development at Weighbridge Road, Deeside Industrial Estate.
 - Deeside Power Station - Application for prior notification of proposed demolition.
- 7.73 The findings of the assessment as presented in Section 7.7.1 and 7.7.2 above, and within **Appendix 7.2**, indicate that the proposed development would result in a limited change to landscape character during each of the development phases.
- 7.74 The addition of the Logik Advanced Gasification Plant which includes a 65m high stack would result in an additional industrial development in close proximity to the Parc Adfer EfW and in many cases would be viewed in combination with it, making it barely discernible as a new element of the landscape from longer distance views. The demolition of the Deeside Power Station would remove two distinctive tall structures within the landscape.
- 7.75 It is considered that these changes, in combination with the proposed development would result in only a marginal change to the landscape character and/or aesthetic and perpetual qualities of the landscape receptors assessed and would not fundamentally change the assessment. It is therefore considered would be no significant in-combination landscape effects.

7.8 ASSESSMENT OF VISUAL EFFECTS

- 7.76 The potential visual impacts of the proposed development relate to its visibility within the Study Area as new features, including how this affects the visual amenity of users of the surrounding area. This includes the visibility of large cranes and other temporary construction plant during the construction period and the visibility of plumes emitted from the stacks during operation.
- 7.77 The largest effects are likely to occur in close proximity to the proposed development, especially adjacent to the A4 land. Further afield, the visibility of the taller elements of the proposed development such as the CHP stacks and construction activities largely associated with the presence of cranes and their associated movements are likely to be the main source of effects. The extent of theoretical visibility for each site is illustrated on **Figures 7.2 to 7.4** and provide a guide as to the extent of how visible the proposed development within each of the three sites will be in the Study Area.
- 7.78 **Figure 7.6** illustrates the location of viewpoints used within the assessment of visual effects.

Assessment of Sensitivity of Visual Receptors

- 6.1 **Table 7-1 of Technical Appendix 7.3** identifies the viewpoints agreed with FCC and provides a description and information on their location. **Table 7-2** identifies the value, susceptibility and overall sensitivity for each of the viewpoints, determined following the methodology detailed in **Technical Appendix 7.1**.

Magnitude of change

- 7.79 In accordance with GLVIA3, potential changes to the individual landscape receptors have been assessed in relation to the following as detailed in **Table 7.2-4 of Technical Appendix 7.2**:
- the Size and Scale of Change;
 - the Geographical Extent of Change; and
 - the Duration and Reversibility of Change.

Assessment of Level of Visual Effects

- 6.2 The assessment of visual effects is detailed in **Table 7-4 of Technical Appendix 7.3**, the levels of effects are summarised or expanded upon as required below for the various visual receptor groups.

Potential Visual Receptors

- 7.80 The visual receptors within the Study Area considered likely to experience potential effects associated with the proposed development are as follows:
- users of the local PRoW network, National Cycle Routes and Long Distance Trails;
 - local visitor attractions where the appreciation of the view is valued, such as Burton Mere Wetlands;
 - visitors to cultural assets, such as Flint Castle;
 - users of recreation green space, such as Prince's Park, Shotton;
 - residents including residents of properties edging Northop Hall, Garden City, Wepre, Burton and Nessholt; and
 - road users, especially those in close proximity to the Site, such as the A548.

7.8.1 Potential Construction Phase Effects

- 7.81 The construction phase may result in loss and disturbance of landscape features and elements within the Site itself, e.g., as a direct result of construction or requirements for access, together with potential impacts on new visual elements, such as construction plant on visual amenity. The ground level activities within the Site will be screened from the majority of the Study Area by the embankments of the A548, vegetation (especially the woodland within and immediately adjacent to the Site) and large-scale buildings and structures within and close to the Site.

- 7.82 Whilst the proposed development would sit within the context of the existing Deeside Industrial Estate and largely within the existing footprint of the Paper Mill building, the presence of the new development may have potential effects on visual amenity of users of the Study Area. This will relate to changes in the existing view, include the prominence of new features and/or the opening up of views to new visual detractors through the removal of existing features which currently screen views as well as an intrusion on the skyline / horizon.

Users of PRoW, Public Footpaths and Permitted Routes

- 7.83 The Site is generally well screened within the Study Area, with only the upper parts of the existing Shotton paper mill being appreciated by receptors using the network of PRoW and National Cycle Routes. The Site is screened from users of the Wales Coastal Path (National Trail) by intervening development (Tata Steel Works) along large parts of its route, with only glimpsed views possible.
- 7.84 Viewpoint C (Shotwick) is located on the footpath within St Michael's churchyard edge of Prince's Park, where focused views towards Deeside Industrial Park are possible. Construction activities would form a small part of the view in the middle distance resulting in a Minor adverse and not significant effect.
- 7.85 Viewpoint E (Wales Coastal Path, near Golftyn) is located on the edge of the Dee river, to the south Site. The visibility of the proposed development will be largely limited to the upper parts of the CHP stacks, screened by the large-scale industrial development in the foreground. It is considered that the construction of the proposed development would result in Negligible adverse and not significant visual effect on the receptors present.
- 7.86 Viewpoint J (Wales Coast Path near Flint Castle) is located approximately 5.5 km to the west of the Site. Users have expansive views across Dee Estuary, with Shotton Paper Mill and Parc Adfer EfW visible on the horizon, along with other large scale visual detractors such as Deeside Power Station, TATA Steel Works, Connah's Quay Power Station and the concentration of OHL pylons. Construction activities would form a very small part of the view and could be easily missed by the casual observer. The proposed development would form a very small part of the view and result in a Negligible/Minor adverse and not significant visual effect on the receptors present.
- 7.87 Viewpoint L (Nessholt) is located on PRoW 334/FP54/1 (Footpath) and receptors would view the proposed development in the far distance within a small part of a panoramic view which contain multiple visual detractors, such Parc Adfer EfW, Tata Steel Works, Deeside Power Station, Flintshire Bridge and Connah's Quay power station. The visual effects on receptors during construction would be Minor adverse and not significant.

Local Visitor Attractions

- 7.88 The edge of the land to the north of the Site tends to offer panoramic views over the Dee Estuary to the hills to the west, and to the industrial development within Shotton Industrial Park and Connah's Quay which include a range of large-scale visual detractors.

- 7.89 Viewpoint B (RSPB Burton Mere Wetlands) is located on the edge of the nature reserve where panoramic views can be gained over the low-lying wetlands towards Deeside Industrial Park, with Parc Adfer and the Shotton Paper Mill forming key features in the view. Construction activities would be seen in the far distance as a small part of the wide view and would result in a Minor/Moderate and not significant adverse effect on visual amenity.

Users of Recreation Green Space

- 7.90 Viewpoint F (Mold Road, Wepre) is located on the edge of Prince's Park, where elevated views towards Deeside Industrial Park are possible over the urban area, and include industrial buildings and stacks form the focus of the view due to their visibility against the sky. The construction activities would be limited to cranes and viewed against the sky resulting in a Minor adverse and not significant effect.

Residents

- 7.91 Viewpoint A (Station Road, Burton) is partially representative of residential views from the edge of the settlement. Existing views include Parc Adfer and Shotton paper mill, Deeside Industrial Estate, plus a wide range of visual detractors. Construction activities would be viewed in the context of the existing large scale industrial developments and are anticipated to result in Minor adverse and not significant effect.
- 7.92 From Viewpoint D (Garden City) the construction activities will be barely perceivable due to intervening screening in the middle distance are anticipated to result in Negligible adverse and not significant effect.
- 7.93 Viewpoint F (Mold Road, Wepre) is partially representative of residential views along and close to Wepre Road. Existing views include Tata Steel Works and OHL and pylons. Intervening woodland is likely to partially screen views from many locations, where views are possible construction activities are anticipated to result in a Minor adverse and not significant effect.
- 7.94 Viewpoint G (Wepre Lane) is partially representative of residential views along the busy road within Shotton, with elevated views over sprawling urban development and with Deeside Industrial Park forming a belt of development below the horizon line with stacks and pylons occasionally visible above it. The visibility of construction activities would be limited to cranes and result in a Minor/Moderate adverse and not significant effect.
- 7.95 Viewpoint H (Northop Hall) is partially representative of residential views from the edge of the settlement. Existing views to the Site and from a long distance resulting in it forming only a very small part of the panoramic view which included large scale vertical structures including Flintshire Bridge, OHL pylons, Shotton Paper Mill and Parc Adfer stacks, Fiddlers Ferry power station cooling towers and chimney, and chimney, stakes and other structures within Ellesmere Port industrial area. Construction activities would be viewed in the context of the existing large scale industrial developments and are anticipated to result in Minor adverse and not significant effect.

- 7.96 Viewpoint I (Paper Mill Lane, Oxenholt) is partially representative of residential views from properties along Paper Mill Lane, where Deeside Power Station form a key element of the view with its four large stacks, accompanied in the view by numerous OHL pylons, which clutter the view. Construction activities would be barely perceivable and are anticipated to result in Negligible adverse and not significant effect.

Users of Roads

- 7.97 Viewpoint K (Weighbridge Road (A548)) is located immediately adjacent to the Site, construction activities would be seen in the near distance and form the focus of the view, changing its nature and composition and resulting in a Major adverse and significant adverse effect.

7.8.2 Potential Operational Phase Effects

- 7.98 The assessment of visual effects is addressed in **Table 7.3-4 of Technical Appendix 7.3** and levels of impact taken from this detailed assessment are summarised or expanded upon as required below for the various visual receptor groups.

Users of PRow, Public Footpaths and Permitted Routes

- 7.99 The Site is generally well screened within the Study Area, with only the upper parts of the existing Shotton paper mill being appreciated by receptors using the network of PRow and National Cycle Routes. The Site is screened from users of the Wales Coastal Path (National Trail) by intervening development (Tata Steel Works) along large parts of its route, with only glimpsed views possible.
- 7.100 Viewpoint C (Shotwick) is located on the footpath within St Michael's churchyard edge of Prince's Park, where focused views towards Deeside Industrial Park are possible. Once operational, the proposed development would form a small part of the view in the middle distance resulting in a Minor adverse and not significant effect.
- 7.101 Viewpoint E (Wales Coastal Path, near Golftyn) is located on the edge of the Dee river, to the south Site. The visibility of the proposed development will be largely limited to the upper parts of the CHP stacks, screened by the large-scale industrial development in the foreground. It is considered that the operation of the proposed development would result in Negligible adverse and not significant visual effect on the receptors present.
- 7.102 Viewpoint J (Wales Coast Path near Flint Castle) is located approximately 5.5km to the west of the Site. Users have expansive views across Dee Estuary, with Shotton Paper Mill and Parc Adfer EfW visible on the horizon, along with other large scale visual detractors such as Deeside Power Station, TATA Steel Works, Connah's Quay Power Station and the concentration of OHL pylons. The proposed development would form a very small part of the view, resulting in a Negligible/Minor adverse and not significant visual effect on the receptors present.

- 7.103 Viewpoint L (Nessholt) is located on PRoW 334/FP54/1 (Footpath) and receptors would view the proposed development in the far distance within a small part of a panoramic view which contain multiple visual detractors, such Parc Adfer EfW, Tata Steel Works, Deeside Power Station, Flintshire Bridge and Connah's Quay power station. The visual effects on receptors during operation would be Minor adverse and not significant.

Local Visitor Attractions

- 7.104 The edge of the land to the north of the Site tends to offer panoramic views over the Dee Estuary to the hills to the west, and to the industrial development within Shotton Industrial Park and Connah's Quay which include a range of large -scale visual detractors.
- 7.105 Viewpoints B (RSPB Burton Mere Wetlands) is located on the edge of the nature reserve which offers panoramic views over the low-lying wetlands towards Deeside Industrial Park, with Parc Adfer and the Shotton Paper Mill forming key features in the view. The proposed development would be seen in the far distance as a small part of the wide view but forming a new and prominent feature. It would result in a Moderate adverse and significant adverse effect on visual amenity.

Users of Recreation Green Space

- 7.106 Viewpoint F (Mold Road, Wepre) is located on the edge of Prince's Park, where elevated views towards Deeside Industrial Park are possible over the urban area, and include industrial buildings and stacks form the focus of the view due to their visibility against the sky. The proposed development would result in a Minor adverse and not significant effect.

Residents

- 7.107 Viewpoint A (Station Road, Burton) is partially representative of residential views from the edge of the settlement. Existing views include Parc Adfer and Shotton paper mill, Deeside Industrial Estate, plus a wide range of visual detractors. The proposed development would be viewed in the context of the existing large scale industrial developments and is anticipated to result in Negligible adverse and not significant effect
- 7.108 From Viewpoint D (Garden City) the construction activities will be barely perceivable due to intervening screening in the middle distance are anticipated to result in Negligible adverse and not significant effect
- 7.109 Viewpoint F (Mold Road, Wepre) is partially representative of residential views along and close to Wepre Road. Existing views include Tata Steel Works and OHL and pylons. Intervening woodland is likely to partially screen views from many locations, where views of the proposed development are possible, they would result in a Minor/Moderate adverse and not significant effect.
- 7.110 Viewpoint G (Wepre Lane) is partially representative of residential views along the busy road within Shotton, with elevated views over sprawling urban development and with Deeside Industrial Park

forming a belt of development below the horizon line with stacks and pylons occasionally visible above it. The visibility of the proposed development would result in a Minor adverse and not significant effect.

- 7.111 Viewpoint H (Northop Hall) is partially representative of residential views from the edge of the settlement. Existing views to the Site and from a long distance resulting in it forming only a very small part of the panoramic view which included large scale vertical structures including Flintshire Bridge, OHL pylons, Shotton Paper Mill and Parc Adfer stacks, Fiddlers Ferry power station cooling towers and chimney, and chimney, stakes and other structures within Ellesmere Port industrial area. The proposed development would be viewed in the context of the existing large scale industrial developments and result in Minor adverse and not significant effect.
- 7.112 Viewpoint I (Paper Mill Lane, Oxenholt) is partially representative of residential views from properties along Paper Mill Lane, where Deeside Power Station forms a key element of the view with its four large stacks, accompanied in the view by numerous OHL pylons, which clutter the view. The proposed development would be barely perceivable and are anticipated to result in Negligible adverse and not significant effect.

Users of Roads

- 7.113 Viewpoint K (Weighbridge Road (A548) is located immediately adjacent to the Site, the proposed development would be seen in the near distance and form the focus of the view, changing its nature and composition and resulting in a Major adverse and significant adverse effect.

7.8.3 Cumulative Effects Assessment

- 7.114 Cumulative effects arise as a result of a number of developments, which individually might not be significant, but when considered together could result in a significant cumulative effect on a common receptor and would include developments separate from and related to the proposed development. The following projects have been identified for consideration of cumulative effects:
- Logik Advanced Gasification Plant – Erection of an advanced gasification plant and associated development at Weighbridge Road, Deeside Industrial Estate.
 - Deeside Power Station - Application for prior notification of proposed demolition.
- 7.115 The findings of the assessment as presented in Section 7.7.1 and 7.7.2 above, and in **Technical Appendix 7.2**, indicate that the proposed development would result in a limited change to landscape character during each of the development phases.
- 7.116 The addition of the Logic Advanced Gasification Plant which includes a 65 m high stack would result in an additional industrial development in close proximity to the Parc Adfer EfW, although in many cases it would be viewed in combination with the CHP stacks and appear barely discernible as a new element of the landscape from longer distance views. The demolition of the Deeside Power Station would remove two distinctive tall structures within the landscape.

- 7.117 The nature of effects associated with these projects would only be discernible in localised views where users gain clear or elevated views of the proposed development. It is considered that the additional projects would not fundamentally alter the viewpoints assessed to experience a Negligible or Minor effect to such a level that they would experience a significant effect. The viewpoints listed below were considered to come close to the threshold for effects to be considered significant and are therefore considered in more detail.
- Viewpoint B: Burton Mere Wetlands;
 - Viewpoint C: Shotwick;
 - Viewpoint F: Mold Road, Wepre and
 - Viewpoint G: Wepre Lane.
- 7.118 It is considered that the proposed development would result in a Major adverse and significant effect on visual amenity for receptors at Viewpoint K: Weighbridge Road (A548), as such this is not considered further.
- 7.119 The following tables detail the anticipated in-combination effects of construction and opening and operation. For reasons explained previously in section 9.6.13 the magnitude of change and resulting effect is unlikely to reduce in operation (taken as year 15) and therefore is not repeated.

Construction

Viewpoint B: Burton Mere Wetlands

- 7.120 The construction of the Advanced Gasification Plant would be partially screened by the Parc Adfer EfW. The combination of the proposed development with the Advanced Gasification Plant would be part of a panoramic view, with considerable visual separation between the two developments. The demolition of Deeside Power Station would be partially visible in a very small part of the view, largely screened by intervening vegetation. It is considered that the magnitude of change would be Slight/Medium on the High sensitivity receptor resulting in a Minor/Moderate adverse effect.

Viewpoint C: Shotwick

- 7.121 The construction of the Advanced Gasification Plant would be partially screened by the Parc Adfer EfW and viewed in the foreground of the proposed development, resulting in the activities being barely perceivable as separate. The demolition of Deeside Power Station would not be visible within the view. It is considered that this the magnitude of change would be Slight/Medium on the Medium sensitivity receptor resulting in a Minor/Moderate adverse effect.

Viewpoint F: Mold Road, Wepre

- 7.122 The construction of the Advanced Gasification Plant would be largely screened by intervening vegetation and development. There would be a degree of visual separation with the proposed development. The majority of the works associated with the demolition of Deeside Power Station

would be screened by the Tata Steel Works. It is considered that the magnitude of change would be Slight on the Medium sensitivity receptor resulting in a Minor adverse effect.

Viewpoint G: Wepre Lane

- 7.123 The construction of the Advanced Gasification Plant would be partially screened by the Parc Adfer EfW. The combination of the proposed development with the Advanced Gasification Plant would be within a panoramic view, with considerable visual separation between the two developments. The demolition of Deeside Power Station would not be visible. It is considered that the magnitude of change would be Slight/Medium on the Medium sensitivity receptor resulting in a Minor/Moderate adverse effect.

Operation

Viewpoint B: Burton Mere Wetlands

- 7.124 The Advanced Gasification Plant would be largely screened by intervening vegetation and development. There would be a degree of visual separation with the proposed development. The demolition of Deeside Power Station would remove two stacks which contribute to the nature of the view, however, due to the prevalence of vertical structures, their removal from the scene will fundamentally change its key characteristics. It is considered that the magnitude of change would be Slight/Medium on the Medium sensitivity receptor resulting in a Moderate adverse effect.

Viewpoint C: Shotwick

- 7.125 The Advanced Gasification Plant would be partially screened by the Parc Adfer EfW, viewed near it. Due to the large scale of Parc Adfer EfW building against the skyline it is considered this will remain the focus of view. The combination of the proposed development with the Advanced Gasification Plant would be in a panoramic view, with a clear visual separation between the two developments. The buildings and structures within the Main Site screen views of Deeside Power Station. Its removal would not be noticeable in the view. It is considered that this the magnitude of change would be Slight on the Medium sensitivity receptor resulting in a Minor adverse effect.

Viewpoint F: Mold Road, Wepre

- 7.126 The construction of the Advanced Gasification Plant would be partially screened by the Parc Adfer EfW. The combination of the proposed development with the Advanced Gasification Plant would be in a panoramic view, with considerable visual separation between the two developments. The demolition of Deeside Power Station would be partially visible in a very small part of the view, largely screened by intervening vegetation. It is considered that the magnitude of change would be Slight on the Medium sensitivity receptor resulting in a Minor adverse effect.

Viewpoint G: Wepre Lane

- 7.127 The construction of the Advanced Gasification Plant would be partially screened by the Parc Adfer EfW. The combination of the proposed development with the Advanced Gasification Plant would be in a panoramic view, with considerable visual separation between the two developments. Only a very small portion of the Deeside Power Station is visible, largely limited to the top of the stacks viewed above the Tata Steel Work. Given, the large number of visual detractors in the view, their removal could be easily missed, and there would be no change to the balance or nature of the view. It is considered that the magnitude of change would be Slight on the Medium sensitivity receptor resulting in a Minor adverse effect.

7.9 SUMMARY AND STATEMENT OF SIGNIFICANCE

- 7.128 The current condition of the landscape within the Study Area is greatly affected by the presence of large scale industrial and infrastructure based development close to the River Dee. Those most prominent in the landscape and views are Parc Adfer EfW, Shotton paper mill, Deeside Power Station, Flintshire Bridge and Connah's Quay power station, along with numerous OHL and their pylons which congregate adjacent to it. The impacts of the proposed development on the wider landscape are viewed in the context of these existing detracting features.
- 7.129 It is predicted that the proposed development would result in no significant landscape effects on any of the receptors identified.
- 7.130 There is the potential for 'perceived' effects associated with a change in the aesthetics of the development, i.e., the appearance of new buildings and structure - a change in extent, overall mass and height. However, given the existing context, it is considered that these effects on landscape character are minimal.
- 7.131 The landscape immediately surrounding the Site includes numerous earthworks, such as the A548 embankments, along with mature vegetation within and close to the Main Site which would screen lower levels views of the proposed development. This results in the potential visual impacts caused by the proposed development being largely associated with the visibility of the proposed CHP stacks.
- 7.132 Some views would gain partial but clear views of the proposed development against the sky (Viewpoints B, F, J and K) increasing its prominence. In all cases, the proposed development is viewed in the context of existing large scale visual detractors.
- 7.133 It is predicted that other than Viewpoints B and K, there will be no significant effects on the visual amenity of the receptors. Due the prominence of the new CHP stacks against the sky Viewpoint B would experience a Moderate effect on visual amenity during operation, whereas Viewpoint K, due to its close proximity, would experience a Major adverse effect on its visual amenity during construction and operation.

7.10 REFERENCES

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8.1 INTRODUCTION

- 8.1 This Environmental Statement (ES) Chapter reports the likely significant environmental effect of the proposed development with regard to Land Quality in the context of the Site and surrounding area.
- 8.2 In particular, it considers the likely significant environmental effects including potential contamination risks on current ground conditions within the Site. It also assesses how the redevelopment of the Site may affect existing ground conditions which might have subsequent effects on sensitive receptors at and near to the Site (such as groundwater and surface water), current and future Site users and Site construction workers. Where appropriate, measures to prevent, minimise or control those effects are presented and residual effects following the adoption of those measures are assessed.
- 8.3 This ES chapter (and its associated figures and appendices) should be read together with Chapters 1 – 6 of this ES, as well as **Chapter 18: Summary**.
- 8.4 Effects on surface water resources are discussed in ES **Chapter 9 Hydrology and Flood Risk** which should be referred to in conjunction with this chapter.
- 8.5 The proposed development for which permission is sought is set out in the Project Description (Chapter 3). The proposed development as assessed in this ES Chapter is defined in the Development Specifications and Parameter Plans.
- 8.6 A prior approval application for demolition of paper mill structures at the Site was submitted by Shotton Mill Ltd to Flintshire County Council (FCC) in September 2021 (ref: 063486). It was subsequently confirmed by FCC that prior approval would not be required for demolition works to proceed. The demolition works have therefore commenced prior to the Main Site planning application. However, due to demolition works having similar activities as construction, these activities have been combined and brought together into the construction phase assessment in this ES.
- 8.7 Piling is required due to the nature of the ground conditions at the Site which comprise made ground underlain by sandy alluvial deposits. Piling within the paper mill building area is the subject of a separate planning application. Piling elsewhere on the Site outside the paper mill building area is included in this application and would therefore be addressed under this ES.

8.2 APPROACH AND METHODOLOGY

8.2.1 Data sources and guidance

- 8.8 This section describes the methodology used to assess the effect of the proposed development on ground conditions at the site. The existing baseline related to ground conditions has been determined through a review of information obtained from a number of sources including:

- Natural Resources Wales (NRW) and Flintshire County Council (FCC) planning and policy information;
- Groundsure environmental search data;
- BGS geological mapping;
- Historical and current Ordnance Survey (OS) mapping;
- Previous soil and groundwater investigation data obtained at the Site;
- Utility and drainage drawings from the Site; and,
- Information obtained from a site walkover and groundwater monitoring undertaken at the site on the 23 August 2021.

8.9 The information obtained from these sources is detailed in the Phase 1 Preliminary Land Quality Risk Assessment (PLQRA) (SLR, 2022) which is included as **Technical Appendix 8.1** with this ES.

Consultation

8.10 To support the assessment a formal scoping process was undertaken to obtain feedback from Planning and Environment Decisions Wales (PEDW) and Flintshire County Council (FCC). In relation to land quality, responses to the formal scoping are presented below.

Planning & Environment Decisions Wales (PEDW)

- 8.11 PEDW noted the presence of potential contamination sources within the Main Site and Expansion Site and that groundwater is assumed to be at a depth of approximately 4m to 5m below ground level with tidal influence from the Dee Estuary also assumed. PEDW recommended that a Site Conceptual Model is presented in the ES with details of the Site Investigation provided. The significance of the impact clearly identified with mitigation and remediation measures outlined, along with methods of disposal of contaminants. Due to the extent of the potential remediation works these should be considered in the description of the construction works and considered as part of other aspect assessments where relevant, including but not limited to ecology, noise and waste.
- 8.12 It was stated any designed measures should be clearly identified and residual impact addressed. PEDW were satisfied with the approach for the land quality assessment and those items which were to be included.
- 8.13 The potential effects of remediation, construction and operational works on the nearby nature conservation sites (i.e. Dee Estuary SSSI/Ramsar/SPA/SAC, Shotton Lagoons and Reedbeds SSSI and Inner Marsh Farm SSSI) would need to be considered. Any potential for pollutant leakage into the nature conservation sites would need to be addressed and the significance of the potential impact identified. It was stated the Applicant should consider that remediation works themselves could affect sensitive ecological receptors and thus should be part of the assessment.
- 8.14 PEDW indicated that the remediation strategy has the potential to create waste which should be addressed.

Flintshire County Council (FCC)

- 8.15 It was stated by FCC that in terms of historic land contamination, the proposed development would require a land contamination assessment to be carried out, and it is expected; given the location of the proposed development site, historical potentially contaminative land uses, reasonable grounds to suspect that the Site may be affected by land contamination. FCC were satisfied that this has been scoped in, and the proposed approach to be taken to assess these impacts.

National Planning Policy

- 8.16 Welsh National Planning Policy is made up of Future Wales – The National Plan 2040, Planning Policy Wales (PPW), Technical Advice Notes (TAN), and circulars and policy clarifications letters. These documents must be considered by Local Planning Authorities through the preparation of Local Plans and are material considerations in regard to decisions made on individual planning applications.
- 8.17 Planning Policy Wales (PPW) indicates that the principal planning objective when considering development on land affected by contamination is to ensure that any unacceptable risks to human health, buildings and other property, and the natural and historical environment from the contaminated condition of land are identified, so that appropriate action can be considered and then taken to address those risks.
- 8.18 To prevent unacceptable risks from pollution and land instability, planning policies and decisions should ensure that new development is appropriate for its location. The effects (including cumulative effects) of pollution on health, the natural environment or general amenity, and the potential sensitivity of the area or proposed development to adverse effects from pollution, should be taken into account. Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner.
- 8.19 The framework planning policies and decisions should also ensure that:
- The site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous uses and any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation and
 - After remediation, as a minimum, land should not be capable of being determined as contaminated land under Part 2A of the Environmental Protection Act 1990 (EPA).

Local Planning Policy**Flintshire Local Development Plan (LDP)**

- 8.20 In the course of pre-application discussions, Flintshire County Council (FCC) advised that they are expecting the Inspector's Report on the Local Development Plan (LDP) in October 2021 with the potential adoption by June 2022.

Flintshire Unitary Development Plan (FUDP)

- 8.21 The Flintshire Unitary Development Plan (FUDP), adopted September 2011, is the adopted development plan for the 15 year period 2000 – 2015. The aim of the FUDP is to provide a framework for making rational and consistent decisions on planning applications and to guide development to appropriate locations in Flintshire.
- 8.22 The FUDP identifies sites where new housing, employment and other development can take place, as well as setting out policies to protect important countryside, habitats, resources and heritage. Although the adopted UDP became time expired at the end of 2015 it remains the adopted development plan for the County. Regard will need to be had to ensuring that the Plan is compliant with up to date Welsh Government guidance in Planning Policy Wales (PPW), Technical Advice Notes (TAN) and any other relevant guidance.
- 8.23 Although the adopted UDP became time expired at the end of 2015 it remains the adopted development plan for FCC until such time that the emerging LDP is adopted.
- 8.24 Policy EWP 12 Pollution states new development which is sensitive to pollution or hazard either directly or indirectly will be permitted only in areas where existing activities pose no potential risk of such impacts.
- 8.25 New development which would create an additional risk of pollution or hazard will be permitted only where: it would not create or increase risk to the general public outside the boundaries of the site; and it would not impose significant restrictions on the use or development of surrounding land. Conditions will be imposed upon the development to ensure that on cessation of the use, reclamation and re-use of the site takes place including appropriate measures to deal with any contamination which exists on the site.
- 8.26 Policy EWP 14 Derelict and Contaminated Land states the reclamation and re-use of derelict and contaminated land will be permitted if:
- a) appropriate measures are taken to deal with any contamination which exists on the site: ensuring that no residual risk remains on site for future receptors; and minimising as far as possible the off site disposal of contaminated waste material; and
 - b) measures can be taken to identify and safeguard any significant nature conservation and historic interests which exist on the site.

Legislation & Regulatory

- 8.27 The assessment completed has been guided by the following legislation and good practice with due regard to the Planning Policy Wales (PPW) and the following documents:
- Part 2A Environmental Protection Act 1990 and the Contaminated Land (Wales) Regulations 2006;
 - The Contaminated Land (Wales) (Amendment) Regulations 2012, Contaminated Land Statutory Guidance for Wales 2012 (Welsh Government, 2012) Defra Circular 01/2006 (Defra 2006);
 - Water Resources Act 1991;

- Water Act 2003;
- Environment Agency - Land Contamination: Risk Management (LCRM) (2020);
- Environment Agency - Protect Groundwater and Prevent Groundwater Pollution (EA, 2017); and
- Environment Agency - Groundwater Protection Technical Guidance (EA, 2017).

Environmental Protection Act (1990) (EPA)

- 8.28 Part 2A of the Environmental Protection Act (EPA) 1990, introduced by s57 of the Environment Act 1995, came into force in Wales on 1 July 2001. The main objective of introducing the Part 2A regime is to provide an improved system for the identification and remediation of land where contamination is causing unacceptable risks to human health or the wider environment given the current use and circumstances of the land.
- 8.29 Part 2A of the EPA 1990 is based on a 'suitable for use' approach to contamination where remedial action is only required if there are unacceptable risks to human health or the environment, taking into account the use of the land and its environmental setting. Statutory Guidance in support of the EPA describes a risk assessment methodology using a source-pathway-receptor methodology.
- 8.30 The legislation places a responsibility on the Local Authority to determine whether any land in its area is contaminated by consideration of whether:
- Significant harm is being caused; or
 - There is significant possibility of significant harm being caused; or
 - Significant pollution of controlled waters is being caused; or
 - There is a significant possibility of such pollution being caused.

Water Resources Act (1991)

- 8.31 The Water Resources Act, (WRA), specifies the national regulatory controls and restrictions used to protect the water environment are set out in the Water Resources Act 1991.
- 8.32 Under Section 85 of the Water Resources Act (WRA), 1991, it is an offence to cause or knowingly permit any poisonous, noxious or polluting matter to enter into controlled waters, which include groundwater and surface waters.
- 8.33 Furthermore, under Section 161 of the Act, the Regulatory Agency (NRW) has the power to serve a Works Order on a person where it appears that poisonous, noxious or polluting matter is likely to enter, or to be present in any controlled water. The Works Order will specify the actions to be taken to mitigate the risk and timescale for the works to be carried out.

Water Act (2003)

- 8.34 The Water Act 2003 introduced a revision to the wording of the EPA, which now requires that if a site is causing or could cause significant pollution of controlled waters it may be determined as contaminated land.

Technical Guidance

- 8.35 The main framework document that sets out procedures for the conduct of technical processes or activities which may be relevant or partially relevant to Part 2A includes The Environment Agency / Department of Environment guidance, Land Contamination: Risk Management (LCRM) (2020) and this document recommends a phased or tiered approach to risk assessment.
- 8.36 Other statutory and non-statutory guidance documents and research publications are available which can be used for assessing risks to Human Health and Controlled Waters from the development of contaminated land. DEFRA and the Environment Agency developed the Contaminated Land Exposure Model (CLEA) in 2002 intended to be used as the common basis for contamination assessments in the United Kingdom.
- 8.37 An assessment of the risks posed by soil and groundwater contamination to Controlled Waters is presented in the Environment Agency's Research and Development Publication, "Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination" and Research and Development Publication 95 - "Guidance on the Assessment and Monitoring of Natural Attenuation of Contaminants in Groundwater".

Relevant Guidance

- 8.38 The assessment is underpinned by the following guidance and best practice:
- Land Contamination: Risk Management (LCRM) (EA, 2020);
 - Protect Groundwater and Prevent Groundwater Pollution (EA, 2017);
 - Groundwater Protection Technical Guidance (EA, 2017);
 - BS 5930:2015+A1:2020 "Code of practice for ground investigations" (BSI, 2015);
 - BS 10175:2011+A2:2017 "Investigation of potentially contaminated sites – code of practice" (BSI, 2011);
 - Human Health Toxicological Assessment of Contaminants in Soil, Science Report SC050021/SR2 (EA, 2009);
 - Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination (EA, 2006);
 - Guidance on the Assessment and Monitoring of Natural Attenuation of Contaminants in Groundwater (EA, R&D95);
 - Construction Industry Research and Information Association (CIRIA) Guidance C532, 'Control of Water Pollution from Construction Sites' (CIRIA, 2001);
 - Guidance C665, 'Assessing Risks Posed by Hazardous Ground Gases to Buildings' (CIRIA, 2007);
 - BS 8485: 2015+A1:2019 Code of practice for the characterization and remediation from ground gas in affected developments (BSI, 2015);
 - The Development of Land Affected by Contamination: A Guide for Developers Version 3. Welsh Local Government, Natural Resources Wales & Welsh Government (2017); and
 - The Development of Land Affected by Contamination. Reports to support planning applications. Flintshire County Council (FCC, 2017).

8.2.2 Study Area

- 8.39 The study area comprises the Site itself and the surrounding area within a 1km radius of the Site, as shown in the Groundsure Report (Groundsure Ltd, 2021) contained within the Phase 1 Preliminary Land Quality Risk Assessment (PLQRA) (SLR, 2022) (Technical Appendix 8.1). Important features and constraints are shown in the Groundsure Report.
- 8.40 The 1km zone of influence was chosen as this is the area within which it is considered that certain sources could potentially have an effect on the Site, and the Site could have an effect on off-Site receptors.

8.2.3 Approach and methods

- 8.41 Before the assessment of environmental impacts can be carried out certain basic information about the project will need to be established. Some of this information will be of particular relevance in the consideration of indirect and cumulative impacts and interactions. This Chapter identifies the type and detail of information about the development proposals that should be obtained, where possible and practical, to enable the assessment to reflect the potential impacts on Land Quality more fully. The assessment of Land Quality also includes the impacts to human health, the water environment (groundwater, surface water quality), property and infrastructure.
- 8.42 It is essential to consider the nature of the project as this influences the type of impacts that are likely to occur. It is important to determine its key physical characteristics as these influence indirect and cumulative impacts and impact interactions. The phasing, scale and layout of the proposed development as well as operational activities, mitigation measures and environmental controls all need to be considered in terms of determining the extent of any impact.
- 8.43 One key aspect of the assessment of impact relates to the baseline condition and/or quality of the land prior to any development taking place. This is because land that is due to be developed, especially if it has a historic industrial use, is not necessarily uncontaminated in terms of its existing condition.
- 8.44 In such circumstances it is likely that development will have a material improvement of the land quality through mitigation activities associated with the remediation of the historic contamination such that the land is suitable for the intended use.
- 8.45 Accordingly, there is a standard approach to assess whether the land to be developed and the associated soil, hydrogeological (groundwater quality) and hydrological (surface water quality) quality, has been impacted from historic activities. The defining assessment of land contamination/quality is undertaken in accordance with the Environment Agency Guidance Land Contamination: Risk Management (LCRM).
- 8.46 LCRM is intended to assist all those involved in dealing with land contamination, including landowners, developers, professional advisors, regulatory bodies and financial providers. The technical approach presented in LCRM is designed to be applicable to a range of non-regulatory and regulatory contexts that includes:

- development or redevelopment of land under the planning regime;
- regulatory intervention under Part 2A of the Environment Protection Act 1990;
- voluntary investigation and remediation; and
- managing potential liabilities of those responsible for individual sites or a portfolio of sites.

8.47 LCRM is split into stages: risk assessment, options appraisal and remediation and verification, which can be sub-divided as shown in **Table 8-1**.

Table 8-1
LCRM Stages of Contaminated Land Assessment

Stages within LCRM for Contaminated Land Assessment				
Stage 2		Stage 3		Stage 4
Risk Assessment		Options Appraisal		Remediation and Verification
<ul style="list-style-type: none"> • Tier 1 - Preliminary risk assessment • Tier 2 - Generic quantitative risk assessment • Tier 3 - Detailed quantitative risk assessment 	>	<ul style="list-style-type: none"> • Identification of feasible remediation options • Detailed evaluation of options • Select final remediation option 	>	<ul style="list-style-type: none"> • Develop the remediation strategy • Remediation (and watching brief) • Produce a verification report • Long-term monitoring and maintenance (if required)

8.48 The first stage, Risk Assessment, is an essential component in achieving effective management of the risks from land contamination. Risk assessment for chemical contamination can be a highly detailed process as there are a range of specific technical approaches for different contaminants and circumstances. As shown in Table 8.1, the risk assessment stage is itself subdivided or tiered; assessors apply each tier in turn. Higher tiers require the assessment of more detailed information.

8.49 The common approach used by practitioners is to assess the direct effects of development on the site’s land quality (through changes to ground and water conditions as a result of development) and the indirect effects of those changes on the ultimate end users of the land. To enable this assessment there are firstly two risk assessments that are undertaken:

- a *Development Impact Assessment* discusses the potential impacts of the proposed development via loss (removal, erosion, disaggregation or compaction) and pollution. The assessment considers impacts during construction and occupation of the development.
- a Preliminary *Land Quality Risk Assessment* (PLQRA) of the chemical quality risks posed by the site:
 - during the construction phase to construction workers, and controlled waters; and;
 - the risks of chemical exposure to future human site end-users and controlled water receptors (including sensitive surface water ecology) from the period following completion of construction, taking into account the change in the land use brought about by the development.

8.50 Where there is a historic contaminated land risk at a site, a Conceptual Site Model (CSM) of the development site is prepared.

8.51 Potential land contamination impacts and associated risks to human health and controlled waters are assessed using a methodology based upon the CIRIA C552 Contaminated Land Risk Assessment – A Guide to Good Practice document (CIRIA, 2001). This method is specifically tailored to assess the impacts and risks that may arise from exposure to ground contamination, contaminated waters and ground gases. These are then used to inform the significance of environmental impact to the baseline conditions from the proposed development.

8.2.4 Assessing Significance

Significance Criteria

8.52 Assessment of effects refers to the change that is predicted to take place to the existing condition of the environment as a result of the proposed development. Effects that relate to ground contamination depend on the establishment of pollutant linkages through a source – pathway – receptor methodology, as detailed in statutory legislation and guidance.

8.53 The significance of an effect is generally determined as the combination of the “sensitivity and/or value” of the affected environmental receptor and the predicted “extent” and/or “magnitude” of the effect or change. The assessment of significance ultimately relies on professional judgement, although comparing the extent of the effect with criteria and standards specific to each environmental topic provides structure and guidance to judgements which are made.

8.54 Details of criteria specific to this assessment are defined in **Table 8-2** and **Table 8-3**. **Table 8-4** outlines the significance matrix.

**Table 8-2
Receptor Sensitivity / Value**

Receptor Sensitivity / Value	Description
High	Land use very sensitive to contamination (e.g. residential with private gardens, allotments or nurseries). Groundwater used for drinking water abstraction (site located within a source protection zone). Potable groundwater resource of national importance. Surface water body of national ecological importance.
Medium	Land use sensitive to contamination e.g. play areas or public open space. Potable groundwater resource of regional importance. Surface water body of regional ecological importance. Construction/Demolition workers involved in significant disturbance of the ground.
Low	Land use with low sensitivity to contamination e.g. commercial or industrial use. Potable groundwater resource of local importance Surface water body of local ecological importance Construction/Demolition workers involved in limited disturbance of the ground.
Negligible	Low sensitivity site use e.g. car parking. No utilisable groundwater resource. Construction/Demolition workers involved in minimal disturbance of the ground.

**Table 8-3
Magnitude of change**

Magnitude of Change	Description
High	Permanent changes to the physical, chemical or biological properties of a significant proportion of the receptor (e.g. significant adverse human health effect, pollution of aquifer or abstraction well, changes in ecological status)
Medium	Permanent or temporary changes to the physical, chemical or biological properties of an insignificant proportion of the receptor (e.g. potential adverse human health effect, pollution of aquifer or abstraction well, changes in ecological status)
Low	Temporary changes to the physical, chemical or biological properties of an insignificant proportion of the receptor (e.g. isolated pollution incident)
Negligible	No discernible change to existing environmental conditions

**Table 8-4
Significance Matrix**

Magnitude of Effect				
Receptor sensitivity/value	High	Medium	Low	Negligible
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

8.2.5 Residual Effects

- 8.55 The residual effects following the mitigation measures put in place would be identified as having a negligible to major magnitude of effect, and whether this effect is local, short term and temporary; or on a more significant scale, long term and permanent; and whether these effects are adverse or beneficial.
- 8.56 By confirming the sensitivity of a receptor coupled with the magnitude of the potential effect caused by development, it is possible to confirm the significance of the impact, i.e. should the development impact on an SSSI (High Sensitivity) resulting in a loss of this attribute (Substantial Magnitude), the significance of this would be Major adverse; and alternatively a reduction in contamination risk from the existing baseline conditions, e.g. land that has a very high contamination risk but undergoes site remediation and improvement compared to the baseline becomes a Major beneficial effect.

**Table 8-5
Residual Effects**

Residual Effect	Description
Major adverse	An increase in contamination risk from the existing baseline conditions of four or five risk levels in the risk matrix, e.g. land that has a very low contamination risk in the baseline becomes a high or very high risk.
Moderate adverse	An increase in contamination risk from the existing baseline conditions of two or three risk levels in the risk matrix, e.g. land that has a low contamination risk in the baseline becomes a moderate or high risk.
Minor adverse	An increase in contamination risk from the existing baseline conditions of one risk level in the risk matrix, e.g. land that has a low contamination risk in the baseline becomes a moderate/low risk.
Negligible	Negligible change in contamination risks.
Minor beneficial	A reduction in contamination risk from the existing baseline conditions of one risk level in the risk matrix, e.g. land that has a moderate/low contamination risk in the baseline becomes a low risk.
Moderate beneficial	A reduction in contamination risk from the existing baseline conditions of two or three risk levels in the risk matrix, e.g. land that has a high contamination risk in the baseline becomes a moderate/low or low risk.
Major beneficial	A reduction in contamination risk from the existing baseline conditions of four or five risk levels in the risk matrix, e.g. land that has a very high contamination risk in the baseline becomes a low or very low risk.

8.2.6 Cumulative Effects Assessment

- 8.57 Projects during their various phases will create emissions of some sort to air, water and land, whether this is air pollution, noise, discharge of cooling water, disposal of construction material etc. At the beginning of the assessment, the nature of emissions at each phase should be considered and where possible quantified. Consideration needs to be given to the likelihood of emissions interacting with other elements in the environment.
- 8.58 There is also the cumulative aspect of emissions, not only from just one project, but also where emissions from a particular project could combine with those from other developments and cumulatively have a significant adverse effect on a particular receptor. Emissions from the proposed development need to be considered in the context of both the receiving environment and other existing or future development in the area. Information on emissions from other existing developments and developments likely to be built in the near future could be obtained from the regulatory authorities. This information would assist in identifying where possible interactions, cumulative or indirect impacts would occur. Development plans and consultation with the planning authority also provide information on future development.

- 8.59 The ES will therefore consider the potential for likely significant effects on the environment resulting from the cumulative impact of committed developments in the area. From a land quality perspective, this could include factors such as release of contamination as part of construction or future development activities that could impact on human health, groundwater or the surface water environment, the potential release of airborne dusts both from site construction activities and on the surrounding road network, the potential for dewatering activities that could temporarily halt or alter groundwater flows, the potential for other nuisance factors such as odours, noise, vibration and traffic.
- 8.60 Whilst a site may have a minor impact that would not require further mitigation, when there are multiple developments, each producing the same minor impact, it could become moderate or substantial on the receptor. A cumulative assessment review has been undertaken within a 1km radius of the Site, although from a land quality perspective for cumulative effects to impact on the proposed development a 500m radius is considered more applicable.

8.2.7 Statement of Significance

- 8.61 Following the classification of an effect, a clear statement will be made as to whether the effect is 'significant' or 'not significant'. As a general rule, major and moderate effects are considered to be significant, and minor and negligible effects are considered to be not significant. However, professional judgement has also been applied where appropriate including the classification of the time period of the effect (temporary or permanent).

8.3 BASELINE CONDITIONS

- 8.62 The baseline conditions are the environmental conditions against which the potential environmental effects of the proposed development are assessed. The conditions refer to the present time and with no significant change predicted during the interim period before development works are programmed to commence. The baseline conditions have been determined through the completion of a Phase 1 Preliminary Land Quality Risk Assessment (PLQRA) (SLR, 2022) for the Site which is included in **Technical Appendix 8.1** of this ES. Findings from the PLQRA are summarised below.
- 8.63 The Site is located within the broader Deeside Industrial Park, occupied by a number of large scale manufacturing and energy generation facilities. The Site is bounded to the north by the A548 (Weighbridge Rd) with marsh and grazing land beyond and to the south by the Shotton Steelworks land, operated by Tata Steel. An access road to the steelworks bounds the site to the west with Deeside Power Station, a 498 MWe gas-fired power station beyond. An electricity converter station operated by EirGrid is located immediately northwest of the Main Site on land that was formerly part of the paper mill site, now leased to EirGrid. The Parc Adfer waste to energy facility is located to the immediate east of the site and the Flintshire Bridge HVDC Converter Station, operated by National Grid is located to the southeast.
- 8.64 The closest residential properties are located over 1.3km to the south west of the Site boundary, in Connah's Key, Wepre and Shotton. To the north east, the communities of Puddington and Burton on the Wirral are approximately 2km from the Site boundary. The Airfields development site at Sealand is approximately 1.5km to the south east.

- 8.65 The Site and surrounding area are at an elevation of some 6m to 8m above Ordnance Datum (aOD). The Site can be separated into two areas - the Main Site which comprises the operational paper mill facility and an open area to the north called Plot A4, identified as the Expansion Site. The topography of the Main Site is essentially level with the surface level of the lagoons in the southwest of the Site at approximately 5m to 6m aOD. Land to the south is some 2m lower than the Site itself, due to past land-raising and a similar fall in elevation is noted from the Plot A4 Expansion Site area towards the A458. The Plot A4 Expansion Site area is relatively flat, however is hummocky in places and has a number of raised mounds. -
- 8.66 The Main Site comprises the existing operations associated with the former paper mill and covers an area of approximately 60 hectares (ha). This includes the area to be used for the proposed combined heat and power plant (approximately 0.5 ha). The Site comprises a number of warehouses, workshops, manufacturing and office buildings with above ground storage tanks and water treatment tanks, legacy railway lines, car parking, hard and soft landscaping and effluent treatment lagoons. An area of woodland is present in the southwest corner and an overhead powerline passes through the south of the Site from east to west.
- 8.67 The Plot A4 Expansion Site comprises vacant land. It previously formed part of Shotton steelworks which was demolished in the 1980s and has remained vacant since. It covers approximately 22 ha and is primarily covered in rough grassland/scrub vegetation. A former gravel access track runs along the length of Plot A4 inside the northern boundary and a combined gravel soakaway and gas vent ditch approximately 3m deep runs parallel to and just south of the access track from near the eastern boundary across approximately three quarters of the Site. A high pressure gas main is present along the northern boundary and crosses into the Site at the eastern and western ends of the boundary. A curved mound is present in the centre south of the Site that forms the above ground portion of a bentonite cut-off wall that was installed associated with land remediation in this area during the 1990s.
- 8.68 The existing Site operations on the Main Site generally comprise receipt of waste paper in the east of the Site which is sorted and pulped before being processed in paper mill no.2 (PM2) into paper rolls. The finished rolls are then packaged and sent to the distribution warehouse in the centre-west of the site. Power for the operations is provided by a boiler plant in the centre of the Site which is supplied by imported waste wood products, stored near the HGV parking area. Water used in the process is taken from a surface water abstraction point on the River Dee in the vicinity of Chester before being pumped through a pipeline entering the Site in the northeast. Waste effluent from the paper production is processed at an effluent treatment plant (ETP) in the centre south of the Site and passed through a series of lagoons in the south and southwest. The lagoon outflow is located at the southwest of Lagoon 3 and is pumped beneath the A548 into the White Sands Gutter, a tributary of the River Dee to the west. Paper mill no.1 (PM1) is vacant due to operations ceasing in this area. A materials recycling and recovery facility (MRRF) is located in the southeast of the Site which receives general household waste. The paper products from the facility are retained on-site for production and the remaining products are sorted, repackaged and exported from Site.
- 8.69 The Main Site was developed with construction of the initial phases of the paper mill in the early to mid-1980s. The paper manufacturing facility uses fuel and chemicals for plant/equipment and within its production process, and there are waste materials generated from the paper processing activities. There are therefore a number of current potential sources of contamination on site

associated with the paper manufacturing process. This includes above ground storage tanks containing fuel oil, diesel and kerosene; hydraulic and lubricating oil tanks and oil stores. Chemical storage is also located on site in areas associated with the RCF (fatty acids, sodium hydroxide, silicate, salt, bentonite, hydrogen peroxide); paper mill 2 (fillers, fixatives, cleaners, defoamers, flocculants (bentonite) and dyes); the boilers (sulphuric acid, sodium hydroxide, ammonia) and effluent treatment plant (ETP) (polymers for thickening sludge, nutrients, pH balancing).

- 8.70 Other areas of drum or IBC scale storage of chemicals have been reported around the Main Site with each area having appropriate spill containment. It is reported that there are no underground storage tanks in use at the Site; although there are drainage sumps present.
- 8.71 In terms of drainage, all 'operational' effluent and foul water is pumped via a series of pump pits along the drainage system through to the Primary Clarifiers then to Lagoon 2A; from where it is pumped to the Secondary Clarifiers and then subsequently to Lagoon 3; and then from where it is pumped from an exit location on the southwest of Lagoon 3 through a below ground (600 mm diameter) pipeline to an off-site discharge point at White Sands Gutter further to the west of the Site prior to entering the Dee Estuary.
- 8.72 The discharge location point at Lagoon 3 is monitored as a permitted regulatory discharge location under the Site's operational permit with NRW (consent permit number EPR/BT 4885IT). Data is gathered at this discharge point on a continuous basis for biological oxygen demand (BOD) suspended solids, pH, ammoniacal nitrogen, temperature and flow.
- 8.73 It is understood there are no below ground oil/water interceptors or below ground tanks along the drainage system due to the presence of the treatment works on site. Although, at the WPS/New Social Block, there is a 'Buried Cesspit' which is a foul collection tank for the block which is pumped/cleared out periodically of foul waste. There is a 6,000 litre waste dye liquid holding tank from the recovered fibre (RCF) paper treatment process, however this is located above ground.
- 8.74 Previous reports indicate groundwater is typically found at a depth of some 4 m to 5 m below ground level (bgl) and displays limited tidal variation of around 0.1m. Groundwater flow is generally to the north and west, however mounding of groundwater levels is understood to occur around the lagoons in the southwest, causing some localised groundwater flow to the south and east. Previous hydrogeological assessments have indicated the relatively low hydraulic conductivities and gradients result in a high capacity to attenuate potential contamination prior to groundwater reaching surface water receptors.
- 8.75 SLR completed a groundwater monitoring round in August 2021 during a Site walkover of the existing monitoring well network for the IPPC permit and including wells recently installed during site divestiture (by Anthesis/Roberts Environmental Ltd (REL)). Based on SLR's assessment of monitoring well construction and hydrogeological understanding, true groundwater was encountered at depths between 2.49 m bgl (JBH2A) and 4.59 m bgl (JBH5). Calculated groundwater elevations range between 4.31m and 5.67m aOD, consistent with previous data. Inferred groundwater flow contours calculated for the site and immediate surroundings as part of previous hydrogeological modelling have been reproduced and provided in the Phase 1 Preliminary Land Quality Risk Assessment (PLQRA) (SLR, 2022) in **Technical Appendix 8.1** of this ES.

8.3.1 Geology

Made Ground

- 8.76 BGS 1:50:000 mapping (Sheet 108, Flint, Solid and Drift) indicate made ground deposits beneath the entirety of the Site. It is understood the Site formerly comprised an island/low lying land in the Dee Estuary and the land was reclaimed in the 1950s using dredged estuarine sand with a platform of fill for the steelworks. Previous investigations indicate the Made Ground deposits are up to 6m in thickness across the Site and generally comprise a sandy clay matrix with frequent anthropogenic materials including concrete, brick, glass, metal, slag, clinker, coal and ash.

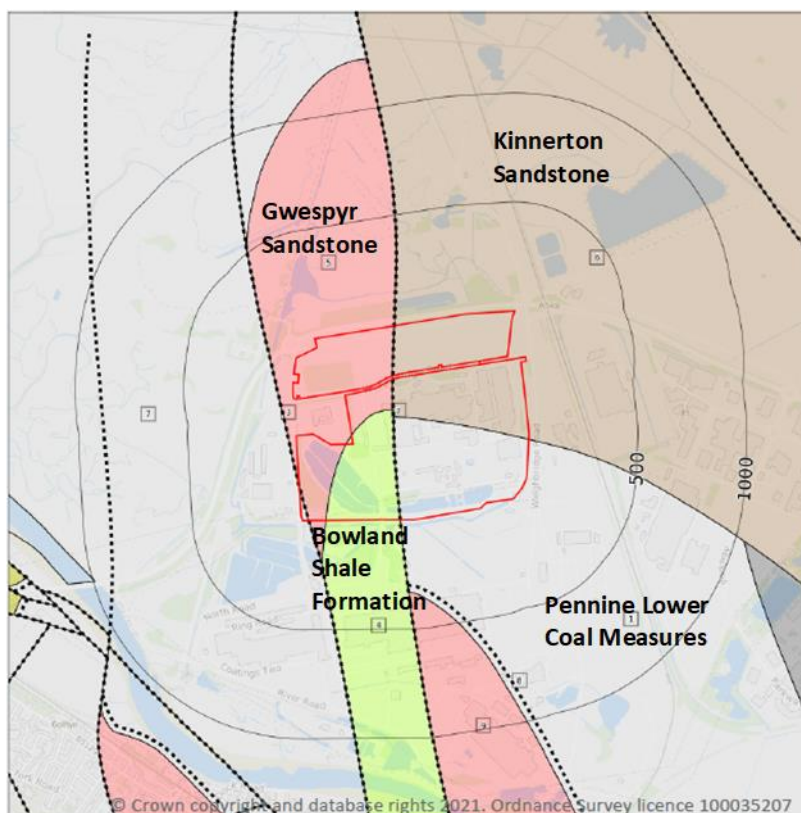
Superficial Drift Geology

- 8.77 The superficial deposits across most of the site are recorded as Tidal Flat Deposits – Clay, Silt and Sand. Blown Sand – Sand deposits are recorded in the southwest of the Site in the area of the woodland.
- 8.78 Available BGS and previous investigation borehole logs indicate the superficial deposits generally comprise a thin layer of dark organic clay/silt which may be relict topsoil, underlain by orangish to greyish brown silty sand with occasional fine gravel and shell fragments, occasionally with an organic odour. The Tidal Flat Deposits have been proven to a depth of at least 20.5m below site level (BGS borehole ref; SJ37SW401). Borehole logs at the nearby Parc Adfer facility show the superficial deposits extend to at least 30 m bgl.
- 8.79 The Tidal flat Deposits are underlain by Glacial Clay at a depth of some 25m bgl, with bedrock being encountered in the general area of the Site at some 45-50 m bgl. A BGS borehole record (BGS borehole ref; SJ36NW15), some 1.2km to the south east, suggests that Glacial Clay was noted at a depth of some 8m with bedrock encountered at around 50m.

Solid Geology

- 8.80 The bedrock deposits on-site are complex. An inferred fault line runs through the centre of the Site in a north-south direction. Bedrock deposits in the southeast of the Site comprise the Pennine Lower Coal Measures Formation (mudstone, siltstone and sandstone), while deposits in the northeast of the site comprise the Kinnerton Sandstone Formation (sandstone). Deposits in the northwest and far west of the Site are recorded as the Gwespyr Sandstone (sandstone and interbedded argillaceous rocks). Deposits in the central southwest are recorded as the Bowland Shale Formation (mudstone). The Kinnerton Sandstone is of Triassic age, with the other deposits being from the Carboniferous period. The bedrock geology is shown on **Figure 8.1**.
- 8.81 Two historical borehole logs in the centre of the Main Site proved the depth to sandstone bedrock deposits of approximately 48m to 50m bgl, while a third failed to encounter bedrock at termination depth of around 46m.

Figure 8.1
Bedrock Geology beneath the Proposed Development Area



8.3.2 Hydrogeology

- 8.82 The superficial Tidal Flat Deposits are classed as a Secondary Undifferentiated aquifer, described as: “Assigned where it is not possible to attribute either category A or B to a rock type. In general, these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type”.
- 8.83 The bedrock Kinnerton Sandstone Formation is classed as a Principal Aquifer, described as “Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale”. The Pennine Lower Coal Measures and Gwespyr Sandstone are classed as Secondary A aquifers and the Bowland Shale Formation is classed as a Secondary Undifferentiated aquifer.
- 8.84 The Site does not lie within a groundwater source protection zone (SPZ) and there are no groundwater abstractions within 1km of the Site.
- 8.85 A summary of the anticipated ground conditions as well as the hydrogeological classifications of the key strata are presented **Table 8-6**.

**Table 8-6
Summary of the Anticipated Ground Conditions**

Stratum	Anticipated Thickness (m)	Typical Description	Hydrogeological classification
Made Ground	4.0 - 6.0	Sandy clay matrix with frequent anthropogenic materials including concrete, brick, glass, metal, slag, clinker, coal and ash	Not Classified
Tidal Flat Deposits	4.0 – 25.0	Loose to medium dense Sands; soft to firm Clays and Silts	Secondary Undifferentiated
Glacial Clay	25.0 – 45.0	Stiff to hard red-brown clay with gravel and boulders	Unproductive Stratum
Kinnerton Sandstone Formation	45.0 – unproven depth	Sandstone	Principal Aquifer
Pennine Lower Coal Measures		Mudstone, siltstone and sandstone	Secondary A aquifers
Gwespyr Sandstone		Sandstone and interbedded argillaceous rocks	
Bowland Shale Formation		Mudstone	Secondary Undifferentiated aquifer

8.3.3 Hydrology

- 8.86 The nearest surface water features are the Greenwood Burn, which lies adjacent to the southern Site boundary, and the Broken Bank Drain, which is an engineered tidal drain located to the north and west of the Site. Both of these then discharge to the White Sands Gutter, which is a tributary of the River Dee (the confluence of the White Sands Gutter and the River Dee is some 3.5km to the northwest). Broken Bank Drain, the White Sands Gutter and the River Dee are all tidally influenced.
- 8.87 The Dee Estuary is classified as a Site of Special Scientific Interest (SSSI), a Ramsar site, a Special Area of Conservation (SAC) and a Special Protection Area (SPA). The area of undeveloped land to the north is also designated as a SSSI. The Site therefore lies in a sensitive surface water location due to three of its boundaries in close proximity to surface water bodies that connect to an estuary with numerous ecological designations.

8.3.4 Ground Contamination

- 8.88 Previous ground investigations have been undertaken across the Site since 1997 for a variety of purposes that have included requirements for permitting operations, building expansion, groundwater monitoring and site divestiture. As such, there is a significant volume of information available on ground conditions and the contamination status of the Site. Investigations typically targeted shallow Made Ground and superficial soil contaminants and groundwater beneath the Site, but also included assessments of ground gas concentrations. Further details are provided in the Phase 1 Preliminary Land Quality Risk Assessment (PLQRA) (SLR, 2022) for the Site included in the **Technical Appendix 8.1** of this ES.

Main Site

- 8.89 Ground investigations undertaken on the Main Site have not identified extensive areas of soil and groundwater contamination that would be regarded as significant in relation to ongoing manufacturing use of the site. Contaminants identified in soils across the Site include Total Petroleum Hydrocarbons (TPH), metals, sulphate and trace polychlorinated biphenyls (PCBs). The concentrations were generally below the generic industrial screening guidelines applied for human health. Low concentrations of mineral oil have been detected in groundwater recovered from two boreholes to the east and north east of the MRF warehouse. Investigations to the west and north west of this area found similar results, with contaminant concentrations generally below generic industrial use screening guidelines.
- 8.90 The most heavily contaminated area has been identified as the central northern boundary of the Main Site, in the vicinity of borehole BH104. This is coincident with the location of the former steelworks by-products plant. Elevated concentrations of phenols, xylene, PAH, benzene and total aromatic hydrocarbons were detected in groundwater at this location. Similar contamination was identified to be present in the adjacent southern area of Plot A4. Hydrocarbon contamination has also been identified in the southwest of the Main Site in borehole JBH1A. Other groundwater sample analysis revealed no significant impact in the wells.
- 8.91 The western boundary and area around Lagoon 3 was identified in 1991 as being contaminated by a wide range of pollutants including phenol, mineral oil, cyanide and heavy metals. The infilled lagoon at the southern boundary was found to be contaminated by mineral oils and heavy metals. The current and former lagoons are reportedly a low level source of contamination impact to the underlying groundwater at the site.
- 8.92 The historical Site features and areas of contamination are shown superimposed over current site features on **Figure 8.2**.

Figure 8.2
Historic and Current Features within the Proposed Development Site Area



Plot A4 Expansion Site

- 8.93 As part of the development of the A548 road to the north in the 1980s, the area along the northern edge of the Site was infilled with biodegradable green waste by FCC. A waste disposal licence was subsequently granted in 1992 for the deposition of inert waste on the northern fringe of the Site (recorded in the Groundsure EnviroInsight with waste reference WW1/L/FLI002). It is understood that efforts have been made to remove the biodegradable waste previously deposited but no details are available. The combined gravel soakaway and gas venting trench in the north of the area was installed by the early 2000s to protect future developments from the area of infilling. The current potential for generation and migration of ground gases is likely to be of low risk, as gas monitoring carried out in 2002 showed “low to negligible hazard” from ground gas.
- 8.94 As a result of high concentrations of ammonia detected in the nearby Broken Bank Drain, ground investigations in the late 1980s identified areas of high ammonia concentrations in the west of the Site. A groundwater pump and treat remediation system was then installed, which is understood to have ceased operation in the late 1990s due to a lack of funds rather than specific evidence of

remediation targets being reached. The extent and severity of remaining ammonia contamination is currently unknown.

- 8.95 In 1989, a sewer was constructed along the southern boundary of the Plot A4 area (i.e. between Plot A4 and the Main Site). In 1990, contamination was identified in the sewer described as oily water with volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbons (PAHs). It is understood that this then led to a site investigation in 1992, followed by pilot studies for a remediation options appraisal. However, there is no further information on any remedial action being implemented. The current condition of this sewer is not known.
- 8.96 In the mid-1990s, proposals to construct a ceramics factory on the eastern part of the Plot A4 area led to a series of remediation activities including an 18-month long programme of volatile organic compound (VOC) vacuum extraction within the former by-products area, construction of a bentonite cut-off wall around the by-products area and physical preparation of the eastern half of the Plot A4 area by dynamic compaction techniques. The bentonite cut-off wall is understood to extend to approximately 8m below ground level (bgl), or 3m - 4m below groundwater level although it is not thought to be “anchored” into a low permeability horizon. The vacuum extraction was reportedly successful in reducing VOC concentrations to below the remediation target value of 200 parts per million (ppm) (200 mg/kg), although VOCs are believed to have reappeared from a source located outside the treatment area. It is understood that this “hot spot” was investigated as part of the prospective development at that time but was not remediated.
- 8.97 Investigations identified made ground of thicknesses between 4m -6m in most parts of the Site. Outside of the area of landfill towards the northern boundary of the Plot A4 area, made ground is dominated by sand with localized pockets of demolition arisings, coal ash, slag, concrete, plastic and timber. The underlying Tidal Flat Deposits comprise clay, silt and sand and gravel with a possible thin layer of peat or organic silt/clay relict topsoil at the base of the made ground. Investigations of soil across the Plot A4 area identified elevated concentrations of VOCs and SVOCs (in particular benzene, xylene, naphthalene, chlorinated solvents and halogenated solvents), phenol, sulphates and heavy metals. Occasional organic type contamination (hydrocarbon odours) was reported in several locations, but no widespread evidence of visual or olfactory impacted soils has been reported and concentrations were below current generic industrial land use screening criteria for human health. Asbestos in soil was not identified during the most recent investigation.
- 8.98 Primary sources of contaminants on the Main Site and Plot A4 area, and in the immediate Site vicinity, comprise the widespread presence of made ground up to 6m in thickness and legacy contaminants associated with the former steelworks operations, particularly residual soil and groundwater contaminants in the area of the former by-products plant, former waste effluent pond (Plot A4 area) and former cooling ponds/current effluent lagoons in the southwest of site. Potential sources also include the storage of chemicals and fuels in above ground tanks associated with current paper mill operations. Formerly identified and potential contaminants include: metals, hydrocarbons (PAHs, VOCs & SVOCs including chlorinated solvents and petroleum), asbestos, ammonia, sulphate, cyanide, phenols and PCBs. The footprint of the former steelworks operations extends slightly beyond the application boundary, including beneath Weighbridge Road which bisects the two areas of the Site. These marginally off-site sources have been treated as on-site sources for the purposes of this CSM. Whilst there are no below ground sumps or interceptors at the Site in relation to drainage (with the exception of waste dye liquid sump holding tank and

WPS/New Social block foul waste tank), there is potential for localised areas of impact around the drainage where loss in integrity may have occurred.

8.3.5 Ground Gas

- 8.99 Previous ground gas monitoring in the last 20 years across the Site has recorded low ground gas concentrations, including monitoring in 2021 which recorded negligible gas concentrations. In April 2021 a ground gas risk assessment undertaken on the Site based on three monitoring rounds of site-specific data. A maximum gas screening value (GSV) of 0.072 litres/hour (l/hr) calculated for a peak methane concentration of 4.8% v/v at one location indicated a value marginally above the upper limit of 0.07 l/hr imposed under Characteristic Situation 1 (CS1). However, when considering the Site's current status, which includes for thick ground floor slabs, large internal spaces and well ventilated manufacturing structures, a CS1 classification (low risk), requiring no gas protection measures, was considered appropriate.
- 8.100 However, depleted oxygen concentrations recorded in two locations, was considered to represent a potential occupational health risk to construction workers undertaking subsurface works. As such, it was recommended that construction workers should be subject to appropriate risk assessments and protection measures for working in confined spaces with depleted oxygen, in accordance with current occupational health legislation. It was also stated that in the event of redevelopment an updated ground gas risk assessment may be required based specific development plans.

8.3.6 Ground Asbestos

- 8.101 Asbestos Containing Materials (ACMs) have been identified in the fabric of the existing buildings on the site. Due to the presence of made ground across the Site, there is also the potential to encounter asbestos in the soil. Asbestos has generally not been recorded in the made ground at any significant concentration however, if present, is thought likely to be present in isolated areas, associated with construction and demolition material from former structures. Asbestos in soil was not identified during the most recent investigation in 2021.
- 8.102 An asbestos management plan in line with the Control of Asbestos Regulations (CAR 2012) would need to be undertaken for the protection of site works from asbestos during the demolition and construction phases of the proposed development.

8.3.7 Contamination Assessment

- 8.103 Ground contamination risks at the site are discussed in detail in the Phase 1 Preliminary Land Quality Risk Assessment (PLQRA) (SLR, 2022) presented in **Technical Appendix 8.1** of this ES. The PLQRA includes a preliminary ground contamination risk assessment based on source – receptor – pathway and contaminant linkage methodology in accordance with best practice guidance – LCRM (EA, 2020).

8.3.8 Existing Environmental Receptors

8.104 The review of the baseline conditions has informed the identification of the following environmental receptors within the site and the surrounding areas which are susceptible to be affected by contamination hazards.

8.105 The identified environmental receptors are summarised in **Table 8-7**.

Table 8-7
Environmental Receptors

Category	Pathways	Receptor	Details
Human Health	Dermal contact, ingestion and inhalation of dusts, vapours and ground gas.	Demolition and Construction workers	Reworking of the contaminant impacted materials in made ground or natural strata during construction works can expose workers to contamination. Potential exposure to toxic and asphyxiant gases which may accumulate in confined spaces such as below ground infrastructure and buildings.
		Site users (site workers, visitors, site maintenance staff)	Direct contact and ingestion of potentially contaminated soils in areas of soft landscaping. Potential exposure to toxic and asphyxiant gases which may accumulate in confined spaces such as below ground infrastructure and buildings.
Property	Migration via permeable strata in soil and groundwater	Site buildings and infrastructure	Materials are primarily foundations, services, in particular potable water pipes. Foundations and services may be damaged by potentially aggressive conditions (e.g. sulphate and pH) present in soils.
Controlled Waters	Migration via permeable strata in soil and groundwater	Secondary Undifferentiated Aquifer – Tidal Flat Deposit	Groundwater in the underlying Tidal Flat Deposits could be impacted by contamination within the Made Ground and through spillages and leaks within site infrastructure and drainage systems. There is potential for piling to create a vertical contaminant migration pathway.
		Groundwater in bedrock Principal and Secondary A aquifers	The underlying groundwater in the Kinnerton Sandstone Formation is classified as a Principal Aquifer, the Pennine Lower Coal Measures and Gwespvr Sandstone as Secondary A Aquifers and the Bowland Shale Formation as Secondary Undifferentiated. There is potential for piling to create a vertical contaminant migration pathway.
		Surface water bodies surrounding the site and the Dee Estuary	The Dee Estuary is classified as a Site of Special Scientific Interest (SSSI); a Ramsar site, a Special Area of Conservation (SAC) and a Special Protection Area (SPA). The area to the north of Plot A4 is designated as a Site of Special Scientific Interest (SSSI). Surface water sensitivity is high by virtue of having surface water bodies close to three boundaries that connect to an

Category	Pathways	Receptor	Details
			estuary with numerous ecological designations. Greenwood Burn, Broken Bank Drain, White Sands Gutter as well as the Dee Estuary are identified as potential key receptors.

8.3.9 Surface Water and Groundwater Quality

- 8.106 Given the high ecological sensitivity of the surrounding water environment to the Site, a surface water and groundwater quality assessment will be undertaken to baseline conditions prior to the construction phase.
- 8.107 A series of groundwater monitoring wells will be installed into the Tidal Flat Deposits on the Site to obtain water quality data from this aquifer unit. The monitoring wells will also allow an assessment of groundwater flow direction and the potential impact from tidal fluctuations associated with the River Dee. The monitoring wells will capture groundwater quality within the aquifer on the Main Site, as well as boundary wells to the north along the Plot A4 Expansion Site boundary.
- 8.108 A series of water sampling locations will be selected at adjacent surface water bodies to the Site to set the baseline water quality within these receiving waters. The sampling locations will be selected to capture potential off site upstream impacts as well as the quality status in proximity to the Site. The surface water bodies in the vicinity of the Site drain towards to the south and west and therefore locations will be identified at key locations.
- 8.109 The surface water and groundwater quality data will enable determination of baseline quality prior to works commencing.

8.4 MITIGATION INCORPORATED INTO THE DESIGN OF THE DEVELOPMENT

- 8.110 A development-specific ground investigation will be undertaken to characterise soil and groundwater conditions at the Site and will include chemical and geotechnical testing, groundwater monitoring, ground gas monitoring and risk assessments to further inform the level of mitigation to be incorporated into the design of the proposed development.
- 8.111 It should be noted that the Site will continue to be regulated under the permitting regime and therefore any impacts to ground and groundwater, and water discharges from Site will be monitored and reported in compliance with accepted regulatory permit limits.

8.5 ASSESSMENT OF EFFECTS

- 8.112 This sub-section identifies the potential impacts of the proposed development to human health, controlled waters (groundwater, surface water), property and infrastructure prior to mitigation

during both the construction and operation of the proposed development. It also assesses the magnitude of each identified impact. The significance of any potential effect has been assessed (based on the sensitivity of the receptor) as described in **Table 8-2**. It should be noted that the magnitude of the potential impacts has been assessed as described in **Table 8-3**.

- 8.113 The proposed design and operation of the proposed development incorporates measures to mitigate potential impacts on the soil and water environment. Except where detailed in the development description above these measures are not included in the initial assessment of impacts so that their effect can be explicitly stated in the mitigation section of this Chapter.
- 8.114 Note that due to the surrounding large-scale manufacturing and energy generation land uses, and the distance to the closest residential properties over 1.3km away to the southwest in Connah’s Key, Wepre and Shotton, the exposure risk to human health at these manufacturing/industrial and residential receptors from the proposed development is unlikely to be realised from a land quality perspective. Therefore, given such a low sensitivity, these human health receptors have not been included within this assessment.
- 8.115 Due to the similar nature of activities and the continuity of works on the Site, demolition activities have been included within the construction phase assessment.
- 8.116 Key potential receptors for the land quality assessment and their sensitivity are summarised in **Table 8-8**.

Table 8-8
Environmental Receptor Sensitivity

Name	Direction	Distance at Nearest Point	Sensitivity	Reason for Sensitivity Class
Human Health – construction demolition workers	-	Onsite	Low	Adult age class in working environment undertaking activities in line with role and responsibilities, H&S protection measures, duty of care in place
Human Health – operational site workers / visitors	-	Onsite	Low	
Property - foundations & site infrastructure	-	Onsite	Low	Piled foundations designed with ground and groundwater conditions assessment undertaken. Site infrastructure includes services and potable water supply.
Superficial Aquifer - Tidal Flat Deposits Aquifer	-	Beneath the site	Low	Secondary (Undifferentiated) Aquifer. Poor quality status and no significant abstraction resource potential. May act as a potential pathway for migration of contamination to surface waters.
Bedrock Aquifer - Kinnerton Sandstone	-	Beneath the site	Low	Principal Aquifer. Poor quality status and only important on a regional scale. No

Name	Direction	Distance at Nearest Point	Sensitivity	Reason for Sensitivity Class
				abstractions within 1km and not located within an SPZ.
Bedrock Aquifer - Pennine Lower Coal Measures, Gwespys Sandstone,	-	Beneath the site	Low	Secondary A Aquifers. Poor quality status and only important on a regional importance. No abstractions within 1km and not located within an SPZ.
Bedrock Aquifer - Bowland Shale Formation	-	Beneath the site	Low	Secondary (Undifferentiated) Aquifer. Poor quality status and only important on a regional importance. No abstractions within 1km and not located within an SPZ.
Surface water - Lagoon 3	-	Onsite	Medium	This is the interface and buffer for surface water progressing from the site to two SSSIs and the SPA. Furthermore, it provides an important biodiverse and amenity feature within the site.
Surface water – Greenwood Burn	South	20m	Medium	Re-engineered natural drain. The level of Greenwood Burn is reportedly regulated by the Steelworks further to the south. May act as a potential pathway for migration of contamination to Dee Estuary.
Surface water – Broken Bank Drain	West	150m	Medium	Quality understood to be low with historical ammoniacal nitrate issues however is hydraulically connected to Dee Estuary SSSI.
Surface water – White Sands Gutter	West	390m	Medium	Quality understood to be low with historical ammoniacal nitrate issues however is hydraulically connected to Dee Estuary SSSI.
Surface water – Dee Estuary	West	965m	High	SSSI, SPA – internationally important population of waders and wildfowl

8.5.1 Potential Construction Phase Effects

8.117 The following section describes the pre-mitigation effects and significance during the construction phase. Due to the demolition works on Site having similar activities as construction, these activities have been combined together into the construction phase.

Human Health

Construction/Demolition Workers

- 8.118 It is identified that the construction phase may give rise to potential effects upon construction workers. Construction workers may be exposed to contaminants that are present in the made ground or shallow groundwater during earthworks exercises or general excavations. Asbestos is present within the fabric of the buildings on Site, and may potentially be encountered within the made ground. Metal, inorganic and hydrocarbon contaminants within the made ground have been found at concentrations that could pose a risk to construction worker's health through dermal contact, inhalation and ingestion. This will represent a potential inhalation risk to construction staff where materials are disturbed. The potential risk from ground gas is low, depleted oxygen concentrations have been considered to represent a potential asphyxiant occupational health risk to construction workers undertaking subsurface works.
- 8.119 There has been a history of potentially contaminative land uses on the Site. Whilst these are mainly historical associated with the former steelworks and benzole plant, it is possible there could be residual contamination present associated with these uses. In addition, whilst a series of Site investigations have not identified site-wide contamination impact, there could be localised areas of potential contamination associated with the made ground (including pockets of potential asbestos), previous areas of demolished development or localised leakages from site drainage infrastructure or bulk materials storage. A ground investigation will be undertaken prior to enabling works to characterise the status of ground and groundwater contamination, which will be followed by a Remediation Strategy to deal with areas of contamination.
- 8.120 Construction activities will include disturbance of the ground during earthworks and installation of foundations with associated dust generation and the potential to encounter asbestos and other contamination. The length of time of direct exposure will be limited to the duration of site works in which construction workers are directly involved. However, any health effects from potential contamination could have a medium to long term effect. Construction workers are assigned a low sensitivity due to the limited period of exposure and manufacturing site surroundings.
- 8.121 All construction workers would be subject to mandatory health and safety requirements under the Construction (Design and Management) (CDM) Regulations 2015 and the Control of Substances Hazardous to Health Regulations 2002 (as amended). Construction workers will be made aware of the possibility of encountering contaminated soils in made ground through toolbox talks. Safe working procedures will be implemented, good standards of personal hygiene will be observed and appropriate levels of personal protective equipment (PPE) and respiratory protective equipment (RPE) will be provided and utilised as necessary, thereby minimising the risk of exposure to potentially contaminated soils, ground gas and groundwater. Where risks are identified they can therefore be managed as part of the construction phase such that the risks to human health would be low.
- 8.122 The potential effects upon construction workers would be limited for the duration of the construction phase activities. As such, the overall magnitude of the effect upon health of demolition and construction workers during the construction phase is defined as '**negligible**'. The significance of the impact is therefore also '**negligible**'.

Operational site workers / visitors

- 8.123 Construction works that entail removal of structures or disturb and expose made ground will potentially release contaminants to the atmosphere, e.g. contaminated dust, asbestos fibres, or will encourage migration of contaminants through groundwater by creating new preferential pathways. Operational site workers and visitors may be affected by contact with contamination, such as direct contact with soil and groundwater, and inhalation of air-borne contamination. Any health effects from the possible contaminants could have a medium to long term effect.
- 8.124 The Site works will be managed under a Construction Environment Management Plan (CEMP) for environmental protection and in accordance with H&S requirements and legislation. This will include the control of contaminated materials and the prevention of the generation of airborne dusts. Asbestos containing materials identified on Site should be removed prior to demolition in accordance with the Control of Asbestos Regulations (CAR 2012) to ensure the potential risks are appropriately managed.
- 8.125 The magnitude of impact on operational site workers and visitors is '**negligible**' and the significance of effect would be '**negligible**'.

Property

Building Foundations & Infrastructure

- 8.126 It is identified that the construction phase may give rise to potential effects upon buildings foundations and other site wide infrastructure such as services and potable water either through exposure or placement within potentially aggressive conditions (e.g. sulphate and pH) or contact with contaminated soil and groundwater. Earthworks site enabling will be required and piled foundations will be required for the new structures. Due to the scale of the Site and the distance to adjacent industrial property, impacts are likely to be insignificant to off-site areas.
- 8.127 Prior to construction works an assessment of aggressive ground conditions in accordance with BRE Special Digest 1 (SD1) '*Concrete in Aggressive Ground*' will be undertaken to inform the design standard for concrete. A potable water assessment will be undertaken in accordance with UK Water Industry Research (UKWIR) '*Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites.*'
- 8.128 The magnitude of impact on building foundations and infrastructure is '**negligible**' and the significance of effect would be '**negligible**'.

Controlled Waters - Groundwater

Superficial Aquifer (Tidal Flat Deposits)

- 8.129 It is identified that the construction phase may give rise to potential effects upon the Tidal Flat Deposits Secondary Undifferentiated Aquifer. The Tidal Flat Deposit aquifer is of low resource potential due to its tidal nature and lack of known abstraction points, however it is assigned a

medium sensitivity due to its hydraulic connectivity to surrounding surface water which is much more sensitive. There is potential for site enabling earthworks and installation of piled foundations to disturb and mobilise potential contaminants as well as increase vertical migration due to generation of preferential pathways. Potential leakages or spillages of stored fuels and chemicals on the construction site during the earthworks could lead to the release of contaminants that could migrate to groundwater. A contaminated groundwater plume could potentially migrate off-site and impact on hydraulically connected surrounding sensitive surface water bodies (Greenwood Burn, Broken Bank Drain, White Sands Gutter).

- 8.130 Groundwater was encountered during previous site investigation works at relatively shallow depths below ground level of between 4m to 5m. There is therefore the potential for open excavations to act as a migration pathway for potential contamination into the underlying aquifer, either through increased leaching from rainwater, mobilising of residual contamination which otherwise would have been stable, or as a route for contaminated surface water and potential accidental spillages/leakages from site operations or construction machinery.
- 8.131 Hydrocarbon and metal contamination has been encountered within the unsaturated made ground at the Site. During construction, the removal of current hardstanding cover and opening up the ground will allow the temporary increased infiltration of surface water and thus potential migration of contamination from the made ground into groundwater within the underlying Tidal Flat Deposits. In addition, other construction phase activity such as removal of below ground infrastructure, sump pumping or uncontrolled discharge of dewatering excavations could lead to residual contamination being mobilised from the made ground and impacting groundwater, or for contaminated water to be discharged to site drainage or open ditches which could act as a soakaway to the underlying groundwater. Stockpiling of contaminated material as part of the enabling works could result in leaching to underlying groundwater if not properly managed. Construction operations will be undertaken with recognised best practice procedures and environmental protection measures will be captured and addressed within the CEMP which will include a groundwater protection management plan.
- 8.132 The magnitude of impact on groundwater within the Tidal Flat Deposits is **'low'** and the significance of effect would be **'minor'**.

Bedrock Aquifers (Kinnerton Sandstone, Pennine Lower Coal Measures, Gwespyr Sandstone, Bowland Shale Formation)

- 8.133 It is identified that the construction phase may give rise to potential effects upon the Kinnerton Sandstone, Pennine Lower Coal Measures, Gwespyr Sandstone and Bowland Shale Formation aquifers. The Kinnerton Sandstone is a Principal Aquifer which is assigned a medium sensitivity due to its regional importance as a potable groundwater resource. However, the Principal Aquifer is located at an assumed 45m depth and is hydraulically separated from the shallow and potentially contaminated made ground by significant thicknesses of Tidal Flat Deposits and relatively low permeability glacial clays. The Pennine Lower Coal Measures, Gwespyr Sandstone and Bowland Shale Formation secondary aquifers are of a lower strategic regional importance and are therefore of low sensitivity.
- 8.134 The foundation solution of the proposed development is likely to include piles which may extend to bedrock and therefore there is the potential for creating a downward vertical migration pathway for contamination to reach the bedrock aquifers. In the past, there has been remediation on Site to

address free phase hydrocarbons present in shallow groundwater. A ground investigation will be undertaken prior to enabling works to characterise the status of ground and groundwater contamination, which will be followed by a Remediation Strategy to deal with areas of contamination. A Piling Risk Assessment (PRA) will be undertaken to mitigate creating potential downward vertical contaminant migration pathways and the significant depth to the bedrock does provide some protection.

- 8.135 The magnitude of impact on groundwater within the bedrock aquifers is **'negligible'** and the significance of effect would be **'negligible'**.

Controlled Waters - Surface Water

Surface water bodies (Greenwood Burn, Broken Bank Drain, White Sands Gutter, Dee Estuary)

- 8.136 It is identified that the construction phase may give rise to potential effects upon nearby surface waters that include Greenwood Burn, Broken Bank Drain and White Sands Gutter and which are hydraulically connected to the Dee Estuary. Dee Estuary is classified as a Site of Special Scientific Interest (SSSI); a Ramsar site, a Special Area of Conservation (SAC) and a Special Protection Area (SPA). Surface water sensitivity is therefore high by having surface water bodies close to three boundaries that connect to an estuary with numerous ecological designations.
- 8.137 There are controls on site associated with the capture of surface water and discharge through a treatment plant, lagoons and a monitored permitted discharge. Enabling earthworks and installation of piled foundations have the potential to disturb and mobilise potential contaminants as well as increase contaminant impacts to groundwater and subsequent lateral migration to hydraulically connected surface water receptors. In addition, potential leakages or spillages of stored fuels and chemicals on the construction site during the earthworks could lead to the release of contaminants that could impact on groundwater which could migrate to surface waters. In addition, site activities could result in contaminated run-off that discharges to the site drainage system and via the on site effluent treatment process prior to discharge into the site lagoons. The monitoring system would be unlikely to automatically shut off the discharge as hydrocarbons are not monitored. However, it is not unreasonable to assume that if a spillage occurred the discharge from the lagoon would be shut off prior to hydrocarbons reaching this far through the system.
- 8.138 In addition, other construction phase activity such as removal of below ground infrastructure, sump pumping or uncontrolled discharge of detwatering excavations could lead to residual contamination being mobilised from the made ground and/or groundwater, and discharged to site drainage or open ditches which could act as a conduit to surface water bodies. Stockpiling of contaminated material as part of the enabling works could result in leaching to drainage and contaminated run-off to surface water if not properly managed. Construction operations will be undertaken with recognised best practice procedures and environmental protection measures will be captured and addressed within the CEMP which will include a surface water protection management plan.
- 8.139 The magnitude of impact on surface water is **'negligible'** and the significance of effect would be **'minor'**.

8.5.2 Potential Operational Phase Effects

- 8.140 The proposed development involves the replacement of an existing paper mill with a new containerboard manufacturing facility. Although the proposed development would utilise modern machinery and have a larger footprint and greater production, other than where stated in the wider application, the mill would continue to operate in the same manner in relation to the water environment and the requirements of a regulatory permit. The existing discharge permits would be retained for the site.
- 8.141 The following section describes the effects and significance once the proposed development is completed and operational.

Human Health

Operational site workers / visitors

- 8.142 The proposed development will be occupied by permanent site workers which include office users, plant and equipment operatives, engineers, maintenance workers and ancillary support such as administration and canteen staff. Visitors will include short term users such as vehicle and haulage operatives, office visitors and specialist maintenance workers. Site users will be at a greater exposure risk depending on task and role – for example, a maintenance worker needing to enter an enclosed space will be at greater risk than a worker within an office setting.
- 8.143 There has been a history of known historical contaminative land uses on the site and it is possible there could be residual contamination that remains within the made ground and surrounding below structures. There could be localised areas of potential contamination associated with the made ground (including pockets of potential asbestos), previous areas of demolished development or localised leakages from site drainage infrastructure or bulk materials storage. There is also a potential asphyxiant occupational health risk to maintenance workers undertaking subsurface works or working close to or within enclosed spaces such as drainage infrastructure.
- 8.144 A Site investigation will be undertaken to identify and characterise the contamination and ground gas risks during the construction phase, and remediation designs will be put in place to mitigate or remediate identified contamination such that no significant risk is posed to future users of the Site. In addition, a ground gas assessment will determine the requirement for ground gas protection measures in buildings to mitigate against ground gas migration into enclosed spaces.
- 8.145 Site operatives will be trained in health and safety awareness and controls will be in place to ensure protection of workers during Site activities. This will include the use of specialist PPE and training (e.g. enclosed spaces) to ensure that workers will not be put at risk from exposure to potential residual contamination or ground gas. Good welfare and hygiene practices will be followed and safe systems of work will be in place.
- 8.146 A large area of Site will consist of building footprint and hard cover with areas of soft landscaping which will provide further protection from the potential exposure to contamination. As such, where

contaminated ground risks are identified to site users, they can be managed as part of the construction works such that during the operational phase the risks to human health would be negligible.

- 8.147 The magnitude of the impact of the complete and occupied proposed development on human health during the operational phase is **'negligible'** and the significance of effect would be **'negligible'**.

Property

Building Foundations & Infrastructure

- 8.148 It is possible once the proposed development has been built that effects upon piled foundations and other Site wide infrastructure such as services and potable water could be impacted through exposure or placement within potentially aggressive conditions (e.g. sulphate and pH) or contact with contaminated soil and groundwater.
- 8.149 However, a ground investigation will have been undertaken to inform of the conditions present in relation to aggressive ground and contamination; and in relation to contamination more specifically, remediation designs will be put in place to mitigate or provide improvement that may reduce potential attack on below ground concrete foundations and infrastructure. Where contamination is identified in and around service and utilities then utility trenches will be backfilled with uncontaminated material, and potential additional secondary measures could include the use of barrier pipe, geosynthetic lining or clay seals to prevent the impact from contamination. To mitigate against aggressive ground then below ground concrete will be designed in accordance with the required design standard. Ground gas assessment will determine the requirement for ground gas protection measures in buildings to mitigate against ground gas migration into enclosed spaces.
- 8.150 In addition to this, the site's Environmental Management System (EMS) and Site Protection Management Plan (SPMP) under the regulatory permit will include site maintenance which will include infrastructure performance checks that will capture integrity loss in drainage systems and secondary forms of containment.
- 8.151 The magnitude of the impact of the proposed development on building foundations and infrastructure during the operational phase is **'negligible'** and the significance of effect would be **'negligible'**.

Controlled Waters - Groundwater

Superficial Aquifer (Tidal Flat Deposits)

- 8.152 There has been a history of known historical contaminative land uses on the Site and it is possible there could be residual contamination that remains within the made ground and surrounding structures. There could be localised areas of potential contamination associated with the made ground, previous areas of demolished development or localised leakages from Site drainage infrastructure or bulk materials storage. In addition to this, on-going operational activities could

result in spillages and leaks from Site infrastructure (e.g. drainage system) or plant and equipment that could impact on the ground condition and subsequently leach and migrate to the shallow groundwater table at 4 m to 5 m below ground level. There is a risk that contamination entering groundwater could result in a contaminant plume that could potentially migrate off-site and impact on hydraulically connected surrounding sensitive surface water bodies (Greenwood Burn, Broken Bank Drain, White Sands Gutter).

- 8.153 The proposed development would consist predominantly of hardstanding surface finishes with areas of soft landscaping through and around the development envelope. As such, the hardstanding areas would reduce infiltration into the underlying aquifers while the likely use of clean imported materials / suitable site material in soft landscaping areas would minimise the leachability risks. New drainage systems would be put in place and therefore the integrity of the system would be improved. There will be no proposed soakaway drainage and all surface water drainage would be captured and diverted through effluent treatment to the lagoon. The surface water detention basins and swales proposed on the Main Site and plot A4 Expansion Site respectively would be lined to prevent infiltration into the underlying made ground. A ground investigation will have been undertaken during the construction phase and remediation designs will be put in place to mitigate or provide betterment that will reduce potential contamination risk to the underlying groundwater. A Piling Risk Assessment (PRA) will have been followed to prevent potential for migration of contamination into the aquifer.
- 8.154 Storage and unloading of chemicals is the highest risk activity for a potential accidental spillage. However, areas of tank storage would have primary and secondary forms of containment in place to ensure the capture of any such leakages or spillages before reaching the ground. Such spillages would be directed to the foul drainage network and then subsequently through to the effluent treatment system. Whilst the intended operation is that all activities involving chemicals would be completed within areas that drains to the effluent system, there could be minor spillages of chemicals or hydrocarbons / oils outside of these areas. The risks in car parking and along roadways with moving vehicles is considered to be mitigated by the SuDS management train.
- 8.155 The site will continue to be regulated under an operational permit and therefore measures will be in place to monitor and protect against the release of contamination; and where an impact is identified under the permit, remediation would need to be undertaken. The Site's Environmental Management System (EMS) and Site Protection Management Plan (SPMP) under the regulatory permit will include site maintenance which will include infrastructure performance checks that will capture integrity loss in drainage systems and secondary forms of containment.
- 8.156 The magnitude of the impact of the proposed development on groundwater within the Tidal Flat Deposits during the operational phase is '**negligible**' and the significance of effect would be '**negligible**'.

Bedrock Aquifers (Kinnerton Sandstone, Pennine Lower Coal Measures, Gwespyr Sandstone, Bowland Shale Formation)

- 8.157 The foundation solution of the proposed development will include piles which are likely to extend and terminate in the Tidal Flat Deposits. There is therefore a low potential for creating a downward vertical migration pathway for contamination to reach the bedrock aquifers.

- 8.158 However, a Piling Risk Assessment (PRA) will have been undertaken to mitigate creating potential downward vertical contaminant migration pathways and the significant depth to the bedrock does provide protection from potential shallow site derived contamination.
- 8.159 The magnitude of impact on groundwater within the bedrock aquifers during the operational phase is **'negligible'** and the significance of effect would be **'negligible'**.

Controlled Waters – Surface Water

Surface water bodies (Greenwood Burn, Broken Bank Drain, White Sands Gutter, Dee Estuary)

- 8.160 Surface water is highly sensitive around the Site due to the potential for Greenwood Burn, Broken Bank Drain and White Sands Gutter to hydraulically connect into the Dee Estuary which has numerous ecological designations. There are no direct site discharges into these surface water bodies, other than the regulated permitted discharge from the site at Lagoon 3 which connects through a below ground pipeline to an off-site discharge point at White Sands Gutter further to the west of the Site prior to entering the Dee Estuary. There is the potential for shallow groundwater within the Tidal Flat Deposits beneath the site to migrate and hydraulically connect into the surface water bodies that surround the Site.
- 8.161 The operational surface water drainage of the proposed development would be similar in nature to the existing system. All drainage from process areas would be directed to the site effluent treatment prior to entering lagoon 3 and being discharged from site via the regulated discharge point. The discharge point would continue to be monitored for biological oxygen demand (BOD) suspended solids, pH, ammoniacal nitrogen, temperature and flow. There would be no below ground oil/water interceptors or below ground tanks along the drainage system due to the presence of the treatment works on site. Other surface water from hardstanding areas and roof drainage will be managed via a SUDS management train and water quality mitigation has been assessed in line with guidance.
- 8.162 During the operational phase there is the potential for leakages or spillages from plant and equipment or from stored fuels and chemicals in tank storage areas to enter the surface water system. Whilst chemicals and fuels will be delivered to areas where hardstanding is present and storage tanks will be located within self-contained bunded areas, as part of unloading there is the potential for a relatively large scale spillage event to enter the effluent drainage system in significantly higher concentrations than the system has been designed for, overwhelm the treatment plant and have potential for water quality impacts to the discharge to the lagoon. Shallow groundwater within the Tidal Flat Deposits could become contaminated following accidental leaks and spillages, that could migrate as a contaminant plume within the groundwater, and potentially impact on surface water bodies surrounding the Site that hydraulically connect with the ecologically sensitive Dee Estuary.
- 8.163 However, the system has been designed to treat the water beyond the requirements for discharge (to allow reuse as clean process water) and there are controls on site associated with the capture of potentially contaminated surface water and discharge through the treatment plant, lagoons and a monitored permitted discharge. The monitoring system would be unlikely to automatically shut off the discharge as hydrocarbons are not monitored. However, it is not unreasonable to assume

that if a spillage occurred the discharge from the lagoon would be shut off prior to hydrocarbons reaching this far through the system and the discharge from the treatment plant into the lagoon would be significantly diluted. The lagoon also has a large freeboard and discharge from the lagoon could be stopped while remediation is completed.

- 8.164 There will be a SUDS management train and effluent treatment system on site to prevent any contaminant releases from reaching the site lagoon. Whilst the discharge from the lagoon is not monitored for some contaminants (e.g. oils and hydrocarbons), and therefore there is the low possibility of slightly contaminated water potentially being discharged to White Sands Gutter, it is considered to be of a negligible magnitude given the control systems in place and the subsequent high levels of dilution within the lagoon prior to any discharge taking place.
- 8.165 The Site will continue to be regulated under an operational permit and therefore measures will be in place to monitor and protect against the release of contamination; and where an impact is identified under the permit, remediation will need to be undertaken. The Site's Environmental Management System (EMS) and Site Protection Management Plan (SPMP) under the regulatory permit will include site maintenance which will include infrastructure performance checks that will capture integrity loss in drainage systems and secondary forms of containment. It is anticipated that any deterioration in groundwater quality would be captured by the ongoing permit requirements prior to any potential contaminant groundwater plume from forming and impacting on any hydraulically connected surface water bodies.
- 8.166 The magnitude of impact on surface water during the operational phase is '**negligible**' and the significance of effect would be '**minor**'.

8.6 MITIGATION MEASURES

- 8.167 The key objective of mitigation is to avoid, offset or reduce the significant adverse effects of the proposed development. Mitigation can be carried out through design or management, and the strategy should be informed by the following hierarchy of options:
- Avoidance;
 - Reduction;
 - Compensation;
 - Remediation; or
 - Enhancement.

Construction Phase

- 8.168 A Site investigation will have been undertaken to identify and assess potential contamination sources. The investigation will have considered the made ground, groundwater and ground gas regimes and will include asbestos screening of soil samples.

- 8.169 The Site investigation will aim to generate site specific data that will be used to refine the preliminary conceptual site model and risks assessments undertaken in the Phase 1 Preliminary Land Quality Risk Assessment (PLQRA) (SLR, 2022) presented in **Technical Appendix 8.1** of this ES.
- 8.170 Following the ground investigation, a generic quantitative risk assessment (GQRA) will be undertaken and, if required, will be followed by a detailed quantitative risk assessment (DQRA). Where contaminant risks remain, remediation works may be required to reduce the risks from potential contamination to identified receptors. A remediation strategy / remediation method statement will be developed to outline the remediation required and the verification plan. It is possible that remediation may not be required and that contamination risks can be managed through a materials management approach. Where site won material is proposed to be segregated, screened, crushed and re-used a Materials Management Plan (MMP) is to be developed to ensure the suitable re-use of material and the implementation of an auditable tracking system. Where required, appropriate risk management measures e.g. cover systems, bulk fill, capping layers; will be incorporated into the detailed scheme design. A watching brief would be implemented during the site enabling excavation to ensure that any unexpected contamination within the made ground and around infrastructure such as drainage is rapidly identified, risk assessed and dealt with appropriately. On the completion of the works a Verification Report will be completed documenting works undertaken in accordance with the remediation strategy including material tracking, findings during the watching brief and details of import and disposal of material.
- 8.171 All demolition and construction workers would be subject to mandatory health and safety requirements under the Construction (Design and Management) (CDM) Regulations 2015 and the Control of Substances Hazardous to Health Regulations 2002 (as amended). Construction workers will be made aware of the possibility of encountering contaminated soils in made ground through toolbox talks. Safe working procedures will be implemented, good standards of personal hygiene will be observed and appropriate levels of personal protective equipment (PPE) and respiratory protective equipment (RPE) will be provided and utilised as necessary, thereby minimising the risk of exposure to potentially contaminated soils, ground gas and groundwater. The associated hazards of handling potentially contaminated materials will be conveyed to all site workers and all works will be conducted in accordance with the Health and Safety Executive publication entitled 'Protection of Workers and the General Public during the Development of Contaminated Land' (1991).
- 8.172 A Construction Environmental Management Plan (CEMP) will require implementation taking into account relevant good site practice with respect to the handling of potentially contaminated material, which will be enforced and monitored throughout the construction phase. This is to include both a surface water and groundwater protection management plan. Water/dust suppressant should be sprayed onto material being worked to damp down any potentially contaminated dust and prevent it from becoming airborne. All on-site fuel, and chemical storage would be above ground and would be lined and bunded. Emergency spill response kit would be provided and maintained on site and site personnel would be trained in their use; direct discharge of dewatered pumping to adjacent surface water bodies would be forbidden; stockpiling good practice is to be followed which would include basal protection, bunding, sheet covering and management of leachate water and wheel cleaning should be carried out on exit to the Site to minimise tracking of sediment onto adjacent roads.

- 8.173 Identified asbestos containing materials will be removed prior to demolition in accordance with the Control of Asbestos Regulations 2012 to ensure the potential risks are appropriately managed. In addition, a pre-demolition asbestos survey will be undertaken and an Asbestos Management Plan (AMP) developed prior to works commencing for detailing with asbestos encountered in made ground.
- 8.174 Care will have to be taken when working around or in excavations, with workers having appropriate training such as confined space training as appropriate. Excavations, especially through gravels, should be confirmed as being stable, and shored up where necessary, before anyone is allowed to enter them.
- 8.175 Removal of the existing hardstanding at the Site should be undertaken in stages, rather than being undertaken in one continuous activity. Removal of the hardstanding could open up unprotected ground and result in fluxes of mobilised contamination due to increased potential for surface water / rainwater infiltration. The phasing of hardstanding removal and surface water management controls will be included within the CEMP.

Operational Phase

- 8.176 The operational site would have an Environmental Management System (EMS) which will include the following information:
- Roles and responsibilities for environmental management of the site;
 - Detailed methodology for managing of any materials, process water and chemicals;
 - Details of site drainage and water management including inspection and maintenance regimes; and
 - Measures for identifying and addressing any pollution incidents should these occur.
- 8.177 The following standard good practice measures would be incorporated and expanded upon within the plan:
- The use and storage of potentially polluting materials on site, including oils and fuel, would be minimised as far as is reasonably possible;
 - All on-site fuel, and chemical storage would be above ground and would be lined and banded;
 - Emergency spill response kit would be provided and maintained on site and site personnel would be trained in their use; and
 - A vehicle management system including strict speed limits and road markings would be put in place wherever possible to reduce the potential conflicts between vehicles and thereby reduce the risk of collision; and
 - Direct discharge of sediment laden or contaminated water to adjacent surface water bodies would be forbidden.

Whilst no substantially significant effects are expected from the proposed development in relation to ground conditions, mitigation measures are provided in **Table 8-8**. These are separated into design, construction and operation management measures which should be adhered to in accordance with best practice procedures.

**Table 8-8
Mitigation Measures**

Category	Description
Design measures	A detailed site investigation including investigation of the made ground, groundwater and ground gas monitoring for geo environmental purposes will be undertaken to identify potential areas of contamination that need to be delineated and managed as part of site demolition and construction
	A baseline investigation, monitoring and assessment of surface water and groundwater quality will be undertaken prior to works commencing.
	A Remediation Strategy / Remediation Method Statement will be prepared on completion of the site investigation to address any pollutant linkages identified. This will be supplemented by a Materials Management Plan (MMP) to ensure the sustainable re-use of materials on site.
	A Piling Risk Assessment will be completed to confirm the preferred piling methodology for protection of the water environment and aquifer protection measures that may need to be included incorporating principles of 'Piling in Contaminated Ground' to minimise potential migration along piling shafts.
	Specification of concrete used in foundations and building structures will be selected based on the results of soil and groundwater sulphate analyses. Guidance is provided by the Building Research Establishment (BRE) series 'Concrete in Aggressive Ground'.
	Installation of service pipes will be suitable to the site ground conditions in consultation with the local water provider.
	Ensure appropriate audit trail, testing frequency and verification to ensure chemically suitable materials across the site, in particular in landscaped areas and imported materials.
	Design substructure with an appropriate level of protection to ground gases where necessary.
Demolition and Construction Management	A Remediation Strategy / Remediation Method Statement will be prepared on completion of the site investigation to address any contaminant linkages identified. This will include an environmental watching brief is implemented during the course of the groundworks. Any unexpected finds of contamination will be dealt with under a revision to the Remediation Method Statement.
	A Refurbishment / Demolition Asbestos Survey will be undertaken to identify the presence or absence of any Asbestos Containing Materials (ACMs) within existing site structures. Any ACMs will be removed by appropriately licenses specialists prior to substructure construction.
	The following measures detailing provisions for environmental protection should be included in the Construction Environment Management Plan (CEMP) and followed during construction: <ul style="list-style-type: none"> • Measures for the management of site drainage, accidental spills and storage of materials to prevent pollution of surface and groundwater (including establishment of emergency response procedures in accordance with NRW / Environment Agency guidelines and provision and maintenance of spill containment equipment); • Risk to construction workers to be dealt with by the Contractor. The Contractor will be responsible for site health and safety and will manage the risk through control of suitable Health and Safety measures including provision of Personal Protective Equipment (PPE), education of the workforce and inductions for all site staff and visitors; • Good site practice measures with regards to the on-site storage, handling and transfer of fuels, chemicals and waste material; • Phasing of removal of surface hard cover and surface water management controls; • Adherence to Pollution Prevention Guidelines; • Regulation of Health and Safety Rules including provision welfare facilities; • A material management plan and tracking system will be put in place for managing all excavated soils prior to transfer to a treatment centre or disposal by a suitably licensed contractor. All copies of the paper work and transfer notes will be retained on site; • Verification testing will be carried out for landscape areas and imported materials; and • An environmental watching brief during site enabling works.
	A Verification Report will be prepared on completion of the groundworks phase detailing the works undertaken, any unexpected finds of contamination, how this was dealt with and import/export of material including disposal.

Operational Management	The Environmental Management System (EMS) will include site maintenance, storage of fuels, chemicals, waste management and emergency response procedures to protect the soil and groundwater from operational activities
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8.6.1 Cumulative Effects Assessment

- 8.178 The environmental plan for the operation of the site and the mitigation measures outlined above would reduce the risks from this development to insignificant. The Site would undergo a process of betterment through remediation of any encountered soil and groundwater contamination to an acceptable standard for the protection of the identified receptors. However, cumulative impacts can occur from similar developments and land uses within the surrounding area.
- 8.179 There are 2 planning applications within a 1km radius of the proposed development which are of a scale to potentially have cumulative impacts with this Site:
- Erection of an advanced gasification plant on Weighbridge Road located adjacent to the southeast of the site on the Deeside Industrial Park (reference 063104)
- 8.180 The proposed gasification plant will be constructed under a planning permission with contaminated land controls in place for the site enabling and construction phase of works. The Site itself will be regulated under an operational permit and therefore Site measures will be in place to monitor and protect against the release of contamination; and where an impact is identified under the permit remediation will need to be undertaken. It can be assumed that under normal operational conditions there would be negligible cumulative impact from discharge to the water environment.
- 8.181 The cumulative effect of the proposed development is not considered significant.

8.6.2 Further Survey Requirements and Monitoring

- 8.182 Surface water and groundwater monitoring is being completed to generate a baseline condition of the local water environment. Following the start of construction the following is proposed.

Construction Phase

- 8.183 During construction, to continue monitoring surface water and groundwater quality at the locations where the baseline conditions were measured.

Operational Phase

- 8.184 Once operational, surface water and groundwater quality to be monitored in line with the requirements of the environmental permit.

8.7 SUMMARY AND STATEMENT OF SIGNIFICANCE

- 8.185 Whilst there will be effects during the construction phase of the development, the adoption of the standard mitigation measures and adoption of best practice techniques would result in **'negligible'** land quality effects. During construction, potential risks will be managed through appropriate design and construction techniques together with appropriate site management procedures.
- 8.186 The implementation of risk management measures to mitigate any identified areas of contamination within the Site will be undertaken throughout the site enabling and construction phase of the development, such that existing contaminant linkages will have been broken prior to the operational phase of the development. Activities during the operational phase of the proposed development have the potential to create additional contaminant sources on the site. However, it is considered likely that the magnitude of effects due to contamination during the operational phase of the development will be **'negligible-minor'** as site operations will be undertaken under appropriate operational management procedures which will be controlled under regulatory permitting requirements.
- 8.187 Provided the mitigation measures outlined in Table 8-8 are adopted, the overall significance of the environmental effects during the construction phase of the proposed development with respect to land quality are considered **'negligible-minor'**.
- 8.188 The overall significance of the environmental effects of the proposed development with respect to land quality during the operational phase is considered **'negligible-minor'**. Whilst the proposed development will improve and provide betterment to existing ground conditions through the reduction and/or remediation of potential contamination and new infrastructure will provide protection is in place to control potential releases, there remains a residual risk for contamination to potentially impact on surface waters.
- 8.189 The significance findings are summarised in **Table 8-9**.

**Table 8-9
Significance Reduction through Mitigation Measures**

Effect Feature / Receptor	Sensitivity	Post Mitigation				Comment on Significance Reduction (Ref. Table 8-8)
		Pre Mitigation		Post Mitigation		
		Magnitude	Significance	Magnitude	Significance	
Construction						
Construction / Demolition Workers	Low	Negligible	Negligible	Negligible	Negligible	<ul style="list-style-type: none"> • CEMP • Use of PPE • Site Investigation and informed Remediation Strategy • Asbestos Survey & Asbestos Management Plan (AMP)
Operational site workers / visitors	Low	Negligible	Negligible	Negligible	Negligible	<ul style="list-style-type: none"> • CEMP • Site Investigation and informed Remediation Strategy • Asbestos Survey & Asbestos Management Plan (AMP)
Building Foundations & Infrastructure	Low	Negligible	Negligible	Negligible	Negligible	<ul style="list-style-type: none"> • CEMP • Site Investigation and informed Remediation Strategy • Asbestos Survey • CEMP • Aggressive ground conditions / ground gas assessments
Tidal Flat Deposits	Low	Low	Minor Adverse	Low	Minor Adverse	<ul style="list-style-type: none"> • CEMP • Site Investigation and informed Remediation Strategy, Watching Brief & Verification • Piling Risk Assessment • Water Quality Monitoring • MMP
Bedrock Aquifers	Low	Negligible	Negligible	Negligible	Negligible	<ul style="list-style-type: none"> • Piling Risk Assessment
Surface Waters	High	Negligible	Minor Adverse	Negligible	Minor Adverse	<ul style="list-style-type: none"> • CEMP • Site Investigation and informed Remediation Strategy, Watching Brief & Verification • Water Quality Monitoring • Piling Risk Assessment
Operation						

Effect Feature / Receptor	Sensitivity	Pre Mitigation				Post Mitigation		Comment on Significance Reduction (Ref. Table 8-8)
		Magnitude	Significance	Magnitude	Significance			
Operational site workers / visitors	Low	Negligible	Negligible	Negligible	Negligible	<ul style="list-style-type: none"> Operational risk management & permitting requirements Verification Report 		
Property	Low	Negligible	Negligible	Negligible	Negligible	<ul style="list-style-type: none"> Ground Gas Protection (if required) Concrete design classification Suitable installation of services Verification Report Operational risk management & permitting requirements 		
Tidal Deposits	Flat Low	Low	Minor Adverse	Low	Minor Adverse	<ul style="list-style-type: none"> Operational risk management & permitting requirements Verification Report 		
Bedrock Aquifers	Low	Negligible	Negligible	Negligible	Negligible	No change		
Surface Waters	High	Negligible	Minor Adverse	Negligible	Minor Adverse	<ul style="list-style-type: none"> Operational risk management & permitting requirements 		

8.190 A summary of the residual effects on land quality associated with the proposed development are summarised in **Table 8-10**.

**Table 8-10
Summary of Residual Effects**

Effect Feature	Description of Effect	Residual Effects	
		Duration	Significance
Construction Phase	Construction/demolition workers may come into contact with contaminated soils/waters through ingestion/exposure inhalation pathways.	Short-term	Negligible
	Construction/demolition workers exposed to dust emissions and demolition waste including asbestos during the demolition phase of the development.	Short-term	Negligible
	Contaminated soils may migrate and be deposited as airborne dust.	Short-term	Negligible
	Ground gases can accumulate in confined spaces to which construction workers could be exposed, leading to potential asphyxiation.	Short-term	Negligible
	Operational site workers / visitors exposed to contaminated dust emissions and airborne asbestos during the demolition and construction phase	Short-term	Negligible
	Operational site workers / visitors exposed to ground gases in confined spaces leading to potential asphyxiation.	Short-term	Negligible
	Mobilisation of contaminants during earthworks and creation of preferential pathways during piling construction affecting groundwater quality in the Tidal Flat Deposits and Bedrock Aquifers.	Short-term	Minor Adverse
	Mobilisation of contaminants during earthworks and impacts to groundwater resulting in migration impacts to surrounding surface waters	Short-term	Minor Adverse
	Release of historic residual contaminants from made ground and around site infrastructure into surface water drainage system and drainage ditches	Short-term	Negligible
Operational Phase	Operational site workers / visitors exposed to contaminated soils at the surface of the completed development or through potable water supply	Long-term	Negligible
	Above-ground activities are unlikely to affect ground conditions and are likely to improve surface water discharge quality	Long-term	Negligible
	Potential for spillages and leakages from activities on site to impact on shallow groundwater within the Tidal Flat Deposits	Long-term	Minor Adverse
	Potential for discharge of hydrocarbons from the site lagoon to impact on surface water	Short-term	Minor Adverse
	Ground gases can accumulate in confined spaces. Operational site / maintenance workers could be exposed leading to potential asphyxiation.	Long-term	Negligible
	Contaminated soils/water could affect services via direct contact.	Long-term	Negligible

Effect Feature	Description of Effect	Residual Effects	
		Duration	Significance
	Contaminated soils/water could affect site structures via direct contact.	Long-term	Negligible

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9.1 INTRODUCTION

- 9.1 This chapter of the Environmental Statement (ES) considers the impact of the proposed development on the local hydrology (including both surface water and groundwater), flood risk and drainage at the Site and in the surrounding area. It seeks to identify possible hydrogeological and hydrological impacts associated with the proposed development during both the construction and operational phases, including impacts associated with the required changes in the abstraction and discharge regime.
- 9.2 It should be noted that, as an impact assessment, this chapter does not explicitly consider the risk of flooding to the proposed development but does consider how the proposals may alter flood risk at the Site and elsewhere.
- 9.3 The flood risk to the proposed development is considered separately in a Flood Consequence Assessment (FCA) which is enclosed as **Technical Appendix 9.1**. Also within this report is information on the outline surface water drainage strategy (SWDS).

9.2 APPROACH AND METHODOLOGY

- 9.4 This hydrology and flood risk chapter:
- describes the existing baseline established from desk studies, dedicated surveys and consultation;
 - outlines the potential environmental effects on hydrology and flood risk arising from proposed development, based on the information gathered and the analysis and assessments undertaken to date;
 - identifies any assumptions and limitations encountered in compiling the environmental information; and
 - highlights any necessary monitoring and/or mitigation measures which could prevent, minimise, reduce or offset the possible environmental effects identified.

9.2.1 Legislation and Planning Policy

- 9.5 Reference has been made to relevant legislation, planning policy, technical guidance and other codes of best practice in the design of the proposed development to limit,
- the potential for contamination of ground and surface waters,
 - the potential for flooding to be caused or exacerbated by the proposed development, and
 - other potential impacts on the water environment.
- 9.6 The proposed development would therefore be in accordance with the following legislation, guidance and planning policies.

Legislation

- 9.7 Water within the local area of the proposed development is currently regulated according to the following key European Commission (EC) Directives and the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017. These legislations will remain extant and applicable within Wales despite Brexit until they are either superseded by national legislation by the UK government or devolved assembly.

Water Framework Directive

- 9.8 The Water Framework Directive (2000/60/EC) (the "WFD") provides the foundation for the protection of the UK's water environment. The WFD seeks to protect all elements of the water cycle and to enhance the quality of groundwater, surface waters, estuaries and coastal waters. The Directive is transposed and implemented within England and Wales through the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017.

Groundwater Directive

- 9.9 The Groundwater Directive (2006/118/EC, including amendments to Annex II detailed under Directive 2014/80/EU) (the "GWD") is designed to combat groundwater pollution and sets out procedures for assessing the quality of groundwater. Aspects of the GWD are transposed and implemented through the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017, the Environmental Permitting (England and Wales) Regulations 2016 and the Groundwater (Water Framework Directive) (Wales) Direction 2016.

Floods Directive

- 9.10 The European Floods Directive (2007/60/EC) requires assessment of all watercourses and coastlines to determine risk of flooding and action to take adequate and coordinated measures to reduce this flood risk. The Flood Risk Regulations 2009 transpose the EU Floods Directive into law in England and Wales.
- 9.11 The Flood and Water Management Act 2010, which largely devolved powers in relation to flood risk management in Wales to Welsh Ministers.

Freshwater Fish Directive

- 9.12 The Freshwater Fish Directive (78/659/EEC) (recodified 2006/44/EC) was originally adopted on 18th July 1978 but consolidated in 2006. The Directive seeks to protect freshwater bodies identified as waters suitable for sustaining fish populations. For those waters identified (salmonid waters and cyprinid waters), physical and chemical water quality objectives are set. Waters protected under the Directive are formally designated through the issue of a notice. In Wales the notice is issued by the Department for Environment, Food and Rural Affairs (DEFRA) and it places an obligation on the Natural Resources Wales (NRW) to ensure that designated waters meet their objectives.

Nitrates Directive

- 9.13 The Nitrates Directive (91/676/EEC) aims to reduce water pollution by nitrate from agricultural sources and to prevent such pollution occurring in the future. The directive requires DEFRA and the

WG to identify surface or groundwaters that are, or could be, high in nitrate from agricultural sources. Nitrogen is one of the nutrients that can affect plant growth. Surface waters also have to be identified if too much nitrogen has caused a change in plant growth which affects existing plants and animals and the use of the water. Once a water body has been identified, all land draining to that water is designated as a Nitrate Vulnerable Zone.

Planning Policy

Planning Policy Wales

9.14 Planning Policy Wales (PPW) sets out the Government's planning policies for Wales and how they are expected to be applied. PPW, Technical Advice Notes (TAN's), circulars and policy clarification letters comprise national planning policy. The PPW states that:

- Planning policies, decisions and proposals should promote resource-efficient and climate change resilient settlement patterns that minimise land-take (and especially extensions to the area of impermeable surfaces) and urban sprawl, especially through preference for the re-use of suitable previously developed land and buildings, wherever possible avoiding development on greenfield sites;
- When drawing up policies and proposals for their area local planning authorities must acknowledge that government resources for flood and coastal defence projects are directed at protecting 'existing' developments and are not available to provide defences in anticipation of future development. A sustainable approach to flooding will therefore involve the avoidance of development in flood hazard areas and, where possible or practical, the encouragement of managed retreat, the creation of wash-lands and floodplain restoration;
- Development plans should take water-related issues into account from an early stage in the process of identifying land for development and redevelopment. New development should be located, and its implementation planned in such a way as to allow for sustainable provision of water services, in particular minimising vulnerability to the impacts of climate change. Design approaches and techniques that improve water efficiency and minimise adverse impacts on water resources, surface water quality, the ecology of rivers and groundwater should be encouraged;
- Development proposals should also include features that provide effective adaptation to, and resilience against, the current and predicted future effects of climate change. This could be achieved, for example, by incorporating green space to provide shading and the use of sustainable drainage systems to reduce run-off;
- The adequacy of water supply and the sewage infrastructure are material in considering planning applications and appeals. The need to balance the growing demand for water with the needs of the environment is crucial;
- Even where there is theoretical capacity, timely investment in infrastructure is required to ensure that new development does not adversely affect water supplies, water quality or sewerage. These issues require early identification when locating future development. Local planning authorities should therefore encourage the use of sites where existing water supply and/or drainage provision problems can be solved and seek to avoid the use of sites where adequate water supply and/or drainage provision is unlikely to be achieved;
- Development proposals in sewered areas must connect to the main sewer, and it will be necessary for developers to demonstrate to local planning authorities that their proposal site can connect to the nearest

main sewer. To ensure consistency of design and facilitate long-term maintenance, sewers should be built to an adoptable standard, and developers should consult sewerage undertakers in the early stages of design and planning.

Technical Advice Note – TAN 15

- 9.15 Technical Advice Note (TAN) 15 provides technical guidance which supplements the policy set out in PPW in relation to development and flooding.
- 9.16 National Assembly for Wales produced the ‘Technical Advice Note (TAN15)’ in July 2004. An update to TAN15 was published and due to come into force 1st December 2021, however on 23rd November 2021 the Minister for Climate change sent a letter informing local authorities that this will now not come into force until 1st June 2023. The 2004 TAN as the enforced guidance will be referred to as TAN 15 whilst the updated version will be referred to as TAN15 (2021)
- 9.17 Associated with the TAN15 (2021) was updated modelling (Flood Map for Planning, Wales¹) which included more extreme climate change modelling than the Development Advice Maps². Taking a conservative approach this modelling has also been assessed against the Development Advice Map to give a strong understanding of flood risk towards the end of the development lifetime.
- 9.18 Currently the majority of the site is located within Flood Zone B (medium risk) as defined by the Development Advice Maps published by NRW and referenced in TAN 15. This category relates to presence of geological indicators of flood risk. Any modelling informing the Development Advice Maps does not include the presence of flood defences. The Flood Map for Planning (which does include defences and if defined from modelling) indicates that the site is located within Flood Zone 1 (the lowest risk category). This is associated with the Sites elevation.
- 9.19 In relation to new development within Zone B, TAN 15 states that:
- “When considering allocations in Zone B, local planning authorities should consult the Environment Agency³ to ascertain whether flooding raises a significant constraint in terms of land use. It is not expected that an assessment of the consequences be undertaken at the plan preparation stage but should flooding be considered an issue then policies outlining the appropriate requirements should be included in the plan, in accordance with Sections 6 and 7, and Appendix 1.”* It is considered that developers should provide the evidence that Flood Zone B does not raise a significant constraint to the proposed development.
- 9.20 TAN15 also requires new developments to reduce the causes and impacts of surface water flooding by implementing the Sustainable Drainage System (SuDS).

1 Natural Resources Wales, Flood Map for Planning (Accessed December 2021)
<https://flood-map-for-planning.naturalresources.wales/>

2 Natural Resources Wales, Development Advice Map (Accessed December 2021)
<https://naturalresources.wales/evidence-and-data/maps/long-term-flood-risk/?lang=en>

³ Environment Agency modelling is used to inform the Development Advice Maps as TAN 15 was published prior to the devolution of powers relating to flood management and the formation of NRW. NRW now holds this information.

9.21 With respect to surface water runoff from new development, TAN15 states that:

“SuDS can perform an important role in managing run-off from a site and should be implemented, wherever they will be effective, in all new development proposals, irrespective of the zone in which they are located.

Development in one part of a catchment may increase run-off and hence flood risk elsewhere, therefore, the aim should be for new development not to create additional run-off when compared with the undeveloped situation, and for redevelopment to reduce run-off where possible. It is accepted that there may be practical difficulties in achieving this aim.”

National Strategy for Flood and Coastal Erosion Risk Management in Wales

9.22 In accordance with the Flood and Water Management Act, 2010, the Welsh Government has prepared the ‘National Strategy for Flood and Coastal Erosion Risk Management in Wales’ in November 2011.

9.23 In relation to flood risk management, it states that:

“Drainage and defence still have a place within a flood and coastal erosion system based on the principals of risk management, but we also need to considered other options that could reduce both the likelihood of an event occurring and the consequence of those events”.

9.24 Examples of other options that could be used include:

- deploying sustainable drainage systems more widely;
- incorporating greater resilience into the design of developments and
- ensuring wider awareness of individual risk to increase levels of preparedness and planning for flood events.

9.25 It is also requires the development of Local Development Plans to include adequate provisions in respect of flood and coastal erosion risk in compliance with the requirements of Planning Policy Wales and relevant Technical Advice Note (TAN15).

SuDS Approval Body

9.26 The Flood and Water Management Act 2010 which came into effect on 7 January 2019 states all Welsh developments of more than one dwelling house or with a construction area greater than 100m² must incorporate SuDS and these must gain the approval from the SuDS Approval Body (SAB) prior to the start of construction. Flintshire County Council are the SAB for the proposed development.

9.27 The proposed development intends to keep the SuDS feature privately owned, operated and maintained.

Strategic Flood Consequence Assessment

9.28 A Strategic Flood Consequence Assessment (SFCA) for Flintshire was carried out by JBA Consulting in July 2018 on behalf of Flintshire County Council. The aim of the SFCA was to inform a range of activities, including land use planning, emergency planning, development control and the development of specific flood risk management policy. The SFCA has been developed at a Strategic Scale to support the (existing) Local Development Plan (LDP).

Flintshire County Council Local Planning Policy

9.29 The current LDP is the adopted Flintshire County Council Unitary Development Plan 2000-2015⁴ There is minimal reference in this plan to flood risk. The only directly relevant sections are:

“STR1: New development will be:...

e) required to respect physical and natural environmental considerations such as flooding and land stability”

“STR 7: The natural environment of Flintshire will be safeguarded by:...

*e) protecting and enhancing the Dee Estuary;
f) the protection and enhancement of the water environment”*

9.30 Flintshire are in the process of updating their LDP. A draft of the new LDP is provided within the Preferred Strategy document⁵ which was issued for endorsement by the full council on 29th September 2020. At the time of writing this document has not been formally adopted. The following emerging policy from that plan is directly relevant to this EIA:

“Strategic Policy STR 14: Climate Change and Environmental Protection

The Council will seek to mitigate the effects of climate change and ensure appropriate environmental protection in the County through:...

iii. Adopting a sustainable approach to water resource management including supply, surface water run-off and wastewater treatment;

iv. Directing development away from flood risk areas, assessing the implications of development in areas at risk of flooding and ensuring that new development does not increase the risk of flooding elsewhere; ...

vii. Design of development to be adaptable and resilient to future effects of climate change.”

9.31 Other documents within the planning suite that are relevant to this assessment are:

4 Flintshire County Council, Unitary Development Plan 2000-2015, Adopted 28th September 2011

5 Flintshire County Council, Flintshire Local Development Plan 2015-2030, Preferred Strategy Consultation Document, Preferred Strategy Main Document, November 2017

- Flintshire Local Flood Risk Management Strategy, December 2013;
- River Dee Catchment Flood Management Plan, Summary Report January 2010;
- North West England and North Wales Shoreline Management Plan 2, February 2011 and
- Dee Management Catchment Summary, 2014.

9.2.2 Data Sources & Guidance

Guidance

9.32 Relevant UK guidance on good practice for construction projects and industrial operational sites is detailed in the following documents:

- Control of Water Pollution from Construction Site (C532), Construction Industry Research and Information Association (CIRIA) 2001;
- Environmental Good Practice on Site (C741), CIRIA 2015;
- NRW have adopted the Environment Agency's approach to protecting groundwater set out in their guidance note; Protect Groundwater and Prevent Groundwater Pollution⁶, EA 2017;
- NRW's Guidance for Pollution Protection – Works and maintenance in or near water, version 1.2, (NRW 2018);
- The SuDS Manual (C753), CIRIA 2015; and
- Statutory standards for sustainable drainage systems – designing, constructing, operating and maintaining surface water drainage systems, Welsh Government, 2018.

6 <https://www.gov.uk/government/publications/protect-groundwater-and-prevent-groundwater-pollution/protect-groundwater-and-prevent-groundwater-pollution>

- 9.33 The CIRIA guidance provides help on environmental good practice for the control of water pollution arising from construction activities. It focuses on the potential sources of water pollution arising from construction activities and the effective methods of preventing its occurrence.
- 9.34 The EA guidance is part of a wider suite of documents and guidance relating to groundwater protection which sets out principles for assessing risk, protecting groundwater and permitting of abstractions and discharges from groundwater.
- 9.35 The NRW guidance is for anyone carrying out works or activities in or near the water environment to reduce the potential to cause pollution, transfer non-native species and impact the bed and banks of a watercourse.
- 9.36 The SUDS Manual incorporates the latest research, industry practice and guidance for design, delivery and maintenance of Sustainable Drainage Systems (SuDS).
- 9.37 The Statutory standards for sustainable drainage systems sets out the principles that SUDS should be designed and constructed to. This forms the assessment criteria used by the SAB.

Data sources

- 9.38 In addition to the above policy and guidance material, the following data Sources have been reviewed in completing this assessment:
- Ordinance Survey (OS) Mapping and Aerial Imagery provided by ESRI ;
 - NRW, Lle geoportal;
 - British Geological Survey, Geology of Britain Viewer;
 - Gordon Smith, History of Shotton Steel;
 - Hydrogeology Wales Mapping Suite, Natural Resources Wales via GeoIndex;
 - NRW, Flood Risk Map Viewer;
 - Data Provided by Natural Resources Wales in response to a flood data request including hydraulic model outputs for the Dee Estuary;
 - Natural Resources Wales, Tidal Dee Breaches – Development and Flood Risk Modelling Note, July 2020;
 - Observations from surveys and site walkovers; and
 - Chapters 8 (Land Quality) and 10 (Ecology and Ornithology) of this assessment.

9.2.3 Study Area

9.39 The study area encompasses the site of the proposed development and immediate environs. Water features identified within a 2km buffer of the site boundary have been screened and those considered to have a potential hydrological pathway to or from the site have been assessed.

9.2.4 Predicting Effects

9.40 A qualitative risk assessment methodology has been used to assess the significance of the potential effects associated with the proposed development. Two factors have been considered using this approach: the sensitivity of the receiving environment and the potential magnitude of impact, should that potential impact occur.

9.41 This approach provides a mechanism for identifying the areas where site specific mitigation measures are required and for considering the effectiveness of mitigation measures proposed to manage the risk presented by the proposed development. This approach also allows effort to be focused on reducing risk where the greatest benefit may result.

Sensitivity of Receptor

9.42 Criteria for determining the significance of effects relates to the importance of the hydrological receptor and the magnitude of the impact. Definitions are provided in **Table 9 - 1**.

Table 9 - 1
Value / sensitivity assessment

Sensitivity	Definition
High	<ul style="list-style-type: none"> International importance. Receptor with a high quality and rarity, regional or national scale and limited potential for substitution / replacement.
Medium	<ul style="list-style-type: none"> National importance. Receptor with a high quality, local scale and limited potential for substitution / replacement; or Receptor with a medium quality and rarity, regional or national scale and limited potential for substitution / replacement.
Low	<ul style="list-style-type: none"> Regional importance. Receptor with a medium quality and rarity, local scale and limited potential for substitution / replacement; or Receptor with a low quality and rarity, regional or national scale and limited potential for substitution / replacement.
Negligible	<ul style="list-style-type: none"> Local importance. Receptor with a low quality and rarity, local scale. Environmental equilibrium is stable and is resilient to changes that are greater than natural fluctuations, without detriment to its present character.

Magnitude of Change (Impact)

9.43 The criteria that have been used to assess the magnitude of potential impacts (i.e. the potential scale of change) to the hydrological and hydrogeological environment will be based on professional judgement. Examples are however provided in **Table 9-2**.

Table 9-2
Magnitude of change (impact)

Magnitude	Criteria	Definition
High	Results in loss of attribute	<p>Fundamental (long term or permanent) changes to hydrology, hydrogeology or water quality, such as:</p> <ul style="list-style-type: none"> • Wholesale changes to watercourse channel, route, hydrology or hydrodynamics. • Changes to the application site resulting in an increase in runoff with flood potential and also significant changes to erosion and sedimentation patterns. • Major changes to the water chemistry or hydro-ecology. • Major changes to groundwater levels, flow regime and risk of groundwater flooding.
Medium	Results in impact on integrity of attribute or loss of part of attribute	<p>Material but non-fundamental and short to medium term changes to hydrology, hydrogeology or water quality, such as:</p> <ul style="list-style-type: none"> • Some measurable changes to watercourses, hydrology or hydrodynamics. Changes to land cover within the application site resulting in an increase in runoff within system capacity. • Moderate changes to erosion and sedimentation patterns. • Moderate changes to the water chemistry of surface runoff and groundwater. • Moderate changes to groundwater levels, flow regime and risk of groundwater flooding.
Low	Results in minor impact on attribute	<p>Detectable but non-material and transitory changes to hydrology, hydrogeology or water quality, such as:</p> <ul style="list-style-type: none"> • Minor or slight changes to the watercourse, hydrology or hydrodynamics. • Changes to application site resulting in slight increase in runoff well within the drainage system capacity. • Minor changes to erosion and sedimentation patterns.

		<ul style="list-style-type: none"> • Minor changes to the water chemistry of surface runoff and groundwater. • Minor changes to groundwater levels, flow regime and risk of groundwater flooding.
Negligible	Results in an impact on attribute but of insufficient magnitude to affect the use/integrity.	<p>No perceptible changes to geology, hydrology, hydrogeology or water quality, such as:</p> <ul style="list-style-type: none"> • No impact or alteration to existing important geological environs. • No alteration or very minor changes with no impact to watercourses, hydrology, hydrodynamics, erosion and sedimentation patterns. • No pollution or change in water chemistry to either groundwater or surface water. • No alterations to groundwater recharge or flow mechanisms.

9.44 It should be noted that many potential hydrological and hydrogeological impacts are probabilistic in nature. This type of impact (i.e. an impact relate to a severe storm or flood event) is clearly different from one that will definitely occur (i.e. changes process effluent discharge quality or volumes). As such, where appropriate and with justification, professional judgement would be used to adjust the stated magnitude of an impact for low probability impacts.

Significance of Effect

9.45 The sensitivity of the receiving environment together with the magnitude of the impact defines the significance of the potential effect, as identified within **Table 9 - 3**. Effects of ‘major’ and ‘moderate’ significance are considered to be ‘significant’ in terms of the EIA Regulations.

Table 9 - 3
Significance of Effect

		Sensitivity of Receptor			
		High	Medium	Low	Negligible
Magnitude of Effect	High	Substantial / Major	Substantial / Major	Moderate	Neutral / Negligible
	Medium	Substantial / Major	Moderate	Minor	Neutral / Negligible
	Low	Moderate	Minor	Minor	Neutral / Negligible
	Negligible	Neutral / Negligible	Neutral / Negligible	Neutral / Negligible	Neutral / Negligible

- 9.46 The characteristics of the impacts are described in terms of direct / indirect, secondary, cumulative, transboundary, temporary (reversible) / permanent (irreversible), together with timescales (Short, medium, long term).

9.2.5 Residual Effects

- 9.47 Mitigation can reduce the magnitude of the impact either by decreasing the results of the impacts or by reducing the probability of the impact occurring. The new magnitude is assessed and the significance recalculated to demonstrate that they are reduced to minor or neutral / negligible.

9.2.6 Cumulative Effects Assessment

- 9.48 Whilst a site may have a minor impact that wouldn't require further mitigation, when there are multiple developments, each producing the same minor impact, it can become moderate or substantial on the receptor. The cumulative assessment reviews locally (within 2km radius of the site) permitted developments that potentially create similar minor impacts to the same receptors.

9.3 BASELINE CONDITIONS

- 9.49 The following hydrogeological and hydrological regime is considered below:

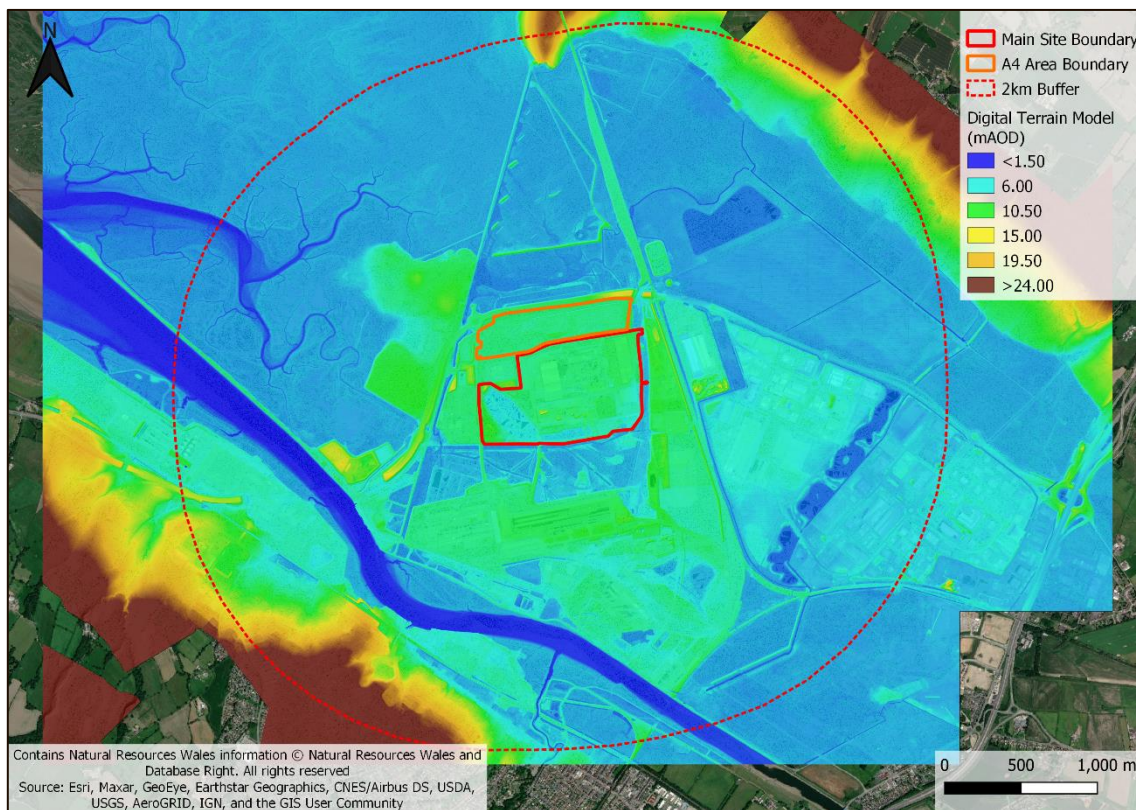
- regional and local topography;
- surface water features and connections;
- regional and local geology;
- aquifer characteristics;
- recharge mechanisms;
- groundwater levels and flow;
- water abstraction and use;
- groundwater quality;
- surface water quality; and
- flood risk.

- 9.50 The hydrogeological and hydrological data have been used to develop a conceptual site model.

9.3.1 Topography

- 9.51 LiDAR topographic data for the site and immediate locality has been downloaded from the National Resources Wales (NRW) open data website⁷ and is contained in **Figure 9.1**. **Figure 9.1** provides bare earth elevation data using a Digital Terrain Model (DTM) and thus excludes built features and vegetation.
- 9.52 The Deeside Industrial Estate is located to the north side of the Dee Estuary on a moderately flat river plain at natural elevations of approximately 4.6m above Ordinance Datum (AOD). Whilst not apparent in mapping, reviewing the elevations at points across the plain, indicates a slight slope within the natural ground towards the northwest. However, artificial land raising of the industrial estate, transport infrastructure and flood defences are the predominant topographic features across the low-lying land.

Figure 9.1
1m Digital Terrain Model

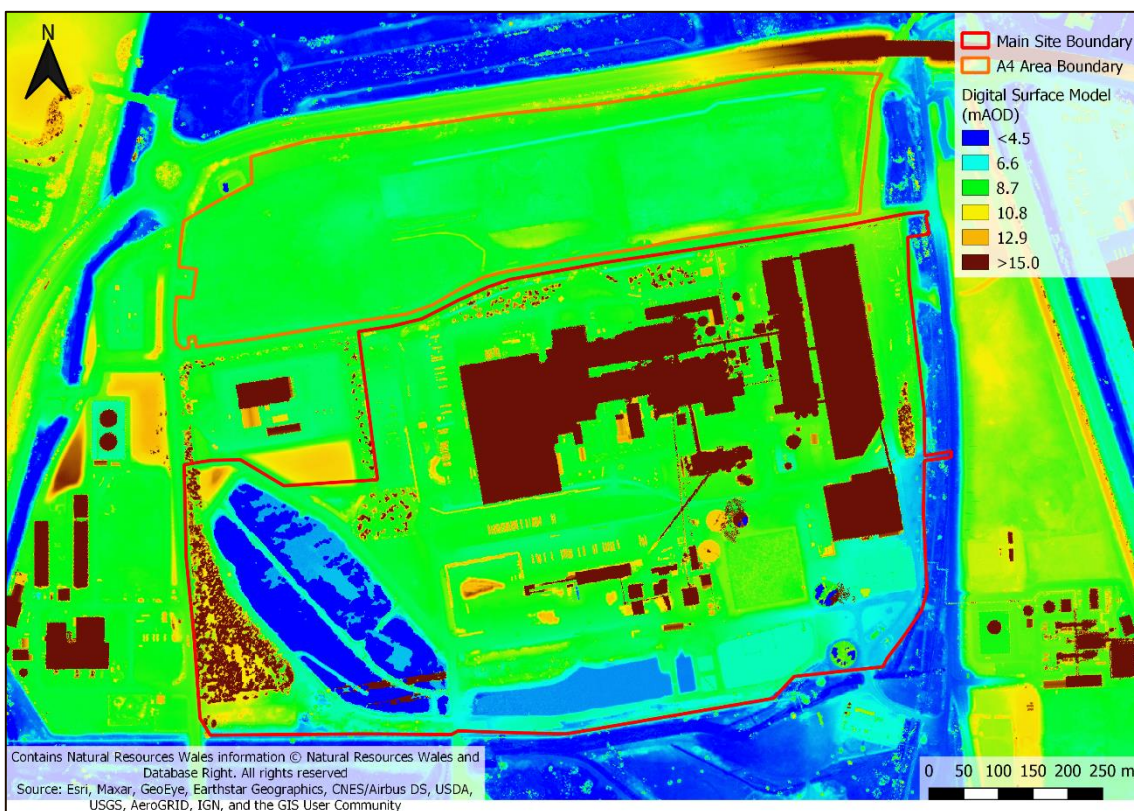


- 9.53 To the northeast of the Site there is a raised embankment (flood defence) that is orientated southwest to northeast. At the south end of the embankment it has an elevation of 6.27mAOD, which is over 2m above the surrounding levels.

⁷ Natural Resources Wales, Lle geoportal, <http://lle.gov.wales/Catalogue/Item/LidarCompositeDataset/?lang=en>

- 9.54 To the east of the Site is a railway line that is elevated above surrounding land. To the north of the Site (where there is natural ground levels) the railway is raised over 4m above the adjacent natural land surface. Adjacent to the Site, the railway is at a similar level to the built-up areas of the industrial estate. The railway has an elevation of 8.15mAOD.
- 9.55 The Digital Surface Model (DSM) of the LiDAR data, which includes all reflective surfaces including buildings and trees etc., has also been downloaded for the Site area. These has been focussed to show the topographical details across the site, refer to **Figure 9.2**.

Figure 9.2
Digital Surface Model - Site



- 9.56 The Site itself can be described as broadly flat with a platform level between 8.3mAOD and 8.7mAOD. Along the northern boundary (within the Main Site) there is a drainage ditch which is approximately 1m deep. Rail tracks through the centre of the Site are up to 1m below the surrounding land.
- 9.57 The DSM also indicates that the lagoons across the south of the Site are lower than Main Site. Additionally, the land in the southeast corner of the Site is elevated below the Main Site with an elevation of approximately 6.2m AOD.
- 9.58 The scrub land to the south of the Site (which is located between Shotton Mill and Tata Steel Plan located about 400m south of the Site) is indicated to be lower than the proposed development Site with an elevation of 5.1mAOD immediately to the south of the Site.

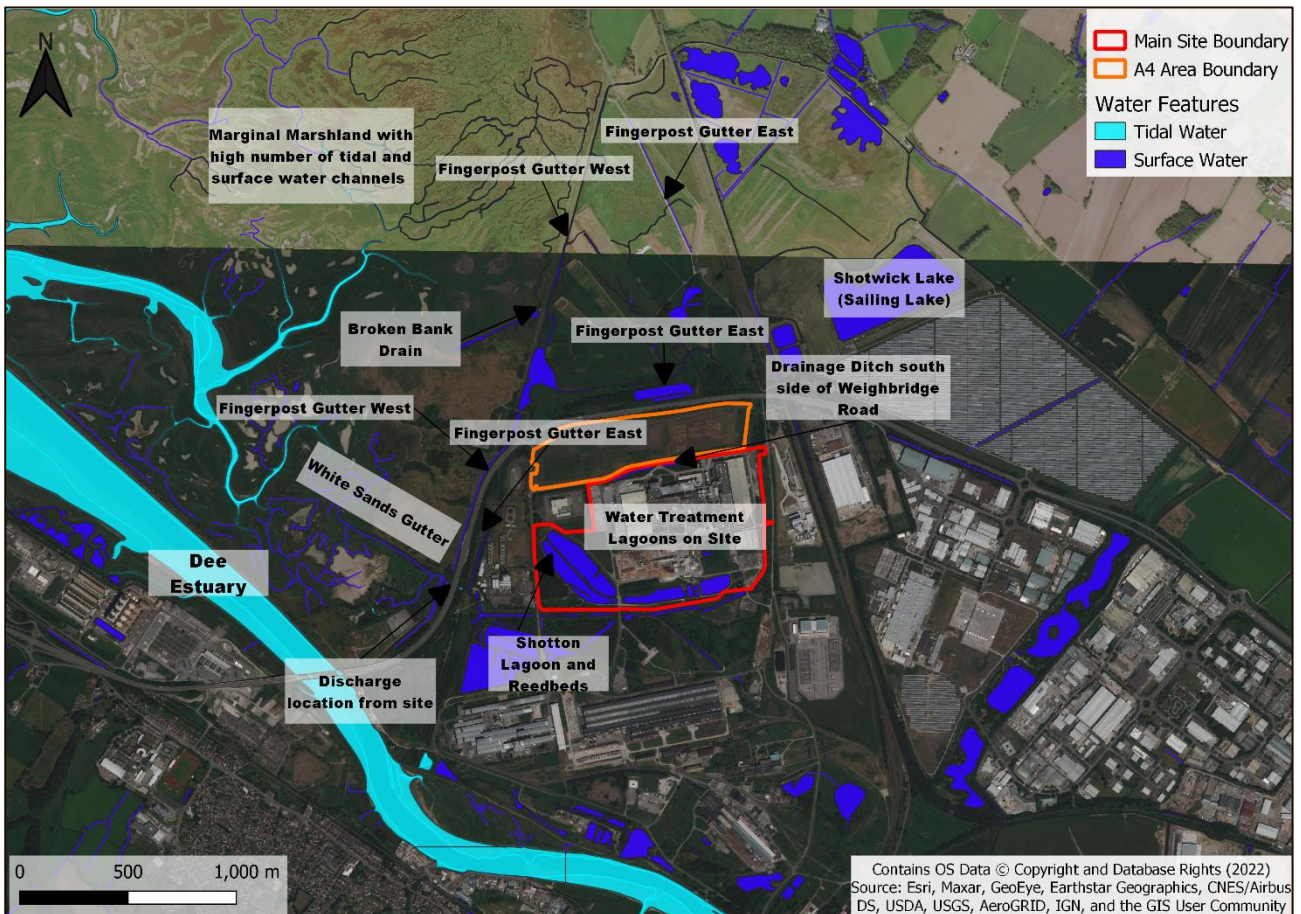
9.3.2 Local Hydrology

- 9.59 Due to the low-lying nature of the land surrounding the Site, there are a large number of surface water and tidal features in the vicinity of the site are shown on **Figure 9.3** and in **Drawing 9.1**.
- 9.60 The Site is located within the plain of the Dee Estuary with the main course of the river located circa 1km southwest of the Site. This is the dominant hydrological feature of the area and the low-lying land (White Sands) to the northwest of the Site crossed by a number of tidal and surface water channels associated with water progressing into the estuary. These channels are collectively assessed within White Sands Gutter.
- 9.61 Crossing White Sands from the A548 adjacent to the southwest corner of the Site to its confluence with White Sands Creek circa 1.9km west of the Site. White Sands Gutter is connected via culvert to a section of channel between the A548 dual carriageway and the embankment that provides the flood defence along the western edge of Shotton Industrial Estate. Flows are piped to here from the southern end of Fingerpost Gutter east branch which comes along the western side of the industrial estate.
- 9.62 White Sands Creek circa 1.9km west of the site is considered within the Dee Estuary SSSI as a receptor.
- 9.63 Fingerpost Gutter has been re-routed and split through the developments in the area both industrial and associating with the local nature, conservation and recreational areas. This drains the area of “marshland” that is located to the east of the raised flood embankment. The main channel passes around the north of the marsh land before flowing along the eastern side of the embankment. This has an upstream catchment of circa 1.2km². There is an eastern branch that collects flows off the southern boundary of the “marshland” flowing to the west. These combine just to the north of the roundabout on the A548 located on the northwest corner of the A4 area of the site. The majority of flows in Fingerpost Gutter flow in a culvert beneath the A548 although there is an overflow channel along the western side of the road. The main channel then flows along the edge of the industrial estate to a pipe / pump station adjacent to the southwest corner of the Site. This appears to have an overflow towards the Shotton Lagoon and Reedbeds located to the south of the Site and are a designated SSSI.
- 9.64 There is a ditch immediate to the south of the southern boundary of the Site, which does not appear to connect to Fingerpost Gutter or directly to the reedbeds during normal hydrological conditions. However, it is likely this is in continuity with groundwater and therefore the hydrogeologically connected to Shotton Lagoons and Reedbeds. During high flows these would likely form a surface water connection to the lagoon and reedbed network.
- 9.65 Within the Site there are currently 4 surface water lagoons along the southern boundary and across the southwest corner of the Site. These lagoons provide water treatment for the existing mill and discharge into White Sands Gutter, approximately 400m west of the Site. The location of the discharge is shown on **Figure 9.3**. This discharge is into White Sands gutter (a tidal drain) that then flows across the low-lying land marginal marshland to the west, entering the Dee Estuary.
- 9.66 Shotwick Lake located about 515m northeast of the site, is an artificially feature that was constructed as part of the creation of the industrial park in the 1970’s. Today the lake is managed

by Shotwick Lake Sailing Club. It is not hydrologically linked to the Site and is understood to be lined to maintain water levels. It does not have a formal outflow however; this would overtop to a drain the flows eastwards (away from the Site). There are further artificial lakes located 1.3km southeast of the Site which were constructed at the same time as the wider industrial park.

- 9.67 Shotwick Brook, a tributary of the River Dee with a confluence about 2.6km southeast of the Site is the main watercourse taking flows from the east side of the railway line from just north of Shotwick Lake to the south and east of the Site. It is not in hydraulic connectivity with the Site under normal conditions however, modelling has been provided by NRW for the flood risk assessment as it controls levels in the streams on the eastern side of the railway which can overtop into the catchment of Fingerpost Drain.
- 9.68 There are further surface water features to the south of the Tata Steel works, adjacent to the north bank of the Dee Estuary. These are separated from the Site by raised ground and therefore not considered to have a pathway for impact.
- 9.69 Shotwick Brook (and upstream tributaries near Shotwick Lake) are separated from the Site by the raised railway embankment. It therefore sits within a separate catchment.

Figure 9.3
Local Hydrology



9.3.3 Surface Water Quality

- 9.70 SLR completed a baseline monitoring round of surface water at the site on 30 November 2021. The locations are shown in **Drawing 9.2**. These found that:
- SW2 on Fingerpost Gutter had elevated levels of Biological Oxygen Demand, Chemical Oxygen demand dissolved organic content, high electrical conductivity and total dissolved solids. Ammoniacal nitrogen and chloride concentrations were also high in this sample. The dissolved sodium was also very high.
 - SW1 had elevated suspended solids which was supported by the observed stagnant nature with floating leaf material.
 - The lagoon sample had similar concentrations to the SW1 sample indicating at the time of sampling treatment had reached a similar level as a natural local water body.
- 9.71 Results of baseline monitoring are awaited and would be reviewed to inform the outline Construction Environment Management Plan (CEMP), see **Technical Appendix 5.3**, prior to construction commencing.
- 9.72 Information from water bodies within the study area assessed under the Water Framework Directive is summarised in **Table 9 - 4**. For the Dee this information is provided via Water Watch Wales⁸, however the cycle 2 data for Shotwick Brook was the responsibility of the Environment Agency and is provided via the Catchment Data Explorer⁹.

Table 9 - 4
Summary of Water Framework Directive Surface Water Bodies

Name	Waterbody ID	2015			2018 (NRW)/ 2019 (EA)		
Dee (N. Wales)	GB3106708200	Fail	Moderate	Moderate	Fail	Moderate	Moderate
Shotwick Brook ¹⁰	GB111067056960	Good	Moderate	Moderate	Fail	Moderate	Moderate

- 9.73 The Dee chemical failure status is associated with nutrients in particularly dissolved inorganic nitrogen.

8 Natural Resources Wales, Water Watch Wales, <https://waterwatchwales.naturalresourceswales.gov.uk/en/>, Accessed March 2022

9 Environment Agency, Catchment Data Explorer, <https://environment.data.gov.uk/catchment-planning/WaterBody/GB111067056960?cycle=2>, Accessed March 2022

10 Shotwick Brook Catchment is under the reporting responsibility of the Environment Agency in the devolution of responsibility. Garden City Drain on the Catchment Data Explorer as the same Waterbody ID as Shotwick Brook in 2015

- 9.74 Shotwick Brook chemical status downgrade from good to moderate is associated with mercury and Polybrominated diphenyl ethers PBDE.

9.3.4 Geology

- 9.75 An extract of the British Geological¹¹ 1:50 000 bedrock mapping has been downloaded for the Site and surrounding area (Drawing 9.3). This shows that the bedrock beneath the Site is relatively complex with two fault lines: one along the western boundary of the Site and one through the centre.
- 9.76 To the east of the fault line is the Pennine Lower Coal Measures Formation consisting of mudstone, siltstone and sandstone. In the northeast of the Site and beneath the A4 area this is overtopped by the Kinnerton Sandstone.
- 9.77 To the west of the central fault line the Site is underlain by the Bowland Shale. This is overlain to the northwest by the Gwespyr Sandstone.
- 9.78 The entire Site is overlain with tidal flat superficial deposits, which consists of clay, silt, and sand. These are shown on Drawing 9.4.
- 9.79 The Site is located on an area of land that has been artificially raised above the surrounding natural land level. This material is understood to have been taken from the local area and consists of sand material taken from the area of (and forming) Shotwick Lake¹². This material was therefore taken from the tidal flat deposits and the Kinnerton Sandstone Formation.
- 9.80 The geological logs for boreholes located on the site (Appendix 01 of the FCA in Technical Appendix 9-1) indicate that the top couple of metres contain made ground of mixed quality (with ash clinker, brick fill, wood pulp etc.). For more details refer to the separate contaminated land reporting (**Chapter 8 Land Quality**). Beneath this, the geology is described as sand across the site which is consistent with the understanding that the material originated from the location of Shotwick Lake. None of these boreholes are believed to have penetrated to the bedrock.
- 9.81 BGS hold additional borehole records. There are a series of deep boreholes across the A4 area within the borehole records held by the BGS¹¹. These indicate that there are at least 20m of sand beneath the site with some of the boreholes encountering groundwater around 4.5 m below ground level while others did not record any groundwater strikes.

11 British Geological Survey, Geology of Britain Viewer, https://mapapps.bgs.ac.uk/geologyofbritain/home.html?&_ga=2.69149649.1302426254.1632923777-1431768481.1632923777, Accessed November 2021

12 Gordon Smith, History of Shotton Steel, <https://shottonsteel.co.uk/appendix/#sailing-club>,

9.3.5 Hydrogeology

9.82 The aquifer designations across the Site classified by NRW¹³ are presented in Table 9 - 5. These are defined as:

- Principal - “layers of rock that have high intergranular and/or fracture permeability – meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale”.
- Secondary A – “ 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”
- Secondary B - “predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering.”
- Secondary (undifferentiated) – where it is not possible to classify as either Secondary A or B due to the heterogenous nature of the geology.

Table 9 - 5
Overview of Bedrock Aquifer Designations and Vulnerability

Bedrock Geology	Part of Site	Aquifer Designation	Aquifer Vulnerability
Kinnerston Sandstone	NE	Principal	High vulnerability, secondary aquifer
Pennine Lower Coal Measure	SE	Secondary A	High vulnerability, Secondary Aquifer
Gwespys Sandstone	NW	Secondary A	High vulnerability, Secondary Aquifer
Bowland Shale	SW	Secondary (undifferentiated)	High vulnerability, Secondary Aquifer

9.83 The superficial tidal flat deposits are classified as secondary (undifferentiated) and are also a high vulnerability secondary aquifer.

9.84 These designations, and the descriptions of material available from the borehole logs, indicate that the geology beneath the Site has moderate permeability. Groundwater will be present beneath the Site and can flow within it.

13 Natural Resources Wales via GeoIndex,
http://mapapps2.bgs.ac.uk/geoindex/home.html?_ga=2.103662016.1144138339.1636645458-1431768481.1632923777,
 Accessed November 2021

- 9.85 Groundwater levels were measured by SLR across the site in August 2021. This indicated a range between 4.00 and 4.75mAOD. The inferred groundwater contours are included as **Drawing 2 of the FCA**. These show that the Site has raised groundwater levels which are flowing in all directions away from the Site.
- 9.86 It is understood that the clay is not lined but has puddled clay base and sides which would inhibit water movement to local groundwater. However taking the conservative approach it assumed that water from the lagoon can enter the shallow groundwater and progress towards other surface water features.
- 9.87 The Site is not indicated to be within a Source Protection Zone (SPZ)¹⁴.

9.3.6 Groundwater Quality

- 9.88 Groundwater monitoring is being undertaken at the Site, however analysis from this has not yet been received. Discussion of the historical groundwater quality is undertaken in **Chapter 8, Land Quality** of this ES.
- 9.89 The groundwater beneath the Site and the majority of the study area is grouped in the Water Framework Directive as part of the Dee Carboniferous Coal Measures Groundwater body (ID:GB41102G204800). This is understood to include all the geological units beneath the Site. The following statuses were recorded as part of Cycle 2:
- Overall status: Poor
 - Quantitative: Good
 - Chemical: Poor (the available data does not provide the reason for this ranking).
- 9.90 The north of the study area groundwater is part of the Dee Permo-Triassic Sandstone Groundwater body (ID: GB41101G202400). Data not available for the Cycle 2 for this body however ins 2015 the following statuses were recorded.
- Overall status: Good
 - Quantitative: Good
 - Chemical: Good

9.3.7 Water Abstractions and Discharges

- 9.91 The Site currently abstracts water from the River Dee. This is a permitted discharge.

¹⁴ Natural Resources Wales, Lle geoportal, <http://lle.gov.wales/map#m=-2.98559,53.23962,12&b=europa&l=289>; Accessed November 2021

9.92 Discharge from the site is via a permitted discharge with the following details under consent permit number EPR/BT 4885IT. This states the following conditions summarised in **Table 9 - 6**:

Table 9 - 6
Summary of Discharge Requirements

Parameter	Limit
Biological Oxygen Demand (measured after 5 days at 20°C) with nitrification suppressed by the addition of allylthiourea)	25mg/l
Suspended Solids	60mg/l
pH max	9pH
pH min	6pH
Ammoniacal Nitrogen	4mg/l
Temperature degrees Celsius	25°C*
Maximum instantaneous flow	800l/s
Maximum Daily Flow	22,000m ³ /day
Maximum Tidal Flow	11,000m ³ /tide

* Maximum discharging temperature can be raised temporarily to 28°C subject to:

- Air temperature data for Hawarden Airport Met Office Station indicates an average temperature exceeding 20°C for the six hours preceding effluent discharge.
- The temporary temperatures derogation only applies between the 1st May and the last day of October

9.3.8 Designated Sites

9.93 There are the following designated sites relevant to the water environment in the vicinity of the Site.

- Shotton Lagoons and Reedbeds SSSI – nesting site for the common tern and the lagoons are fringed by or infilled by emergent swamp vegetation and
- Dee Estuary SSI and SPA – internationally important population of waders and wildfowl.

9.4 INCORPORATED MITIGATION

9.94 The scheme already includes mitigation measures that are inherent to the design and have therefore been considered to be in place during the unmitigated assessment.

- 9.95 Key elements relevant to the water environment would be:
- Greater water efficiency in new plant;
 - Potential for future water recycling;
 - Use of rainfall harvesting for grey water uses to reduce mains water consumption;
 - New ETP for foul and effluent flows so improved water quality of discharges;
 - Chemical / fuel handling area drain to foul system and ETP and
 - Lined emergency lagoon.
- 9.96 Additionally, the Site will have a SuDS scheme that will be approved by the SAB. Details of the SuDS scheme are included within **Technical Appendix 9-1** however in summary they will include:
- A swale through which the A4 area is drained;
 - Filter / French drains for the truck parking areas; and
 - Detention basins.
- 9.97 The SuDS system will improve the water quality entering the lagoon and will provide additional biodiversity and amenity benefits.
- 9.98 The operation of the lagoon for managing surface water and treated effluent flows would not be impacted by the presence of a floating platform for common turns (refer to **Chapter 10, Ecology and Ornithology**).

9.5 ASSESSMENT OF EFFECTS

- 9.99 This sub-section identifies the potential impacts of the proposed development on the hydrogeological and hydrological environments prior to mitigation during both the construction and operation of the proposed development. The demolition is considered as part of the construction phase with the assumption that the CEMP will be in place and the SuDS system will be installed as the first element of the works. It also assesses the magnitude of each identified impact. The results of this assessment are summarised in **Table 9 - 7**. It should be noted that the magnitude of the potential impacts has been assessed as described in **Table 9-2**. The significance of any potential effect has then been assessed (based on the sensitivity of the receptor) as described in **Table 9 - 3**.
- 9.100 The proposed design and operation of the application Site incorporates measures to mitigate potential impacts on the water environment. Except where detailed in the proposed development description above these measures are not included in the initial assessment of impacts so that their effect can be explicitly stated in the mitigation section of this chapter.

9.101 The potential hydrological and hydrogeological receptors and their sensitivity are summarised in **Table 9 - 7**.

Table 9 - 7
Potential Receptors and their Sensitivity

Name	Direction	Distance at Nearest Point	Sensitivity	Reason for Sensitivity Class
Lagoon Southwest	Onsite	Onsite	Low	Receptor with low quality and only local importance however the proposed development is looking to provide significant betterment and provide biodiversity benefits (refer to Chapter 10 Ecology and Ornithology).
Lagoons Other	Onsite	Onsite	Negligible	Onsite lagoons that have only onsite importance and low quality.
Shotton Lagoon and Reedbeds and associated channels	Southwest and South	120m and 40m	High	SSSI – designation for protection of the common tern and the lagoons are fringed by or infilled by emergent swamp vegetation.
White Sands Gutter	West	390m	Medium	Receptor with low to medium quality but is of local importance.
Fingerpost Gutter	West	215m	Medium	Receptor with low to medium quality but is of local importance
Dee Estuary	South and Southwest	965m	High	SSSI, SPA – internationally important population of waders and wildfowl
Groundwater- Shallow	-	Beneath the site	Low	Poor quality status and historic land condition (refer to Chapter 8 Land Quality) shallow groundwater only has local significance as baseflow to local ditches.
Groundwater – Deep	-	Beneath the site	Medium	Contains a Principal Aquifer designation.
River Dee	Southeast	11km ¹⁵	High	Important regional resource.
Weighbridge Road (Flood Risk Receptor)	East	145m	Low	Provides access to Recycling centre, HVDC Converter Station and Trucking company, is a relatively low usage road and vehicles

¹⁵ Included due to the water abstraction from the site being taken from the fluvial River Dee

Name	Direction	Distance at Nearest Point	Sensitivity	Reason for Sensitivity Class
				are capable of passing through shallow flood water. However, no other vehicular access for these businesses.

9.5.1 Potential Construction Phase Effects

9.102 During the construction of the new buildings of the paper mill, there is potential for adverse impacts on surface water environment and groundwater quality associated with:

- The use and storage of oil and chemicals associated with construction activities;
- High level of suspended solids arising from earthworks and the use of plant on the site,
- The use and storage of cementitious material associated with construction activities; and
- Disruption of contaminated material within the made ground (further assessment included in **Chapter 8 Land Quality**)

Groundwater and Surface Water Quality

9.103 The proposed surface water drainage strategy (subject to SuDS Approval Board (SAB) approval) will route flows via a suite of features including filter drains, swales and detention areas prior to discharge into the lagoon in the southwest of the Site. This management train has been designed to mitigate the minor detrimental impacts to water quality from the development land uses and would be a betterment when compared to the existing operational paper mill. It is assumed that this system will be installed at the start of the construction (i.e. benefits from the system are considered to apply in the unmitigated scenario including during construction) and if necessary, would be repaired and remediated at the end of the construction phase.

Blockage of Drainage Network

9.104 A number of the potential impacts discussed below have potential for resulting in blockages / compromising of the SuDS system. To ensure clarity and avoid repetition the impact of such a blockage in relation to water quality is assessed here. Specific instances where this occurs are then highlighted in the relevant sections below. Assuming normal operation, inspection and maintenance of site drainage infrastructure, a blockage of this nature would not be anticipated on its own.

9.105 Should water be unable to enter the drainage network, it would likely result in shallow flooding, which would remain passable for construction equipment, and then flow towards the lower lying areas. For the majority of the site this would be the main drainage lagoon or for the A4 area the swale which then drains towards the lagoon. However flows could bypass some of the pollution control measures provided through the SuDS management train. Discharge from the lagoon is controlled with reference to the discharge permit outlined above with continuous monitoring and would be shut off if the permit parameters are breached.

- 9.106 In the event of a monitoring system failure or waters bypassing the SUDS result in high contaminants not automatically monitored, the discharge would be manually stopped and discharge would only be permitted subject to manual checks. Discharge would only be restarted once concentrations have dropped below agreed thresholds defined in the permit. Given the very large capacity of the lagoon, no further downstream connection (i.e. to the Dee Estuary) is considered likely from this route. The magnitude of the impact on the lagoon (including consideration of the anticipated contaminant concentrations) would be **'low'**. The significance of the effect is therefore **'minor'**.
- 9.107 In the very east of the Site, prior to releveling of the development platform there is some potential for water to flow overland from the development area onto Weighbridge Road to the east of the Site. This would then enter the highway drainage. The water quality would be similar to the runoff from the road although could potentially have high turbid flows. Given the low volume of flow, the magnitude of this impact would be **'low'** and the significance therefore also **'minor'**.

Spilled Oils and Fuels

- 9.108 Spilled oils and fuels from site vehicles and / or equipment on the Site, if unmitigated could enter surface water runoff from the Site. This could enter shallow groundwater or flow over land following topographic gradients entering the proposed swale in the north of the Site, the southwest lagoon.
- 9.109 If unmitigated, spillages across the Site would enter the surface water drainage network and progress to the final lagoon. The monitoring system would be unlikely to automatically shut off the discharge as hydrocarbons are not monitored. However, it is not unreasonable to assume that if a spillage occurred the discharge from the lagoon would be shut off prior to hydrocarbons reaching the lagoon outlet.
- 9.110 Small quantities of hydrocarbons (such as from very small-scale seepage / oily mechanical parts) are likely in Site construction runoff. The SuDS system will be designed to take runoff from operational yards and roadways and will therefore be designed to intercept and treat small amounts of hydrocarbons. This mitigation therefore would also apply once constructed and therefore through the construction phase. The magnitude of impact on the lagoon would therefore be **'negligible'**. This would therefore have a significance of effect that is **'negligible'**.
- 9.111 However, a larger spill, if unmitigated, could result in a significant deterioration of the southwest lagoon which would require remediation, impact the biodiversity within the Site and potentially render the surface water drainage network temporarily inoperable. These impacts would be short term, have minimal impact to the water environment outside the Site and be reversible (with sufficient remedial actions). The magnitude of this impact to the southwest lagoon would therefore be **'medium'**. The significance of the effect would be **'minor'**.
- 9.112 The made ground at the Site likely has relatively high permeability and contaminated water on land that is unsurfaced or partially surfaced would penetrate into the ground. Contaminated water within the southwest lagoon could also percolated into the shallow groundwater. The magnitude of the impact in a moderate to large spillage on open ground would be **'medium'**. The overall significance of the effect would be **'minor'**. Flows from the groundwater would likely reach the lagoons and Fingerpost Gutter west and the ditch to the south of the Site associated Shotton

Reedbeds SSSI. However, the dilution in this ditch would mean the magnitude of the impact would be **'low'** and the significance **'minor'** and **'moderate'** respectively.

Elevated Concentrations of Suspended Solids

9.113 Elevated suspended solids within runoff are a well-known issue of construction sites. Due to the broken ground, soils and other unbound materials are at greater risk of mobilisation by storm flows during a rainfall event. Due to the historical land uses at the Site, the made ground potentially contains contaminated material adsorbed to the suspended solids and therefore could theoretically result in elevated concentrations for other contaminants (refer to **Chapter 8 Land Quality**). The most common sources of turbid runoff at a construction site are from:

- storm runoff across ground churned up by construction traffic;
- intense rainfall onto exposed earth surfaces and / or spoil heaps;
- dewatering of excavations for foundations; and
- tracking of soil by plant onto adjacent roads and hardstanding and mobilisation from there into storm drainage networks.

9.114 Due to the topography of the Site (relatively flat) there is no major preferential flow pathways across the Site where there might be higher risk of mobilisation of suspended solids or where turbid flows would pass through. Turbid water would most likely enter any drainage systems in place and be treated as it is routed to the lagoon network. Otherwise it would flow overland into the lagoon network. The magnitude of the impact would be **'low'** and therefore the significance to the lagoon would be **'minor'**.

9.115 Routing through the drainage network could result in sedimentation of the pipes resulting in blockage. The significance of this is as discussed above. There would also likely be deposition along the base of the swales / basin however, this could be remediated with ease at this stage and is not considered significant.

9.116 In the east of the Site flows could drain onto Weighbridge Road to the east of the Site entering the highway drainage network. Taking a precautionary approach, it is assumed this road drainage discharges towards the drain along the southern boundary of the Site which is in continuity with the Shotton Lagoon and Reedbed systems (designated as a SSSI). The magnitude of the impact would be **'medium'** and therefore the significance of the effect is **'substantial / major'**.

Cementitious Materials

9.117 Spillage or accidental discharge of cementitious material during groundworks or construction, and spillages of raw building material throughout construction, could enter surface water runoff from the Site. This could enter the surface water drainage network and the lagoon system. In the east of the Site, it could also discharge towards Weighbridge Road and thereby drain to the ditch along the south of the Site which is in continuity with the Shotton Lagoon and Reedbed systems (designated as a SSSI).

- 9.118 If cementitious materials entered the drainage network, it would result in a complete blockage and / or substantial damage to the closest features and pipework. In this scenario, rainfall upgradient of the blockage would surcharge from the system. Refer to the assessment of this risk above.
- 9.119 For much of the Site, overland flow of cementitious material would like progress into the lagoons on Site. This could result in highly alkaline water reaching the lagoon the magnitude of the impact is assessed to be **'medium'**. The significance would therefore be **'moderate'**. This could then infiltrate into the shallow groundwater having a **'medium'** magnitude impact and therefore **'minor'**. This groundwater could connect through to Shotton Lagoon and Reedbeds SSSI. The dilution by this point would make it a **'low'** magnitude impacts and therefore this would have **'moderate'** significance.
- 9.120 A major spillage on the east of the Site would (with no change in levels) progress towards Weighbridge Road. There would be no direct flow into any water body from this source however, the highway drainage could become blocked. As such the runoff from the highway (which likely contains loading of hydrocarbons) could enter the channel in the southeast corner of the Site which is associated with Shotton Lagoon and Reedbeds SSSI. However considering the very low probability of a major spill occurring close enough to this boundary for flows to progress into the drainage network and cause highway drainage to route overland into this drain the magnitude of the impact is **'low'** and therefore the significance is **'moderate'**.
- 9.121 If the spillage of cementitious material were to occur outside of an area of hardstanding, high alkaline water could percolate into the ground and pose a risk to the underlying groundwater. The magnitude of the impact is **'medium'** and therefore the significance is **'minor'**. However this groundwater could connect through to Shotton Lagoon and Reedbeds SSSI. The dilution by this point would make it a **'low'** magnitude impacts and therefore this would have **'moderate'** significance.

Groundwater and Surface Water Volumes and Runoff Rates

- 9.122 The proposed surface water drainage strategy (subject to SuDS Approval Board (SAB) approval) will route flows via suite of features including swales and wetland areas to the lagoon. Discharge from the lagoon will be at a controlled rate within the existing discharge permit for the Site. It is assumed that this system will be installed at the start of construction (i.e. benefits from the system are considered to apply in the unmitigated scenario).

Blockage of On-site Drainage Infrastructure

- 9.123 In the event of a blockage within the system the majority of flows would progress overland to the lagoon and therefore have a **'negligible'** impact in relation to runoff volumes and peak rates. Any water that progresses from the east of the Site onto Weighbridge Road, could overwhelm the capacity of the highways drainage and result in minor flooding of the highway. The road serves a recycling centre, HVDC Converter station and a trucking company. The users of these sites are likely to be in vehicles that can pass through shallow flood water however, there would likely be some inconvenience. Considering the probability of a blockage occurring during a large enough storm to result in flooding, the magnitude of the impact is considered **'low'** and the significance is therefore **'minor'**.

Blockage of Discharge Infrastructure

- 9.124 Should a blockage occur in the pipework for the discharge, or the discharge cannot occur for any reason (i.e. pump failure), then water levels within the lagoon would rise. There is a large freeboard volume within this lagoon and water levels in the lagoon would be monitored. As a result it is considered highly unlikely that overtopping would occur from the lagoon prior to a remedial solution being put in place the magnitude is considered '**negligible**', and the overall significance is '**neutral / negligible**'.

9.5.2 Potential Operational Phase Effects

- 9.125 The proposed development involves the replacement of an existing papermill with a new modern papermill producing a different type of paper. Although the new development will utilise modern machinery and have a larger footprint and great production, other than where stated in the wider application, the mill will continue to operate in the same manner. In relation to the water environment the changes in operation are not significant. The existing water abstraction and discharge permits will be retained for the Site.
- 9.126 A sustainable urban drainage system (SuDS) has been designed for the Site (included with the FCA in **Technical Appendix 9-1**) and will be approved by the SAB prior to construction. This inherently provides mitigation against increases in surface water runoff leaving the site due to increase impermeable footprint and associated decrease in water quality. Additionally, rainfall harvesting will intercept small storms. It is assumed that this system will be in operation and maintained throughout the lifetime of the proposed development (i.e. the benefits are provided in the unmitigated scenario).
- 9.127 Prior to the consideration of mitigation measures, the operation of the Site has potential to give rise to the following sources of impact;
- failure or overtopping of the SuDS System;
 - accidental emissions impacting groundwater and surface water quality;
 - changes in groundwater recharge;
 - changes in abstraction and discharge impacting water resources; and
 - changes to flood risk and drainage.

Groundwater and Surface Water Quality

Failure or Overtopping of the SuDS System

- 9.128 Should water be unable to enter the drainage network or there is an exceedance within the body of the Site, it would likely result in shallow flooding, which would remain passable for operational equipment. Excess water would then flow towards the lower lying areas of the site. For the majority of the Site this would be the main drainage lagoon via the roadways of the site. For the A4 area this

would flow into the swale of the A4 area or cross the road into the truck parking on the main Site. This would eventually drain through the drainage network to the southwest lagoon.

- 9.129 Providing that the SuDS System is regularly inspected and maintained the probability of a failure, or of a storm that is larger than the design storm is negligible. There is capacity within the lagoon above the design storm of 1% AEP with an uplift in peak rainfall rates of 40%. However, should it occur the capacity of the lagoon would be exceeded and, mildly contaminated water could overtop towards the Shotton Reedbeds SSSI.
- 9.130 The magnitude of the impact (taking into account the probability) would be **'low'** and therefore the significance is **'minor'** respectively.

Failure or Overtopping of the Lagoon

- 9.131 Should a blockage occur in the pipework for the discharge, or the discharge cannot occur due to pump failure or a pollution incident, then water levels within the lagoon would rise. Similarly, if an event in excess of the design event (1% AEP + 40% CC) occurred water levels in the lagoon would rise above the design range.
- 9.132 There is a large freeboard volume within the lagoon, and it is considered low that overtopping would occur from the lagoon going towards the south and the Shotton Reedbed SSSI. The water quality of water from lagoon would have a **'low'** magnitude impact which would result in a **'moderate'** significance.

Accidental Emissions

- 9.133 Fracturing of piping, rupturing or overflowing of containment vessels could potentially result in accidental emissions of chemicals and / or fibres. All new pipework and storage areas will however be constructed in accordance with Best Available Techniques.
- 9.134 Due to the position of the proposed development over the existing site and further north (i.e. further from the sensitive water features) and the newer storage facilities the probability of an accidental emission from this source is reduced as a result of the proposed development and therefore the magnitude of the impact is **'negligible'**. The significance of the impact is therefore **'negligible'**.
- 9.135 Unloading of chemicals is the highest risk activity for a potential accidental spillage and will only be completed in areas that drain to the foul network and then the effluent treatment plant. Direct discharge of major spills to the storm water system is therefore high unlikely.
- 9.136 We would note that major spills could enter the effluent drainage system in significantly higher concentrations than the system has been designed for. This could therefore overwhelm the treatment plant and have potential for water quality impacts to the discharge to the lagoon. However, this system has been designed to treat the water beyond the requirements for discharge and has the capacity to manage contaminated flows. If flows were beyond that which the effluent treatment plant could accommodate the emergency lagoon would be used.

- 9.137 Effluent (including foul water and runoff from areas of the Site where contamination could occur) would be treated at the Site by a treatment works. It is highly unlikely for more than one element of the treatment plant to fail at the same time (and there are 3 stages each with multiple processes). Given that it has been designed to treat the water further than the requirement for discharge, the requirements of discharge could likely be met even if part of the treatment plant is not fully functional. The discharge from the treatment plant will be monitored upstream processes would be shut down in the event of discharge parameters related to the effluent treatment plant are not met.
- 9.138 There is an additional fully lined emergency lagoon (estimated capacity of at least 1,500m³) to which treated effluent that does not reach the discharge requirements can be transferred. From here the water would either be subject to additional treatment or removed off-site for treatment and discharge at an approved treatment facility. Given the inherent mitigation to the design the magnitude of the impact of a failure in part of the treatment plant is assessed to be **'low'** and significance to the lagoon is **'minor'**. The magnitude of the impact to the White Sands Gutter with consideration of the dilution within the southwest lagoon is assessed to be **'negligible'**. The significance would therefore also be **'negligible'**. Inherently the same would apply to shallow groundwater beneath the lagoon, Shotton Lagoons and Reedbeds SSSI and any downstream receptors including the Dee Estuary SSSI. Despite having a higher sensitivity these downstream receptors have a very large dilution effect and therefore negligible impacts higher in the system would result in negligible impacts downstream.
- 9.139 Whilst the intended operation is that all activities involving chemicals will be completed within areas that drains to the effluent system, there could be minor spillages of chemicals or hydrocarbons / oils outside of these areas. This risk is greatest in car parking areas, operational yards and along roadways with moving vehicles. Runoff from all of these areas will drain to the Site storm water management system and so any spill, if it occurred, would be mitigated by the SuDS management train. Despite this, some contamination could reach the lagoon particularly for the truck car park where a more serious hydrocarbons / oil spill is possible.
- 9.140 The discharge from the lagoon is not monitored specifically for the contaminants associated with oils and hydrocarbons and there is a low potential that slightly contaminated water (albeit highly diluted by the lagoon) could be discharge to White Sands Gutter. The magnitude of the impact to the lagoon if unmitigated is **'medium'** and therefore the significance is **'moderate'**. The magnitude of the impact to the White Sands Gutter with consideration of the dilution within the lagoon is **'low'**. The significance would be **'minor'**. Due to the further dilution at the confluence with the Dees Estuary the unmitigated magnitude of impact here would be **'negligible'** and therefore the significance will be **'negligible'**.

Groundwater Recharge

- 9.141 In the north of the site, there is a significant increase in the impermeable footprint, there is also an increase in impermeable cover in the main existing Site area. The overall increase in the impermeable coverage is approximately 13.2ha out of a total proposed impermeable footprint of

51.44ha. The standardised annual average rainfall (SAAR) for the site is 694mm¹⁶ of which circa 200mm would contribute to recharge with the remainder lost as evaporation. The loss of recharge therefore of the order of 26,400m³/year which would likely contribute to shallow baseflow in the marine alluvium towards in all directions as well as regional flows within the deeper aquifer out to the estuary. In relation to the quantity, the loss of recharge and baseflows would be a **'negligible'** magnitude and therefore **'negligible'** significance.

- 9.142 Recharge from the Site passes through a significant layer of made ground which is considered to be contaminated (refer to **Land Quality Chapter 8**). Recharge through the made ground would result in mobilisation of the contaminants into the underlying aquifer. In relation to the quality, the loss of recharge through the potentially contaminated land would be a **'low'** magnitude beneficial impact. The significance of this would be **'minor'** beneficial.

Groundwater and Surface Water Volumes

Failure or Overtopping of the On-site SuDS System

- 9.143 Providing that the SuDS System is regularly inspected and maintained the probability of a failure, or of a storm that is larger than the design storm (1% AEP + 40% uplift for climate change) has a low probability of occurring. For all of the site overflow or overtopping of SuDS features would still result in the flows reaching the lagoon, which acts as the final element of the SuDS management train. The magnitude of the impact in relation to volumes and rates to the lagoon would be **'negligible'** and the overall significance would be **'negligible'**.

Failure or Overtopping of the Lagoon

- 9.144 Should a blockage occur in the pipework for the discharge, or the discharge cannot occur due to pump failure or a pollution incident, then water levels within the lagoon would rise. Similarly, if an event in excess of the design event (1% AEP + 40% CC) occurred water levels in the lagoon would rise above the design range.
- 9.145 There is a large freeboard volume within the lagoon, and it is considered low that overtopping would occur from the lagoon going towards the south and the Shotton Reedbed SSSI. Whilst the Shotton Reedbed SSSI is considered water level sensitive, NRW have advised that the common turns nest on floating platforms and forage elsewhere in the estuary. The additional volume of water is unlikely to be sufficient to result in perceptible changes therefore the magnitude is considered **'negligible'**, and the overall significance is **'neutral / negligible'**.
- 9.146 The water quality from this source would have a **'low'** magnitude impact on the water in the Shotton Reedbeds SSSI and therefore the significance would be **'moderate'**.

9.5.3 Summary of Unmitigated Potential Impacts

The unmitigated potential impacts have been compiled in **Table 9-8**.

¹⁶ UK Centre for Ecology & Hydrology, Flood Estimation Handbook Web Service, <https://fehweb.ceh.ac.uk/GB/map>, Accessed February 2022

Table 9 - 8
Summary of Unmitigated of Potential Impacts

Potential Impact	Receptor	Spatial and Temporal Impact	Magnitude of Impact	Sensitivity of Receptor	Significance of Potential Effect	Mitigation Required?
Construction Phase						
Groundwater and Surface Water Quality						
Blockage of Drainage Network	Southwest Lagoon	Only the lagoon and would be short to medium term impact depending on remediation time	Low	Medium	Minor	No
Blockage of Drainage Network	Weighbridge Road	Smaller area if roadway to the east of the Site;	Low	Low	Minor	No
Spilled Oils and Fuels	Discharge from the SuDS System to Southwest Lagoon	Minimal spatial impact and short-term impacts	Negligible	Medium	Negligible	No
Spilled Oils and Fuels	Southwest Lagoon	Minimal spatial extent (within site water environment), short to medium term depending on remediation time	Medium	Low	Minor	Yes
Spilled Oils and Fuels	Groundwater	Moderate spatial extent from groundwater flow; Medium to long term impacts	Low	Low	Minor	No

Potential Impact	Receptor	Spatial and Temporal Impact	Magnitude of Impact	Sensitivity of Receptor	Significance of Potential Effect	Mitigation Required?
Spilled Oils and Fuels	Fingerpost Gutter West	Minor Spatial extent, medium to long term impact	Low	Medium	Moderate	Yes
Spilled Oils and Fuels	Shotton Lagoons and Reedbeds SSSI and associated channels	Minor Spatial extent, medium to long term impact	Low	High	Moderate	Yes
Elevated Concentration of Suspended Solids	Southwest Lagoon	Minimal spatial impact; short term impact	Medium	Low	Minor	No
Elevated Concentration of Suspended Solids	Shotton Lagoons and Reedbeds SSSI and associated channels	Moderate spatial impact, medium term	Medium	High	Substantial / Major	Yes
Cementitious Materials	Southwest Lagoon	Minimal spatial impact, long term	Medium	Low	Moderate	Yes
Cementitious Materials	Shallow Groundwater via Southwest Lagoon	Minimal spatial impact, long term	Medium	Low	Minor	No
Cementitious Materials	Shotton Lagoons and Reedbeds SSSI and associated channels via Shallow Groundwater via Southwest Lagoon	Minimal spatial impact, long term	Low	High	Moderate	Yes
Cementitious Materials	Weighbridge Road Drainage Network	Minimal spatial, medium term	Low	High	Moderate	Yes

Potential Impact	Receptor	Spatial and Temporal Impact	Magnitude of Impact	Sensitivity of Receptor	Significance of Potential Effect	Mitigation Required?
Cementitious Materials	Groundwater	Moderate spatial impact, long term	Medium	Low	Minor	No
Groundwater and Surface Water Volumes and Runoff Rates						
Blockage of On-site Drainage Infrastructure / Uncontrolled Runoff	Southwest Lagoon	Minimal spatial Impact, very short term	Negligible	Medium	Negligible	No
Blockage of Discharge Infrastructure	Shotton Lagoons and Reedbeds SSSI and associated channels	Minimal spatial Impact, very short term	Negligible	High	Negligible	No
<i>Operational Phase</i>						
Groundwater and Surface Water Quality						
Failure / Overtopping of the SuDS System	Southwest Lagoon	Minimal spatial impact, short term	Low	Low	Minor	No
Failure / Overtopping of the SuDS System	Shotton Lagoons and Reedbeds SSSI and associated channels	Minimal spatial impact, short term	Low	High	Moderate	Yes
Failure / Overtopping of the Lagoon	Shotton Lagoons and Reedbeds SSSI and associated channels	Minimal spatial, medium term				

Potential Impact	Receptor	Spatial and Temporal Impact	Magnitude of Impact	Sensitivity of Receptor	Significance of Potential Effect	Mitigation Required?
Accidental Emissions - Chemicals	Southwest Lagoon	Minimal Spatial Impact; Short to medium term	Low	Low	Minor	No
Accidental Emissions - Chemicals	White Sands Gutter (i.e. after discharge from the site)	Large Spatial Impact, Medium to Long Term	Negligible	High	Negligible	No
Accidental Emissions – Failure of Treatment Plant	Southwest Lagoon	Minor Spatial, Short to Medium Term	Low	Medium	Minor	No
Accidental Emissions - Spillage	Southwest Lagoon	Minimal Spatial Impact; Short to medium term	Medium	Medium	Moderate	No
Accidental Emissions - Spillage	White Sands Gutter (i.e. after discharge from the site)	Large Spatial Impact, Medium to Long Term	Low	High	Minor	No
Groundwater Recharge	Groundwater	Medium spatial; long term	Low beneficial)	Low	Minor	No
Groundwater and Surface Water Volumes and Runoff Rates						
Failure or Overtopping of the SuDS System	Southwest Lagoon	Minimal Spatial, Very Short-Term Impacts	Negligible	Low	Negligible	No
Failure or Overtopping of the SuDS System	Shotton Lagoons and Reedbeds SSSI	Medium Spatial, Short-Term Impacts	Negligible	Medium	Low	No

9.5.4 Proposed Mitigation Measures

- 9.147 Mitigation measures to address potential significant effects detailed in **Table 9 - 88** are described below. These measures reduce the magnitude of potential impact. It should be noted that several of the mitigation measures proposed below would result in a positive change on more than one potential impact.
- 9.148 A number of operational mitigations measures and best available techniques have been incorporated into the procedures already used at the existing operational Site. These have been considered as incorporated mitigation within the initial assessment as well as mitigation that is inherent in the design (refer to section 9.4) as the proposed development will continue to operate in the same manner.
- 9.149 Additionally the pump discharge from the lagoon would be either dual pump in case one failures or a spare pump would be kept on Site that could be switched in. The freeboard within the lagoon would provide sufficient time for the change of the pump.

Construction Phase

- 9.150 The construction of the replacement paper mill at Shotton Mill would be undertaken in line with relevant technical guidance and codes of best practice to limit the potential for contamination of both ground and surface waters.
- 9.151 Best practice techniques would be incorporated within the management procedures for construction activities onsite in order to protect the water environment from pollution incidents. This would involve the preparation of a detailed 'construction - site water management plan' which would be incorporated into the CEMP and agreed with NRW prior to work commencing at the application site. This document would set out:
- roles and responsibilities for environmental management during the works;
 - detailed methodology for managing any imported materials;
 - details of Site drainage and water management during works;
 - details of what other material would be required during the works and where and how these would be stored, and
 - measures for identifying and addressing any pollution incidents should these occur.
- 9.152 Where works are completed using cementitious materials there is a specific risk associated with the generation of highly alkaline runoff. To mitigate this the contractor would:
- preferentially seek to use precast concrete fitting where this is a reasonable approach;
 - avoid any onsite batching through the use of ready mixed concrete;

- direct all cement delivery vehicles to return to depot (offsite) for washout;
- locate mixing of grout within areas with lining and a suitable bunding;
- washout area for onsite equipment to be lined and bunded and also be subject to regular (weekly) check for the integrity of the containment;
- wash out areas will be located away from any of the water / SuDS features – they should not be located within the southern area (where the lagoon is infilled) until releveling ensures any accidental escapes of washout water can not enter the water environment;
- alkaline water from concrete wash out would not be disposed of at the Site unless subject to appropriate treatment and specific agreement with NRW. At the stage it is assumed this would be tanked from Site for treatment and disposal at an appropriate licenced facility.

9.153 The following standard good practice measures would be incorporated and expanded upon within the plan:

- the use and storage of potentially polluting materials on site, including oils and fuel, would be minimised as far as is reasonably possible;
- all on-site fuel, chemical storage, and potentially polluting materials, would be above ground and would be situated in areas that are lined and bunded;
- emergency spill response kit would be provided and maintained on site and site personnel would be trained in their use;
- a vehicle management system including strict speed limits and road markings would be put in place wherever possible to reduce the potential conflicts between vehicles and thereby reduce the risk of collision;
- direct discharge of sediment laden water to adjacent surface water bodies would be forbidden;
- spoil heaps should be minimised and kept covered as far as possible; and
- wheel cleaning should be carried out on exit to the Site to minimise tracking of sediment onto adjacent roads.

9.154 A detailed inventory of potential pollutant sources and specific high-risk activities (such as refuelling) that are on Site through the construction process will be made and kept on Site. As already noted, appropriate storage facilities for these materials would be provided and these facilities would be regularly inspected and maintained.

Additionally monitoring will be completed in:

- adjacent surface water features to check for pollution entering the wider water environment; and

- enhanced checks on this discharge, primarily visual checks on suspended sediments and oils with monthly spot checks.

Operational Phase

The operational Site would have an Environmental Management Plan which will include the following information:

- roles and responsibilities for environmental management of the Site;
- detailed methodology for managing of any materials, process water and chemicals;
- details of Site drainage and water management including inspection and maintenance regimes;
- measures for identifying and addressing any pollution incidents should these occur; and
- details for how to respond in the event of a regional flood event (i.e. issue of flood warning by NRW).

The following standard good practice measures would be incorporated and expanded upon within the plan:

- the use and storage of potentially polluting materials on site, including oils and fuel, would be minimised as far as is reasonably possible;
- all on-site fuel, and chemical storage would be above ground and would be situated in areas that are lined and bunded;
- tankers for delivery of liquids will be required to park up for offloading in areas that drain to the foul water system;
- emergency spill response kit would be provided and maintained on site and Site personnel would be trained in their use; and
- a vehicle management system including strict speed limits and road markings would be put in place wherever possible to reduce the potential conflicts between vehicles and thereby reduce the risk of collision.

9.5.5 Summary of Residual Impacts

The mitigated potential impacts have been compiled in **Table 9 - 89**.

Table 9 - 9
Summary of Mitigated Residual Impacts

Potential Impact	Receptor	Spatial and Temporal Impact	Magnitude of Impact	Significance of Unmitigated Potential Effect	Mitigated Magnitude of Impact	Significance of Mitigated Potential Effect
<i>Construction Phase</i>						
Groundwater and Surface Water Quality						
Blockage of Drainage Network	Southwest Lagoon	Only the lagoon and would be short to medium term impact depending on remediation time	Low	Minor	Negligible	Negligible
Blockage of Drainage Network	Weighbridge Road	Smaller area if roadway to the east of the Site;	Low	Minor	Negligible	Negligible
Spilled Oils and Fuels	Discharge from the SuDS System to Southwest Lagoon	Minimal spatial impact and short-term impacts	Negligible	Negligible	Negligible	Negligible
Spilled Oils and Fuels	Southwest Lagoon	Minimal spatial extent (within site water environment), short to medium term depending on remediation time	Negligible	Negligible	Negligible	Negligible
Spilled Oils and Fuels	Southwest Lagoon	Minimal spatial extent (within site water environment), short	Medium	Minor	Negligible	Negligible

Potential Impact	Receptor	Spatial and Temporal Impact	Magnitude of Impact	Significance of Unmitigated Potential Effect	Mitigated Magnitude of Impact	Significance of Mitigated Potential Effect
		to medium term depending on remediation time				
Spilled Oils and Fuels	Groundwater	Moderate spatial extent from groundwater flow; Medium to long term impacts	Low	Minor	Negligible	Negligible
Spilled Oils and Fuels	Fingerpost Gutter West	Moderate spatial extent from groundwater flow; Medium to long term impacts	Low	Moderate	Negligible	Negligible
Spilled Oils and Fuels	Shotton Lagoons and Reedbeds SSSI and associated channels	Minor Spatial extent, medium to long term impact	Low	Moderate	Negligible	Negligible
Elevated Concentration of Suspended Solids	Southwest Lagoon	Minimal spatial impact; short term impact	Medium	Low	Low	Minor
Elevated Concentration of Suspended Solids	Shotton Lagoons and Reedbeds SSSI and associated channels	Moderate spatial impact, medium term	Medium	Substantial / Major	Negligible	Negligible
Cementitious Materials	Southwest Lagoon	Minimal spatial impact, long term	Medium	Minor	Low	Minor
Cementitious Materials	Shallow Groundwater via Southwest Lagoon	Minimal spatial impact, long term	Medium	Minor	Low	Minor

Potential Impact	Receptor	Spatial and Temporal Impact	Magnitude of Impact	Significance of Unmitigated Potential Effect	Mitigated Magnitude of Impact	Significance of Mitigated Potential Effect
Cementitious Materials	Shotton Lagoons and Reedbeds SSSI and associated channels via Shallow Groundwater via Southwest Lagoon	Minimal spatial impact, long term	Low	Moderate	Negligible	Negligible
Cementitious Materials	Weighbridge Road Drainage Network	Minimal spatial, medium term	Low	Moderate	Low	Minor
Cementitious Materials	Groundwater	Moderate spatial impact, long term	Medium	Minor	Low	Minor
Groundwater and Surface Water Volumes and Runoff Rates						
Blockage of On-site Drainage Infrastructure / Uncontrolled Runoff	Southwest Lagoon	Minimal spatial Impact, very short term	Negligible	Negligible	Negligible	Negligible
Blockage of Discharge Infrastructure	Shotton Lagoons and Reedbeds SSSI and associated channels	Minimal spatial Impact, very short term	Negligible	Negligible	Negligible	Negligible
Operational Phase						
Groundwater and Surface Water Quality						

Potential Impact	Receptor	Spatial and Temporal Impact	Magnitude of Impact	Significance of Unmitigated Potential Effect	Mitigated Magnitude of Impact	Significance of Mitigated Potential Effect
Failure / Overtopping of the SuDS System	Southwest Lagoon	Minimal spatial impact, short term	Low	Minor	Low	Minor
Failure / Overtopping of the SuDS System	Shotton Lagoons and Reedbeds SSSI and associated channels	Minimal spatial impact, short term	Low	Moderate	Negligible	Negligible
Accidental Emissions - Chemicals	Lagoon	Minimal Spatial Impact; Short to medium term	Low	Minor	Negligible	Negligible
Accidental Emissions - Chemicals	White Sands Gutter (i.e. after discharge from the site)	Large Spatial Impact, Medium to Long Term	Negligible	Negligible	Negligible	Negligible
Accidental Emissions – Failure of Treatment Plant	Southwest Lagoon	Minor Spatial, Short to Medium Term	Low	Minor	Low	Minor
Accidental Emissions - Spillage	Southwest Lagoon	Minimal Spatial Impact; Short to medium term	Medium	Moderate	Low	Minor
Accidental Emissions - Spillage	White Sands Gutter (i.e. after discharge from the site)	Large Spatial Impact, Medium to Long Term	Low	Minor	Low	Minor
Groundwater Recharge	Groundwater	Medium spatial; long term	Low beneficial)	Minor	Low beneficial)	Minor
Groundwater and Surface Water Volumes and Runoff Rates						

Potential Impact	Receptor	Spatial and Temporal Impact	Magnitude of Impact	Significance of Unmitigated Potential Effect	Mitigated Magnitude of Impact	Significance of Mitigated Potential Effect
Failure or Overtopping of the SuDS System	Lagoon	Minimal Spatial, Very Short-Term Impacts	Negligible	Negligible	Negligible	Negligible
Failure or Overtopping of the SuDS System	Shotton Lagoons and Reedbeds SSSI	Medium Spatial, Short-Term Impacts	Negligible	Negligible	Negligible	Negligible

9.5.6 Cumulative Effects Assessment

- 9.155 The implementation of a robust CEMP during the construction phase and a Site Environmental Management Plan for the operation of the site will ensure that the mitigation measures, as outlined above, are delivered and maintained at the Site. This, alongside the incorporated mitigation means that the risk of an adverse effect on the water environment is not significant in EIA terms. The primary controls are that the Site provides a significant volume of storage upstream of where water will be discharged and that these discharges to the wider water environment are and will continue to be continually monitored.
- 9.156 Irrespective of this it is noted that even where the effects of a proposed development are deemed to be not significant in isolation, cumulative impacts can occur from a large number of similar developments and land uses when considered as a whole.
- 9.157 In Wales, all development of a significant size is required to gain SAB approval. It is therefore assumed that through this process, the cumulative impacts of multiple developments within a single catchment on peak flood flows will therefore be negligible. It is also assumed that once constructed the SuDS schemes will be sufficient to offset any potential deterioration of water quality during storm events.
- 9.158 There are 2 planning applications within the vicinity of the Site which are considered to potentially have cumulative impacts with this site:
- A proposed paper mill on Plot C' Airfields, Northern Gateway (063721); and
 - Erection of an advanced gasification plant on Weighbridge Road to the southeast of the site (reference 063104)
- 9.159 The proposed paper mill at the former airfield will have two effects for further consideration:
- **An additional discharge to the Dee Estuary (not via the same tidal creek)** – details about what is proposed at the Northern Gateway site, outside of this being inline with an NRW Environmental Permit, are scarce. This permit will place on the site restrictions so that discharge does not contain high levels of likely contaminants. The assessment for the permit should be based on catchment models and it can be assumed that under normal operational conditions there would be negligible cumulative impact from the discharges. Given the design mitigation for Shotton Mill with an emergency lagoon as well as additional freeboard within the main lagoon, the probability of a discharge not in line with the environmental permit is extremely low. For this to then occur at the same time as at the gateway mill (particularly given that Shotton is not within the floodplain) is extremely small and considered an insignificant risk.
 - **Abstraction from River Dee** – it is not clear from publicly available information where the water supply will be obtained from the site. Reference is made to a non-potable raw water network, and it is assumed that this draws water from the River Dee. The proposed development at Shotton will not increase and will likely decrease abstractions. The cumulative impact is therefore considered negligible.

- 9.160 The proposed gasification plant will have a series of SuDS features to manage storm water drainage and the Site is understood to discharge trade effluent to a public sewer. This is within the Shotwick Brook catchment draining to the Dee Estuary. The cumulative effect of the two developments is considered insignificant.

9.5.7 Further Survey Requirements and Monitoring

- 9.161 Surface water monitoring is being completed to generate a baseline condition of the local water environment. Following the start of construction the following is proposed.

Construction Phase

- 9.162 During construction monitoring would be undertaken from the surface water monitoring points where the baseline conditions were measured (refer to Drawing 9-2). This monitoring would be undertaken monthly to ensure that pollution reaching the wider water environment. If pollution is identified in the southwest lagoon, discharge would be stopped until the water quality has been mediated. If increases occur in the wider water environment (other than the upgradient sample points that would not be impacted by the Site) these would be investigated to find the cause / incident and identify mitigation to prevent further losses. As a minimum the following parameters would be tested for:

- suspended solids;
- pH;
- temperature;
- major ions suite (EC, Ammoniacal Nitrogen, Chloride, Fluoride, Sulphate, Ortho-phosphate, bromide, nitrate, nitrite, Ca, Mg, K, Na, total hardness and total alkalinity);
- metals;
- Chemical and Biological Oxygen Demand (COD and BOD);
- Total Organic Content (TOC); and
- Total Petroleum Hydrocarbon (TPH) Criteria Working Group (CWG).

Operational Phase

- 9.163 Once operational the mill would monitor inline with the requirements of the environmental permit for discharge as summarised in **Table 9 - 1010**.

Table 9 - 10
Monitoring Parameters

Parameter	Monitoring Frequency
Biological Oxygen Demand	Weekly
Chemical Oxygen Demand	Daily
Suspended Solids	Weekly
pH	Continuous
Ammoniacal Nitrogen	Daily
Temperature	Continuous
Flow	Continuous / Daily
Total Phosphorus	Weekly
Total Nitrogen	Weekly
Metals (Fe, Mn, Zn, As, Cu, Cr, Ni, Pb, Cd, Hg)	Quarterly
Water Framework Directive relevant priority hazardous substances screen	Annually

9.6 SUMMARY AND STATEMENT OF SIGNIFICANCE

- 9.164 The proposed development is set on an existing raised parcel of land in the proximity of the Dee Estuary. The proposed development involves the replacement of an existing papermill with a new facility and storm and treated effluent will continue to discharge towards the estuary via a large lagoon system (onsite) and a tidal creek (offsite).
- 9.165 A summary of the significance of the potential effects of the proposed development after consideration of mitigation measures is given in 9. This demonstrates that given the mitigation incorporated into the scheme design, the implementation of appropriate preventative measures and mitigation, as outlined in this report, significantly and appropriately limits the identified adverse effects to surface water and groundwater from the proposed Site activities to acceptable levels (i.e. not significant in EIA terms).
- 9.166 The proposed changes will not give rise to any impact that have the potential to result in a negative change in the WFD status of any pf the local water bodies. The improvements brought about by the redevelopment of the Site will likely result in net benefits to the water environment through

improved treatment of storm and effluent flows and this will assist in contributing towards achieving the local WFD objectives.

- 9.167 Risk posed to the Dee Estuary SSSI and the Shotton Reedbeds SSSI are assessed as low or negligible and can be managed through the construction and operation of the Site. Where an upstream receptor has been identified as having a negligible impact, downstream receptors despite higher sensitivity, will have a negligible impact as the water is significantly diluted as it passes downstream.
- 9.168 Overall, it is concluded that, with respect to groundwater surface water and flood risk, there would be no significant residual effects of the proposed development after inclusion of the identified mitigation measures.

9.7 REFERENCES

- 9.169 Natural Resources Wales, Flood Map for Planning (Accessed December 2021) <https://flood-map-for-planning.naturalresources.wales/>
- 9.170 Natural Resources Wales, Development Advice Map (Accessed December 2021) <https://naturalresources.wales/evidence-and-data/maps/long-term-flood-risk/?lang=en>
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10.1. Introduction

10.1 This chapter of the ES describes the ecological conditions at the Site of the proposed development at Shotton Mill, Weighbridge Road, Flintshire, which comprises the area of an existing paper mill ('the Main Site') application 1, and the area of planned Expansion Land, which is located on land immediately north of the Main Site boundary, known as 'Plot A4' (application 1). In addition, a combined heat and power (CHP) plant is proposed for the site (application 2) and piling will be required as part of the works (application 3). It outlines the value of the Site to biodiversity with regard to designated sites, habitats and protected wildlife, assesses the potential impacts of the proposed development upon biodiversity, and details the appropriate mitigation measures required to avoid, reduce or compensate for these impacts. Following this, any residual impacts are identified and their significance assessed. A full description of the project is provided in **Chapter 3 Proposed Development**.

10.2. Approach and Methods

10.2 The ecological evaluation and impact assessment approach used in this chapter is based on Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland ("CIEEM guidelines") (CIEEM, 2018¹).

10.3 The approach to the ecological assessment has been undertaken as follows:

- *definition of the existing ecological conditions at the Site of the proposed development, including a review of the development area in its local and regional ecological context;*
- *determination of the existing ecological value of the Site of the proposed development and surrounding areas;*
- *identification and description of all potentially significant ecological effects associated with the proposed development;*
- *outlining the design, mitigation and compensation measures required to ensure compliance with nature conservation legislation and to address any potentially significant ecological effects;*
- *identification of how mitigation and compensation measures will be delivered;*
- *identification of any residual ecological effects following mitigation, and an assessment of their significance;*
- *identification of appropriate enhancement measures and how these will be delivered; and*
- *outlining the requirements for post-construction monitoring.*

¹ CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland <https://cieem.net/resource/guidelines-for-ecological-impact-assessment-ecia/>

10.4 Professional judgement is used to identify and characterise the ecological receptors under consideration and to describe the value, or sensitivity, of individual ecological receptors that have been identified during baseline data collection.

10.2.1. Data sources and limitations

10.5 Desktop studies and field surveys have been completed by SLR Consulting Ltd ('SLR') in 2021 and 2022 and have been used to determine the baseline conditions at the Site of the proposed development and its surrounding area, or 'Zone of Influence' (see paragraph 10.11 below).

10.6 Desktop studies include information collected from both England and Wales and briefly comprise:

- *Ecological data search from the Cofnod Environmental Records Centre (CERC), received in July 2021, which provides records of protected and otherwise notable species, and non-statutory protected sites for the Site and land within a 2km radius of its centre point (OS grid reference SJ 30430 71472).*
- *Ecological data search from RECORD (Local Environmental Records Centre for Cheshire, Halton, Warrington and Wirral), received in January 2022, which provides records of protected and otherwise notable species, and non-statutory protected sites for the Site and a 2km radius of the Site's centre point (OS grid reference SJ 30430 71472), for land which falls within the LERC boundary.*
- *Local Wildlife Site citation records from Cheshire Wildlife Trust, received in January 2022, for sites which fall within a 2km radius of the Site's centre point.*
- *Further baseline data in respect of statutory wildlife sites was sought through examination of DEFRA's web-based resources from the Multi-Agency Geographic Information for the Countryside (MAGIC)² and links provided within this database to additional records relating to statutory wildlife sites from country agencies, i.e. Natural Resources Wales (NRW), Natural England (NE) and Joint Nature Conservation Committee (JNCC). MAGIC was also searched for priority habitats listed on the Priority Habitats Inventory (England), ancient woodlands, and European Protected Species (EPS) Licences granted within 1km of the Site.*
- *Ecological data search carried out using The Woodland Trusts' Ancient Tree Inventory³ to identify veteran trees that are situated within a 2km buffer zone of the Site.*
- *In addition, data on Important Plant Areas was sourced from Plantlife⁴ and Important Invertebrate Areas from Buglife⁵ to see if the Site was located in close proximity to any of these areas deemed of national or international significance for plants and invertebrates respectively.*

² DEFRA (2022) *Multi-Agency Geographic Information for the Countryside MAGIC map*. Available at: <http://www.magic.gov.uk> (Accessed 1 February 2022)

³ <https://ati.woodlandtrust.org.uk/>

⁴ Plantlife (2022) *Important Plant Areas*. Available at: <https://www.plantlife.org.uk/international/important-plant-areas-international> (Accessed 1 February 2022)

⁵ Buglife (2022) *Important Invertebrate Areas*. Available at: <https://www.buglife.org.uk/our-work/important-invertebrate-areas/> (Accessed 1 February 2022)

- *Wetland Bird Survey (WeBs) data from the British Trust for Ornithology (BTO) was requested at the three core count parcels situated in proximity to the Site, these being: Cop Hole and Marsh, Shotton BSC Lagoons and Shotton Paper Mill Lagoons.*
- *Merseyside ringing group information on the Shotton reedbed and lagoon common tern (*Sterna hirundo*) colony.*

10.7 Field studies were undertaken at the Site by suitably experienced and qualified field ecologists. The surveys briefly comprise:

- *Preliminary Ecological Appraisal, comprising a habitat survey using the UK Habitat Survey (UKHab) classification methodology and protected species scoping survey. This was undertaken on 29 June 2021 and 10 August 2021. Condition assessment data pertinent to Biodiversity Metric 3.0 were collected on 21 October 2021 and on 26 October 2021.*
- *Preliminary Roost Assessment of on-site trees and buildings to assess their potential for roosting bats was undertaken on 29 June 2021 and 10 August 2021.*
- *One bat activity transect survey with 10-day static deployment was undertaken on 26 October 2021.*
- *A Habitat Suitability Index (HSI) and great crested newt eDNA survey were undertaken on one pond in the north-western area of Plot A4 on 29 June 2021.*
- *Breeding bird surveys and wintering bird surveys have been undertaken at the Site involving visits once a month in June- September and twice a month from October onward (surveys are on-going until May 2022) using a modified Common Bird Census (CBC) methodology. The surveyed locations include the site, Plot A4, and the Cop Hole and Marsh WeBs count area, part of the Dee Estuary SPA. Cop Hole and Marshes was covered by a vantage point survey. Shotton Lagoon and Marshes Site of Special Scientific Interest (SSSI) has been incorporated since February 2022 and nocturnal surveys of the onsite lagoons have also occurred since February 2022.*
- *An aquatic PSYM⁶ survey of one lagoon onsite ("Lagoon 2b") was undertaken on 21 December 2021. Fish metabarcoding eDNA analysis of lagoon 2b was also undertaken on 20 January 2022.*

10.8 Limitations regarding the baseline data collection and data sources are as follows:

- *Desk study data is unlikely to be exhaustive, especially in respect of species, and is intended mainly to set a context for the study. It is therefore possible that protected species not identified during the data search do in fact occur within the vicinity of the Site. Interpretation of maps and aerial photography has been conducted in good faith, using recent imagery, but it has not been possible to verify the accuracy of any statements relating to land use and habitat context outside of the field study area.*
- *Adverse weather conditions were encountered during the bat activity survey, specifically strong winds, which combined with the sub-optimal timing of the survey (last week in October) reduces the reliability of this survey. However, spring and summer transect surveys are scheduled to take place in 2022 which will inform future findings and recommendations.*

⁶ [PSYM Method - Freshwater Habitats Trust](#)

- *Bird data collection reported here spans June 21- January 22, as surveys are ongoing an update will be provided once breeding bird data is available. For bird survey specific limitations, refer to ornithology, **Technical Appendix 10.3.***
- *The aquatic macroinvertebrate data were collected outside of the optimum survey period for aquatic macroinvertebrates (March to November inclusive). Therefore, a precautionary approach has been taken in the interpretation of the aquatic macroinvertebrate results and in assessment of the ecological quality of the aquatic community present.*
- *Baseline reports of all field surveys and associated assessments are presented as Appendices to this ES Chapter. Survey specific limitations or constraints are stated in each report.*
- *Technical Appendix 10.1- Ecology baseline report;*
- *Technical Appendix 10.2- Aquatic Ecology report;*
- *Technical Appendix 10.3- Ornithology baseline;*
- *Technical Appendix 10.4- Habitat Regulations Assessment; and*
- *Technical Appendix 10.5 Air Quality Effects on Ecological Receptors.*

10.9 Further data collection and analysis is ongoing, this information is intended to provide supplementary information including on habitats and species beyond the project footprint, in areas associated with potential indirect effects. In the absence of this information a precautionary approach has been taken to the assessment of ecological resources.

10.2.2. Study Area

10.10 The study area is outlined in **Error! Reference source not found.** and comprises the Main Site as well as the Expansion site within the Plot A4 land.

10.11 In assessing the effect of the proposed development, an area beyond the project Site needs definition and consideration. This will be assessed in terms of the 'Zone of Influence', defined as the area over which ecological features may be affected by biophysical changes as a result of the proposed project and associated activities.

10.12 The surveyed area was amended for species-specific surveys to ensure the correct Zone of Influence was examined for each particular receptor. Where a different Zone of Influence has been used, details of stated survey area are provided in the appropriate report.

10.2.3. Determining the importance of Ecological Features ('receptors')

10.13 Ecological features can be important for a variety of reasons and the rationale used to identify them is explained below. Importance may relate, for example, to protected status, the quality or extent of the site or habitats therein; habitat and/ or species rarity; the extent to which such habitats and/ or species are threatened throughout their range, or to their rate of decline.

Important Habitats

10.14 Important habitats are considered here to be those which:

- *match the descriptions of habitats listed on Annex 1 of the Habitats Directive, so far as it applies to the UK and as transposed by The Conservation of Habitats and Species Regulations 2017 (as amended);*
- *match the descriptions of Habitats of Principal Importance as outlined under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006; and/or match descriptions of habitats of principal importance for biodiversity under s.7 of the Environment (Wales) Act 2016;*
- *match the descriptions of habitat included within Flintshire Local Biodiversity Action Plan;*
- *match the descriptions of habitat selection criteria for Local Wildlife Sites in Flintshire;*
- *comprise irreplaceable habitats such as (but not limited to) ancient woodland and veteran trees. Irreplaceable habitats are defined as “Habitat that cannot be recreated within a specified time frame because it would be technically very difficult or impossible to recreate taking into account their age, uniqueness, species diversity, rarity and environmental or historical context.”⁷; and/ or*
- *comprise a significant habitat resource for an important species (see below).*

Important Species

10.15 Important species are considered here to be those:

- *of European conservation importance (as listed on Annexes II, IV and V of the Habitats Directive or Annex 1 of the Birds Directive) so far as it applies to the UK and as transposed by The Conservation of Habitats and Species Regulations 2017 (as amended);*
- *specially protected under the terms of the Wildlife and Countryside Act 1981 (as amended);*
- *of principal importance for biodiversity as outlined under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006; and/or of principal importance for biodiversity under s.7 of the Environment (Wales) Act 2016;*
- *included within Flintshire Local Biodiversity Action Plan;*
- *match the descriptions of species selection criteria for Local Wildlife Sites in Flintshire;*
- *red listed or listed as near threatened using International Union for the Conservation of Nature (IUCN) criteria (IUCN, 2012; IUCN, 2016; IUCN 2019), e.g. in one of the UK Species Status Project reviews, or, where a more recent assessment of the taxonomic group has not yet been undertaken, listed in a Red Data Book);*
- *for birds, a potentially important population of a species which is red or amber listed in the UK (Stanbury et al., 2021);*
- *which are listed as a Nationally Rare or Nationally Scarce species (e.g. in one of the Species Status Project reviews) or listed as a nationally notable species where a more recent assessment of the taxonomic group has not yet been undertaken; and/ or*
- *endemic to a country or geographic location, it is appropriate to recognise endemic sub-species, phenotypes, or cultural behaviours of a population that are unique to a particular place.*

⁷ British Standard BS8683:2021

- 10.16 The importance of an ecological feature is considered within a defined geographical context. The following frame of reference has been applied to the ecological features identified during the desk study and surveys to inform this report:
- *International;*
 - *National (i.e. UK);*
 - *Regional (i.e. North Wales & North-West England);*
 - *County (i.e. Flintshire); and*
 - *Local (i.e. within circa 5km).*
- 10.17 In this context, ecological features are assigned ‘County’ importance if they include habitats and species which are typical of Flintshire, but in a wider context are nationally uncommon.
- 10.18 For the purposes of this assessment only ecological features of local importance or greater and/ or subject to legal protection are subject to detailed assessment (and are referred to as “important ecological features”). Effects on other ecological features of lower importance are considered unlikely to be significant in legal or policy terms so are not subject to detailed assessment.

10.2.4. Characterising Impacts

- 10.19 When describing impacts, reference has been made to the following characteristics, as appropriate:
- *beneficial, adverse or negligible;*
 - *extent;*
 - *magnitude;*
 - *duration (short term <5 years, mid-term 5-10 years, long term >10 years);*
 - *timing;*
 - *frequency; and*
 - *reversibility.*
- 10.20 The impact assessment process considers both direct and indirect impacts: direct ecological impacts are changes that are directly attributable to a defined action, e.g. the physical loss of habitat occupied by a species during the construction process. Indirect ecological impacts are attributable to an action, but which affect ecological resources through effects on an intermediary ecosystem, process or feature, e.g. the interruption of water courses which cause hydrological changes, which, in the absence of mitigation, could lead to the drying out of downstream habitats.

10.2.5. Significant Effects

- 10.21 The concept of ecological significance is addressed in paragraphs 5.24 through to 5.28 of the CIEEM guidelines¹. Significance is a concept related to the weight that should be attached to effects when decisions are made. For the purpose of an ES Chapter, a ‘significant effect’ is an effect that either supports or undermines biodiversity conservation objectives for ‘important ecological features’ or

for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local and the scale of significance of an effect may or may not be the same as the geographic context in which the feature is considered important.

10.22 Paragraphs 5.29 – 5.34 of the CIEEM guidelines cover how significant effects are determined. To summarise:

- *For designated sites – effects may be significant if they are likely to undermine the conservation objectives of the site; or positively or negatively affect the conservation status of species or habitats for which the Site is designated; or may have affect the condition of the Site or its interest/qualifying features.*
- *For ecosystems – effects may be significant if the project is likely to result in a change in ecosystem structure and function. Consideration should be given as to whether any processes or key characteristics will be removed or changed, if there will be an effect on the nature, extent, structure and function of component habitats or if there is an effect on the average population size and viability of component species.*
- *For habitats and species - consideration of conservation status is important for evaluating the effects of impacts on individual habitats and species and assessing their significance. Conservation status is defined 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; and*
- *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.*

10.2.6. Cumulative Effects

10.23 Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. Cumulative effects can occur where a proposed development results in individually insignificant impacts that, when considered in combination with impacts of other proposed or permitted plans and projects, can result in significant effects.

10.2.7. Avoidance, Mitigation, Compensation and Enhancement

10.24 The purpose of avoidance, impact minimisation and compensation measures are to reduce the extent or magnitude of project impacts. The aim of these measures is to reduce the project's adverse impacts such that there is no overall loss of biodiversity as a result of the project. Following CIEEM guidelines, the following terminology has been defined as below:

- *Avoidance: where an impact has been eradicated through, e.g. changes in project design.*
- *Mitigation: measures used to reduce or remedy a specific negative impact in situ.*

- *Compensation: when mitigation in situ is impossible, then compensation is used to offset residual effects.*
- *Enhancement: provision of new benefits for biodiversity that are additional to those provided as part of mitigation or compensation measures.*

- 10.25 When seeking mitigation or compensation solutions, the CIEEM guidelines state that efforts should be consistent with the geographical scale at which an effect is significant. For example, mitigation and compensation for effects on a species population significant at a county scale should ensure no net loss of abundance or distribution of the population at a county scale. The relative geographical scale at which the effect is significant will have a bearing on the required outcome which must be achieved.
- 10.26 Where potentially significant effects have been identified, the mitigation hierarchy has been applied, as recommended in the CIEEM guidelines. The mitigation hierarchy sets out a sequential approach beginning with the avoidance of impacts where possible, the application of mitigation measures to minimise unavoidable impacts and then compensation for any remaining impacts. Once avoidance and mitigation measures have been applied residual effects are then identified along with any necessary compensation measures, and incorporation of opportunities for enhancement.

10.2.8. Residual Impacts

- 10.27 After assessing the impacts of the proposed development, all attempts should be made to avoid and mitigate ecological impacts as described above. Once measures to avoid and mitigate ecological impacts have been finalised, assessment of the residual impacts should be undertaken to determine the significance of their effects on ecological features.
- 10.28 As outlined in the CIEEM guidelines, any residual impacts that will result in effects that are significant, alongside the proposed compensatory measures, will be the factors considered against ecological objectives (legislation and policy) in determining the outcome of the application.

10.2.9. Relevant Legislation and Planning Policy

Legislation

- 10.29 A summary of legislation relevant to (onshore) biodiversity in England and Wales is provided below. Note that the summary provided here is intended for general guidance only and the original legislation should be consulted for definitive information.

Conservation of Habitats and Species Regulations 2017 (as amended)

- 10.30 The Conservation of Habitats and Species Regulations 2017 (as amended) (the Habitats Regulations) consolidate the Conservation of Habitats and Species Regulations 2010 with subsequent amendments. The Regulations transpose Council Directive 92/43/EEC, on the conservation of natural habitats and of wild fauna and flora (EC Habitats Directive), into national law. Under the Habitats Regulations it is an offence to deliberately capture, kill or disturb wild animals listed under

Schedule 2 of the Regulations. It is also an offence to damage or destroy a breeding site or resting place of such an animal (even if the animal is not present at the time).

Wildlife & Countryside Act 1981

10.31 The Wildlife and Countryside Act 1981, as amended by the Countryside and Rights of Way (CROW) Act 2000 and the Natural Environment and Rural Communities (NERC) Act 2006, consolidates and amends existing national legislation to implement the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and Council Directive 79/409/EEC on the Conservation of Wild Birds (Birds Directive), making it an offence to:

- *Intentionally kill, injure or take any wild bird or their eggs or nests (with certain exceptions) and disturb any bird species listed under Schedule 1 to the Act, or its dependent young while it is nesting;*
- *Intentionally kill, injure or take any wild animal listed under Schedule 5 to the Act;*
- *Intentionally or recklessly damage, destroy or obstruct any place used for shelter or protection by any wild animal listed under Schedule 5 to the Act;*
- *Intentionally or recklessly disturb certain Schedule 5 animal species while they occupy a place used for shelter or protection;*
- *Pick or uproot any wild plant listed under Schedule 8 of the Act; or*
- *Plant or cause to grow in the wild any plant species listed under Schedule 9 of the Act.*

Protection of Badgers Act 1992

10.32 The Protection of Badgers Act 1992 makes it illegal to kill, injure or take a badger or to intentionally or recklessly interfere with a badger sett. Sett interference includes disturbing badgers whilst they are occupying a sett or obstructing access to it.

Natural Environment & Rural Communities (NERC) Act 2006

10.33 Section 40 of the NERC Act 2006 places a duty on public authorities to have due regard for biodiversity and nature conservation during the course of their operations. Public authorities include government departments, local authorities and statutory undertakers.

10.34 Section 41 of the Act (Section 42 in Wales) requires the publication of a list of habitats and species which are of principal importance for the purpose of conserving biodiversity. The Section 41 list is used to guide authorities in implementing their duty to have regard to the conservation of biodiversity.

Environment (Wales) Act 2016

10.35 The Environment (Wales) Act puts in place the legislation needed to plan and manage Wales' natural resources in a more proactive, sustainable and joined-up way. Part 1 Section 6 of the Act introduces a new biodiversity duty, which replaces and enhances the biodiversity duties set out in the NERC Act 2006 and requires public authorities to seek to maintain and enhance biodiversity in the exercise of their functions and in so doing promote the resilience of ecosystems.

- 10.36 Section 7 of the Act lists living organisms and types of habitat in Wales, considered to be of key significance to sustain and improve biodiversity in relation to Wales.

Planning Policy

- 10.37 A summary of national planning policy relevant to (onshore) biodiversity in England and Wales is provided below. Note that the summary provided here is intended for general guidance only and the original policy documents should be consulted for definitive information. Local planning policy relevant to biodiversity is also described below.

Planning Policy Wales 10 and Biodiversity Enhancements

- 10.38 Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. The primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales. Section 6.4 of PPW relates to biodiversity and ecological networks.
- 10.39 Paragraph 6.4.3 of PPW states that: *“The planning system has a key role to play in helping to reverse the decline in biodiversity and increasing the resilience of ecosystems, at various scales, by ensuring appropriate mechanisms are in place to both protect against loss and to secure enhancement.”*
- 10.40 It goes on to state that: *“Development plan strategies, policies and development proposals must consider the need to:*
- *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.”*
- 10.41 Section 6.4 goes on to set out policy in respect of: The Biodiversity and Resilience of Ecosystems Duty, as set out in Section 6 of the Environment (Wales) Act 2016, including:
- *Designated Sites*
 - Sites of Special Scientific Interest;
 - Special Protection Areas, Special Areas of Conservation and Ramsar Sites;
 - Proposed Special Areas of Conservation, Special Protection Areas and Ramsar sites; and
 - Non-statutory Designations.
 - *Protected Species; and*
 - *Trees, Woodlands and Hedgerows.*

- 10.42 PPW is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales. TAN 5 deals with Nature Conservation and Planning and states in paragraph 2.4: *“When considering policies and proposals in local development plans and when deciding planning applications that may affect nature conservation, local planning authorities should:*
- *Pay particular attention to the principles of sustainable development, including respect for environmental limits, applying the precautionary principle, using scientific knowledge to aid decision making and taking account of the full range of costs and benefits in a long term perspective;*
 - *Contribute to the protection and improvement of the environment, so as to improve the quality of life and protect local and global ecosystems, seeking to avoid irreversible harmful effects on the natural environment;*
 - *Promote the conservation and enhancement of statutorily designated areas and undeveloped coast;*
 - *Ensure that appropriate weight is attached to designated sites of international, national and local importance;*
 - *Protect wildlife and natural features in the wider environment, with appropriate weight attached to priority habitats and species in Biodiversity Action Plans;*
 - *Ensure that all material considerations are taken into account and decisions are informed by adequate information about the potential effects of development on nature conservation;*
 - *Ensure that the range and population of protected species is sustained; and*
 - *Adopt a step-wise approach to avoid harm to nature conservation, minimise unavoidable harm by mitigation measures, offset residual harm by compensation measures and look for new opportunities to enhance nature conservation; where there may be significant harmful effects local planning authorities will need to be satisfied that any reasonable alternative sites that would result in less or no harm have been fully considered.”*

Planning Policy Wales Edition 11 (2021)

- 10.43 Planning Policy Wales (PPW) sets out set out the Welsh Government’s land use principles and what development plans must achieve. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales.
- 10.44 The primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales, as required by the Planning (Wales) Act 2015, the Well-being of Future Generations (Wales) Act 2015 and other key legislation.

Technical Advice Note 5 Nature Conservation and Planning

- 10.45 This TAN provides advice about how the land use planning system should contribute to protecting and enhancing biodiversity and geological conservation.

Natural Resources Policy (2017)

- 10.46 The focus of the Natural Resources Policy (NRP) is on improving management of natural resources. It is a key part of the delivery framework for the sustainable management of natural resources established by the Environment (Wales) Act. It is also key to the delivery of the well-being goals set out within the Well-being of Future Generations Act and Wales international contribution to the delivery of the United Nation's (UN's) Global Goals.

Natural Resources Wales (NRW) North West Wales Area Statement

- 10.47 Natural Resources Wales (NRW) has developed seven Area Statements that relate to different regions of Wales. Viewed together, the seven Area Statements presents NRW's response to the NRP. The North West Wales Area Statement identifies six themes.

Nature Recovery Action Plan for Wales 2020 – 2021

- 10.48 The above plan identifies five immediate priorities for further action:
- *aligning the responses to the climate emergency with the biodiversity crisis;*
 - *addressing the post European Union (EU) exit funding gap for agri-environment measures;*
 - *providing spatial direction for targeting action for biodiversity;*
 - *improving the condition of the Protected Sites Network; and*
 - *exploring new and sustainable funding mechanisms for biodiversity action.*

Hedgerow Regulations 1997

- 10.49 These regulations, enforced under the Environment Act 1995, restrict the removal of hedgerows. To be included in the regulation, a hedgerow must be at least 30 years old and over 20m long and in addition must fulfil one of a number of criteria set out in the legislation.

Well-being of future Generations Act 2015

- 10.50 The Act includes a set of seven statutory sustainable development goals for Wales and place a well-being duty on public bodies. The goals encompass the need to act on the causes and adapt to the consequences of climate change, as well as ensuring that Wales is globally responsible in its actions.

Future Wales: The National Plan 2040

- 10.51 Future Wales – the National Plan 2040 is the national development framework, setting the direction for development in Wales to 2040. It addresses key national priorities through the planning system, including sustaining and developing a vibrant economy, achieving decarbonisation and climate-resilience, developing strong ecosystems and improving the health and well-being of communities.

National Planning Policy (England)

- 10.52 As the Site sits on the English/ Welsh boarder the following policies also have some relevance albeit to a limited extent.

10.53 The National Planning Policy Framework (NPPF) sets out guidance for local planning authorities and decision makers in how to apply planning policies when drawing up plans and making decisions about planning applications. Along with Government Circular 06/052, the broad policy objectives in relation to the protection of biodiversity and geological conservation in England through the planning system are set out. Specific policies relating to habitats and biodiversity are set out in paragraphs 174 and 179-182 of the NPPF.

10.54 Paragraph 174 states that:

“Planning policies and decisions should contribute to and enhance the natural and local environment by:

- a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);*
- b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;*
- c) maintaining the character of the undeveloped coast, while improving public access to it where appropriate;*
- d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;*
- e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development f) should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and*
- f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate”.*

10.55 Paragraph 179 states that:

“To protect and enhance biodiversity and geodiversity, plans should:

- a) identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation; and*
- b) promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity.”*

10.56 Paragraph 180 of the NPPF states that:

“When determining planning applications, local planning authorities should apply the following principles:

- a) *if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;*
- b) *development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;*
- c) *development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists; and*
- d) *development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to improve biodiversity in and around developments should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity or enhance public access to nature where this is appropriate.”*

10.57 Paragraphs 181-182 relate to European sites (referred to as habitats sites) and state:

“The following should be given the same protection as habitats sites:

- a) *potential Special Protection Areas and possible Special Areas of Conservation;*
- b) *listed or proposed Ramsar sites; and*
- c) *sites identified, or required, as compensatory measures for adverse effects on habitats sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.”*

10.58 Paragraphs 181-182 relate to European sites (referred to as habitats sites) and state:

“The presumption in favour of sustainable development does not apply where the plan or project is likely to have a significant effect on a habitats site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site.”

Local Planning Policy

Flintshire Draft Local Development Plan (LDP) 2015 - 2030⁸

10.59 Flintshire County Council have submitted their draft updated Local Development Plan 2015 – 2030, which is yet to be examined or adopted. The following Policies are relevant to biodiversity:

⁸ Flintshire County Council (2019): ‘Flintshire Local Development Plan Deposit Draft’. Flintshire County Council, Wales.

10.60 Policy EN6: Sites of Biodiversity Importance:

“Development likely to significantly affect any site of international importance, either alone or in combination with other plans or projects, will be subject to a Habitat Regulations Assessment (HRA). Development will only be permitted where it is possible to ascertain no adverse effect on the integrity of the Site or where there are Imperative Reasons of Overriding Public Interest and compensatory measures are secured.

Development likely to impact the special features of a Nationally Designated Site will only be granted in exceptional circumstances where appropriate compensation can be provided.

Development proposals that would have a significant adverse effect on locally designated sites or site with other biodiversity and / or geological interest, including priority species, will only be permitted where:

- a) it can be demonstrated that the need for the development outweighs the biodiversity or geological importance of the site; and*
- b) it can be demonstrated that the development cannot reasonably be located elsewhere; and*
- c) any unavoidable harm is minimised by effective mitigation to ensure that there is no reduction in the overall biodiversity value of the area.*

Where this is not feasible compensation measures designed to create, restore and enhance biodiversity must be provided. Development that results in the restoration, enhancement and creation of habitats will be supported especially where this promotes the resilience of ecosystems.”

10.61 EN7: Development Affecting Trees, Woodlands and Hedgerows:

“Development proposals that will result in significant loss of, or harm to, trees, woodlands or hedgerows of biodiversity, historic, and amenity value will not be permitted. Where the impact of development affecting trees, woodlands or hedgerows is considered acceptable, development will only be permitted where:

- 1. the development maximises their retention through sensitive design measures; and*
- 2. where the removal of trees is considered necessary, suitable replacements shall be provided elsewhere within the site; and*
- 3. it results in a net gain in biodiversity.”*

Flintshire Adopted Local Development Plan 2000 – 2015 (Adopted 2011)⁹

10.62 This LDP was intended to span until 2015 but is still the adopted current plan. The Core Strategy part of the plan has the following policies of relevance to biodiversity:

10.63 Policy WB1: Species Protection:

“This policy seeks to protect species with regard to the development and use of land and does not override the statutory requirements for species protection as contained in Acts of Parliament or through European

⁹ Flintshire County Council (2011): ‘Flintshire Unitary Development Plan 2000 – 2015 – Adopted 28th September 2011’. <http://www.cartogold.co.uk/flintshire/text/english/08.htm> [Accessed 14/12/2021].

Law. Where the Council require mitigation or compensatory provision to be made either onsite or on adjacent land, conditions will be attached or obligations required to facilitate species survival, minimise disturbance or as a last resort provide suitable alternative habitat to ensure that species are safeguarded.

Development which would have a significant adverse effect on important species or their habitats will not be permitted unless appropriate measures are taken to secure their long term protection and viability.

The presence of an important species is a material consideration in deciding a planning application. Important species or habitats are those protected by law, identified as a priority species or habitat in the UK Biodiversity Action Plan or the FBAP. Examples of protected species occurring in Flintshire include bats, badgers, barn owls, great crested newts, otters and some orchids.”

10.64 Policy WB2: Sites of International Importance:

“Development will not be permitted unless:

- it is demonstrated that it will not have a significant adverse effect on any Ramsar Site or Natura 2000 site (including SPAs, potential SPAs, SACs, candidate SACs); or*
- it is demonstrated, following appropriate assessment, that it will not adversely affect the integrity of any Ramsar or Natura 2000 site.*

This policy is directed at sites which have, or may be identified as having, ecological value of international significance. In Flintshire, the Dee Estuary has several such designations, and these are shown on the proposals map. It has been designated as a Ramsar site under the Convention on Wetlands of International Importance and a Special Protection Area (SPA) under the European Community Birds Directive (79/409/EEC) due to its importance as a wintering site for significant populations of migratory waders and wildfowl. The Dee Estuary has also been designated a Candidate Special Area of Conservation (SAC) under the Habitats Directive (92/43/EEC). These designations are intended to promote conservation and the wise use of wetlands and stem the progressive loss of internationally important habitats.

Where the County Council, in consultation with the Countryside Council for Wales (CCW), suspect that the impact of a development on a designated area is likely to be damaging, planning applications should be accompanied by suitable supporting environmental impact information. An Environmental Impact Assessment will be required in certain instances, which is the process by which information about the likely significant environmental effects of certain types of development is collected, assessed and taken into account in deciding whether planning permission should be granted.”

10.65 Policy WB3: Statutory Sites of National Importance:

“Sites of Special Scientific Interest (SSSI) will be protected. There will be a presumption against development either within or in the vicinity of a site which would have a significant adverse effect on the nature conservation interest of the site.

The key importance of sites designated for nature conservation interest means that development proposals in or likely to affect them must be subject to special scrutiny. Where a specific proposal would impact directly or indirectly upon a SSSI it must be demonstrated that the site features meriting designation would not be detrimentally affected. Government guidance notes that SSSI's may be seriously damaged by developments outside their boundaries.

Consequently, within SSSI's planning permission should only be granted where the Local Planning Authority is satisfied that the nature conservation value of the SSSI will not be compromised as a result of the proposed development, or where in accordance with national planning guidance, other material factors are sufficient to override nature conservation considerations. Where development is permitted, the Council will consider the use of conditions or planning obligations to ensure the protection and enhancement of the site's nature conservation interest."

10.66 Policy WB5: Undesignated Wildlife Habitats:

"Development will be permitted only if it will not have a significant adverse effect on wildlife and habitats of local importance.

There are many undesignated sites which have considerable nature conservation value and represent vital elements in the County's biodiversity. Examples include natural watercourses, streams or rivers and their banks, unimproved grasslands, wetlands, heather moorland and woodlands (particularly those of ancient semi-natural origin). Some of these habitats may be comparatively rare in the Plan area, and considered to be of value on a very local basis, for example the last remaining pond close to a particular town or village. Developers will often be required to undertake detailed surveys of flora and fauna to enable the Council to ascertain whether a proposal would be acceptable.

However, planning permission will not be refused, where in accordance with national policy guidance, other material factors are sufficient to override nature conservation interests. Conditions and agreements will be used to mitigate any harmful effects to nature conservation interests."

Flintshire Local Biodiversity Action Plan¹⁰

10.67 Flintshire contains international, national and local nature conservation designations. These contain sensitive habitats which provides for rare species such as Sand Lizards, Little Terns, the Great Crested Newt and thousands of wading birds on the Dee Estuary.

10.68 Key BAP Species / Habitats Present Flintshire contains a rich variety of wildlife which the Council recognises needs protecting and enhancing. The Flintshire Local Biodiversity Action Plan (LBAP) identifies protected species and habitats that are of conservation concern within the County. The list also includes species identified as being of Principal Importance for Conservation in Wales under Section 42 of the Natural Environment and Rural Communities Act 2006. The LBAP contains species and habitat action plans for species and habitats some of which are listed as follows.

- *Species action plans include:*
 - Bat;
 - European hedgehog and;
 - Native black poplar.
- *Habitat action plans include:*

¹⁰ Flintshire County Council (2011): 'Flintshire Local Biodiversity Action Plan'. Flintshire County Council, Wales.

- Woodland;
- Upland and;
- Freshwater farmland.

10.69 In addition, there are many undesignated sites and habitats which have nature conservation value and are key elements in the County's biodiversity. These include streams, ponds and woodlands – particularly those of ancient semi natural origin.

10.3. Baseline Conditions

10.3.1. Landscape Context

10.70 The Site is situated on the Dee Estuary in Deeside, just south of the English-Welsh border, refer to Error! Reference source not found.. The immediate surroundings are characterised by part-industrial and part-suburban development. The area became heavily industrialised from the establishment of the Shotton Steelworks in 1895, and parts of the land from the mouth of the River Dee was reclaimed from the sea in the 18th century.

10.71 Upstream of the Site, the Dee has been canalised and straightened, with large rectangular fields covering the reclaimed land. Further downstream, the Dee opens out into a broad estuary with mudflats and tidal habitats.

10.72 The Dee is a Special Area of Conservation (SAC), Special Protection Area (SPA) and SSSI and is an important habitat for migratory fish, salmon, otter and many invertebrates. The floodplain surrounding the Dee has rich soils, and abandoned sand, gravel and clay workings now support a range of water bodies and semi-natural habitats, including grasslands which support a large population of great crested newts and other amphibians.

10.73 Regarding birds, the Dee Estuary SAC SPA SSSI and Ramsar, is protected for its internationally important habitats for wintering waterfowl waders and terns on the tidal flats, salt-marsh and coastal grazing marsh. Non-breeding waders also visit in significant numbers in the summer, and spring and autumn migrants also use the area.

10.74 Major industries are associated with the wider area, including mineral extraction and processing of coal; mudstone and clay extraction for brick, tile and pottery production, and quarrying for building stone.

Climate change and future pressures

10.75 A mixture of public and privately owned coastal defences exist along the coastline of the Dee Estuary north towards Merseyside, to act to fix the position of the shoreline in some locations. Retaining, creating and enhancing important habitats such as mudflats, salt marshes and sand dunes has been identified as a cost-effective defence against erosion or flooding, and aid in adapting to the increased storms, wave energy and sea level rise as a result of climate change.

- 10.76 Additional aims include looking to deliver managed realignment schemes for coastal salt marsh creation and allowing for natural erosion processed of coastal cliffs where appropriate, to account for the increased risk of sea level rise as well as providing geological and biological landscape interest.
- 10.77 Regarding the protected species for which the Dee is designated, ensuring that migratory routes for protected fish species are maintained by removing physical barriers and promoting good water quality have been identified as priorities. For the Dee Estuary, aims are centred around maintaining and enhancing the mosaic of inland habitats in the coastal hinterland to provide for birds, including waders such as curlew (*Numenius arquata*) and pink-footed goose (*Anser brachyrhynchus*).

10.3.2. Statutory and Non-Statutory Designated Sites

- 10.78 Within a 2km radius of the application site, there are a total of four Statutory Wildlife Sites which are summarised in **Table 10- 1** Error! Reference source not found.Error! Reference source not found.Error! Reference source not found.below and provided in **Figure 10.2**. Within a 12km radius, there are a further three designated sites. The Site is also within a 2km radius of six non-statutory designated sites which are provided in **Table 10- 2**Error! Reference source not found.Error! Reference source not found.Error! Reference source not found.Error! Reference source not found.Error! Reference source not found.Error! Reference source not found.. There are no records of ancient woodland or veteran trees within a 2km radius, but four sites within a 4km radius have also been described in the table.

Table 10- 1:
Statutory Designated Sites within 2km of the site centre

Name of Site	Central OS Grid Reference	Closest Distance from Site Boundary	Description
Dee Estuary SSSI, SAC, SPA, Ramsar	SJ 28547 73816	100m north; also to the south west	Intertidal and saltmarsh habitats which support internationally important wintering wader and wildfowl populations in addition to nationally important tern populations. Part of the site is also an RSPB reserve.
River Dee SSSI, SAC	SH 930351 – SJ 311695	100m north	The River Dee is of special interest for its fluvial geomorphology, Carboniferous geology, range of river habitat types, and saltmarsh transition habitats.
Shotton Lagoons and Reed beds SSSI	SJ 29657 70829	170 m south west	Shotton Lagoons and Reedbeds is a SSSI which is also part of the Dee Estuary Ramsar. The lagoons are of special interest for their breeding population of common tern.
River Dee and Bala Lake SAC (River Dee SSSI)	SJ 2953 6993	1.2km south	The River Dee and Bala Lake SAC Standard Data Form indicates that the site is 1,271ha in size. It is primarily made up of inland water bodies, covering 90% of the site area. Tidal rivers, estuaries, mud flats, sand flats, lagoons (including saltwork basins), salt marshes, salt pastures, salt steppes,

Name of Site	Central OS Grid Reference	Closest Distance from Site Boundary	Description
			improved grassland and broad-leaved deciduous woodland make up the further 10% ¹¹ .
Inner Marsh Farm SSSI	SJ 30725 73492	1.1 km north	The site is notified for the ornithological interest it supports, particularly its wintering and summering bird populations.
Deeside and Buckley Newt Sites SAC/Connah's Quay Ponds and Woodland SSSI	SJ 291 678	2.6km south	The site is a large collection of water bodies created by past mineral exploitation, surrounded by neutral and acid grassland. The site supports one of the largest breeding populations of great crested newts (<i>Triturus cristatus</i>) in Great Britain.
Halkyn Mountain SAC/ Halkyn Common and Holywell Grasslands SSSI	SJ 196 715	8.3km west	Halkyn Common and Holywell Grasslands is of special interest for Carboniferous limestone and cherts which is found in spoil tips and in situ exposures. Habitats of interest include open vegetation on soils rich in heavy metals; calcareous grassland; and dry heath. The site also supports a population of great crested newt and other amphibian species.
Alyn Valley Woods SAC	SJ 196 630	11km south west	The site supports a large stand of semi-natural broadleaved woodland, namely the Annex 1 habitat 9180 "Tilio-Acerion forests of slopes, screes and ravines" and "91E0 Alluvial forest with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> ".

Table 10- 2:
Non-statutory Designated Sites within 2km of the site centre

Name of Site	Central OS Grid Reference	Closest Distance from Site Boundary	Description
Shotton Steelworks wildlife site	SJ306709	80 m south	Ex-industrial site in the Dee Estuary, adjacent to the Dee Estuary SSSI. There are many habitats present, including rough neutral grassland, marshy grassland, bare ground, tall herb, reedbed and man-made lagoons.
Dee Rifle Ranges LWS	SJ30357337	700m north	LWT site due to the presence of priority habitat types: restorable grassland; coastal and floodplain grazing marsh; fens, swamps, bogs and reedbeds; ponds and ditches. There are also protected vascular plant species present on site.
Burton Mere Wetlands LWS	SJ30847342	1.5km north	LWT site due to several priority habitats situated on site that are included in the priority habitat types: fens, swamps, bogs and reedbeds; saltmarsh and intertidal mudflaps. There are also protected bird species found at this site.
Burton Point LWS	SJ30257358	1.8km north	LWT site due to several priority habitat types situated on site: acid grassland; fens, swamps, bogs and reedbeds; rock outcrop and stone

¹¹ JNCC (2015). [UK0030252.pdf \(jncc.gov.uk\)](https://jncc.gov.uk/uk0030252.pdf)

Name of Site	Central OS Grid Reference	Closest Distance from Site Boundary	Description
			structures; wildlife corridors/buffer. There are also protected butterfly species present on site.
River Dee wildlife site	SJ308693	1.9 km south	For most of its 9.3 km length the site is a narrow band (about 10-20m wide) of bare mud at low tide. At the high-water mark this is a thin strip of saltmarsh vegetation is dominated by sea purslane (<i>Halimione portulacoides</i>) with sea beet <i>Beta vulgaris</i> , grass-leaved orache (<i>Atriplex littoralis</i>), sea blight (<i>Suaeda maritima</i>) and sea club rush (<i>Bolboschoenus maritimus</i>). An important site for a range of bird species.
Burton Point Farm LWS	SJ30497414	2.4km north	LWT site due to the presence of priority habitat types: veteran and ancient trees; traditional orchards; restorable grassland; fens, swamps, bogs and reedbeds; ponds and ditches; wildlife corridors/buffer; accessible neutral greenspace. There are protected mammal and vascular plant species present on site.
Mudhouse Woodland AWS	SJ33197496	4.06km north east	The site supports a stand of 3.2ha ancient and semi-natural woodland.
Shotwick Dale AWS	SJ34567252	3.8km east	This site supports 3.7ha of ancient and semi-natural woodland
Veteran Tree grouping	SJ31287431	2.7km north	A grouping of three veteran trees that are not identified within an ancient woodland. There is a distance of 173m between Tree A and Tree B and a distance of 70m between Tree B and Tree C.
Ancient and Veteran trees	SJ33477448	4km north east	An individual ancient tree and an individual veteran tree are not identified within an ancient woodland. They are stood closely together within a broadleaved woodland 444m south of Mudhouse Woodland.

- 10.79 Notably, the Site is situated close to Shotton Lagoons and Reedbeds SSSI, part of the Dee Estuary SPA SAC Ramsar. Shotton Lagoons and Reedbeds SSSI supports a large and increasing population of breeding common terns, the largest in Wales. The *Phragmites* reedbeds are also important for locally uncommon breeding birds such as reed warbler (*Acrocephalus scirpaceus*). The lagoons are also used by wintering wildfowl from the nearby estuary, and therefore contribute to the overall waterfowl assemblage of the Dee Estuary SPA SAC Ramsar.
- 10.80 Immediately south of the Site is Shotton Steelworks Wildlife Site. This occurs on land formerly occupied for steelworks which has since been left to recolonise. Several of the habitats present on this wildlife site, such as rough grassland, bare ground with tall herbaceous vegetation, reedbed and artificial lagoons are similar to those present onsite.
- 10.81 The Dee Estuary SPA is designated as such under Article 4.1 of the Directive, as it is used regularly by 1% or more of the Great Britain populations of the Annex 1 species listed in **Table 10- 3Error! Reference source not found.Error! Reference source not found.Error! Reference source not found.Error! Reference source not found.** below.

**Table 10- 3:
Qualifying species for Dee Estuary SPA**

Species	Count and season	Period counted	% of Great Britain population
Annex 1 species			
Bar-tailed godwit <i>Limosa lapponica</i>	1150 individuals – wintering	5 year peak mean 1994/5 – 1998/9	2.2%
Common tern	392 pairs – breeding	5 year mean 1995 – 1999	3.2%
Little tern <i>Sterna albifrons</i>	69 pairs – breeding	5 year mean 1995 – 1999	2.9%
Sandwich tern <i>Sterna sandvicensis</i>	957 individuals – autumn passage	5 year mean 1995 – 1999	2.3%
Migratory species			
Redshank <i>Tringa totanus</i>	8,795 individuals- passage	5 year mean 1994/95 – 1998/99	5.9% Eastern Atlantic (wintering)
Shelduck <i>Tadorna tadorna</i>	7,725 individual -wintering	5 year mean 1994/95 – 1998/99	2.6% NW Europe
Teal <i>Anas crecca</i>	5251 individuals -wintering	5 year mean 1994/95 – 1998/99	1.3% NW Europe
Pintail <i>Anas acuta</i>	5407 individuals wintering	5 year mean 1994/95 – 1998/99	9.0% NW Europe
Oystercatcher <i>Haematopus ostralegus</i>	22,677 individuals - wintering	5 year mean 1994/95 – 1998/99	2.5% Europe and NW Africa
Grey plover <i>Pluvialis squatarola</i>	1643 individuals wintering	5 year mean 1994/95 – 1998/99	1.1% Eastern Atlantic
Knot <i>Calidris canutus islandica</i>	12,394 individuals - wintering	5 year mean 1994/95 – 1998/99	3.5% NE Can/Grl/Iceland/NW Eur
Dunlin <i>Calidris alpina</i>	27,769 individuals-wintering	5 year mean 1994/95 – 1998/99	2.0% N Siberia/Europe/ W Africa
Black-tailed godwit <i>Limosa limosa islandica</i>	1,747 individuals wintering	5 year mean 1994/95 – 1998/99	2.5% Iceland (breeding)
Curlew <i>Numenius arquata</i>	3,899 individuals wintering	5 year mean 1994/95 – 1998/99	1.1% Europe (breeding)
Redshank	5,293 individuals -wintering	5 year mean 1994/95 – 1998/99	3.5% Eastern Atlantic (wintering)

10.82 In addition, the SPA also qualifies under article 4.2 of the Directive as it is used regularly by over 20,000 waterbirds in any season.

10.83 Impacts are anticipated upon designated and non-statutory designated sites, and as such this feature is brought forward for further consideration.

10.3.3. Habitats

10.84 The UK Habitat Classification (UKHab) survey undertaken in 2021 identified numerous habitats present onsite, which are presented in Error! Reference source not found.. Detailed habitat

descriptions are provided in the Baseline Ecological Report, in **Appendix 10.1**, and are summarised below.

Grassland (g3c, g4, 16)

- 10.85 Within the Main Site there are several areas of frequently managed amenity grassland (g4). These are located around the office buildings and the warehouses. The grassland itself is dominated by Yorkshire fog (*Holcus lanatus*), with occasional false oat grass (*Arrhenatherum elatius*) and red fescue (*Festuca rubra*). Other species include occasional birds foot trefoil (*Lotus corniculatus*), white clover (*Trifolium repens*) and ribwort plantain (*Plantago lanceolata*).
- 10.86 These modified grassland areas also contain introduced shrub planting, with species including Himalayan cotoneaster (*Cotoneaster simonsii*), wall cotoneaster (*Cotoneaster horizontalis*), dogwood (*Cornus sanguinea*), silver birch (*Betula pendula*) and holly (*Ilex aquifolium*).
- 10.87 A large proportion of the Expansion Land/Plot A4 land is characterised by neutral grassland g3c, with areas containing scattered scrub (secondary code 10), scattered trees (11), scattered dwarf shrubs (13), tall herb (16) and ruderal/ephemeral vegetation (17). In the northwest portion of the plot, grass species are less dominant in the sward and ruderal and herbaceous species are favoured such as perforate St John's-wort (*Hyericum perforatum*), field scabious (*Knautia arvensis*), common toadflax (*Linaria vulgaris*), mouse-ear hawkweed (*Pilosella officinarum*), oxeye daisy (*Leucanthemum vulgare*) and great mullein (*Verbascum thapsus*). Elsewhere, grass species are dominated by false oat grass, with frequent cock's foot (*Dactylis glomerata*), red fescue and common bent (*Agrostis capillaris*).
- 10.88 An area supporting pyramidal orchid (*Anacamptis pyramidalis*) is in the north-western portion of the plot, with this species seen frequently throughout the western third of this area of grassland.
- 10.89 A relatively species-rich neutral grassland is also present adjacent to the access road through the Main Site, south of the car park and small woodland, opposite the current wood storage location. This was dominated by cock's-foot (*Dactylis glomerata*) and red fescue (*Festuca rubra* agg.), was mown (code 64) and was rabbit grazed (62) in places. This area has been used as temporary soil storage area during the recent works to demolish parts of the paper mill and associated buildings.
- 10.90 North-west of the woodland exists another area of neutral grassland, which was unmanaged (80) and consisted of abundant common reed (*Phragmites australis*) as well as occasional tall rocket (*Sisymbrium altissimum*) and hoary mustard (*Hirschfeldia incana*).
- 10.91 Strips of other neutral grassland between 1-3 metres wide surrounded sections of the lagoons, this was dominated by false oat-grass (*Arrhenatherum elatius*) leading to g3c5 classification. These areas were neglected (77), and contained scattered scrub and trees (10,11) including broom (*Cytisus scoparius*), sea buckthorn (*Hippophae rhamnoides*), black chokeberry (*Aronia melanocarpa*), goat willow (*Salix caprea*), hazel (*Corylus avellana*) and hawthorn (*Crataegus monogyna*). Late cotoneaster (*Cotoneaster lacteus*) was also recorded on a grassland strip by the north-east lagoon.
- 10.92 To the south-west of the Main Site, neutral grassland occurred at the southern boundary of the plantation woodland for a narrow strip underneath pylon lines. This neutral grassland contained

scattered buddleia (*Buddleia*) (10) and tall herbaceous species (16) including dominant common nettle (*Urtica dioica*) and rare mugwort (*Artemisia vulgaris*) and spear thistle (*Cirsium vulgare*). The grassland formed a transition (130 – ecotone) between the woodland and the scrub section to the south.

Woodland (w1d, w1g7, w1h6)

- 10.93 Wet woodland (w1d) is located on small strips of land between the lagoons, and in an area north of lagoon 2b. It comprises a single-age structure and was dominated by willows (*Salix sp.*).
- 10.94 Mixed woodland (w1g7) is present on the eastern side of the northern boundary in Plot A4. The trees are young in character, with species including silver birch, white poplar (*Populus alba*), goat willow (*Salix caprea*) and hawthorn (*Crataegus monogyna*). Mixed woodland is also present on the northern boundary of the paper mill site, and consists of a mixed stand of sycamore, holly, Scot's pine and silver birch, with occasional areas of scattered scrub.
- 10.95 A large section of majority coniferous woodland (w1h6) is located in the south-west of the Site, and is plantation woodland (36) dominated by Scot's pine, with areas supporting prevalent holm oak adjacent to the western boundary by the road. Planting lines remain obvious and the ground comprises a deep needle litter with limited ground flora of common nettle and bramble, as well as mushrooms *Agaricus sp.* and earthstar *Geastrales sp.*

Open mosaic habitat on previously developed land (u1a)

- 10.96 The majority of the eastern portion of the Expansion Site A4 Plot is characterised by open mosaic habitat (u1a). A distinct boundary exists between this community and the bordering neutral grassland, where the proportion of bare earth is increased, and grass species become rare. Species include sheep's sorrel, black medic, wild carrot, bird's foot trefoil, fairy flax (*Linum catharticum L.*), Dyer's weed (*Reseda luteola*), cat's-ear (*Hypochaeris radicata*), evening primrose (*Oenothera biennis*), white mullein (*Verbascum lynchitis*), and thyme leaved sandwort (*Arenaria serpyllifolia*).
- 10.97 A small section of open mosaic habitat also exists in the south of the Site, opposite lagoon 2b. This comprises early successional communities, with gravel substrate and areas of moss lawn, and is bordered by bracken to the south and the trackway to the north. Species recorded include Canadian fleabane (*Conyza canadensis*), hare's foot clover (*Trifolium arvensis*), scentless mayweed (*Tripleurospermum inodorum*), sow thistle, bird's-foot trefoil, dog's tongue lichen *Peltigera sp.*, hoary mustard and white campion.

Scrub (h3, h3d, h3c, h3d, h3h)

- 10.98 Scrub (h3) is present on the southern boundary of the A4 Plot, with several areas also scattered across the Main Site. Species recorded include bramble, nettle, cock's foot, Yorkshire fog, ragwort, mugwort, creeping thistle, hawthorn, goat willow (*Salix caprea*) Buddleja (*Buddleja davidii*), and white willow (*Salix alba*). A more mature patch of mixed scrub (h3h) borders the northern section of A4 Land, this is characterised by an increase in woody species, scattered trees and shrubs.
- 10.99 In addition, several patches of sea buckthorn scrub are scattered throughout the western portion of A4 Land.

- 10.100 Within the Main Site, mixed scrub (h3h) lies next to the small woodland section south of the car park, with tall herbs (16) and disturbed ground, and comprises common nettle, bramble, Yorkshire fog, cock's-foot, elder (*Cornus sanguinea*) and holm oak. A large area of scrub is also located in the south of the Site and is dominated by bramble (h3d), with locally frequent patches of grass (189) and bindweed (*Convolvulus sp.*). A variety of other scrub species are also present at low abundances, including goat willow, dogwood, rowan (*Sorbus aucuparia*) and holm oak.

Standing water (r1a, r1e)

- 10.101 Three ditches (r1e, 117) are present on-site; two of which occur in the A4 Land and were dry at the time of survey. One ditch located on the northern boundary is part stone-lined, with rabbit warrens lining the base, and therefore it is assumed that the water course remains dry throughout the year. A single dry ditch is present within the mixed woodland on the northern boundary of the Main Site.
- 10.102 One pond (r1a) lies just outside the north-western boundary of the A4 Land. The pond is on a raised area of rough grassland and is lined with a vinyl base. As such, no aquatic vegetation was observed within the water body.
- 10.103 There are six lagoons (r1) within the Main Site, the three largest of which are known as Lagoon 2A, Lagoon 2B and Lagoon 3. Lagoon 2A is an aeration lagoon used for the treatment of industrial process water, which once treated, is discharged into the other lagoons (see **Technical Appendix 10.2**).
- 10.104 Lagoon 2B is 1.3ha rectangular artificial water body that is located within the working Site and is surrounded by scrub, buildings, roads, paths and other lagoons. The lagoon was found to have water depth of approximately 1m and a substrate that consisted of silt and macerated litter. The banks of the lagoon were sloped and common reed (*Phragmites australis*) was present around the margins of the lagoon, being abundant towards its eastern corner, where it formed a dense reedbed.
- 10.105 Lagoon 3 is 4.8ha artificial water body that consists of three interconnected areas of water and is surrounded by scrub, buildings, roads, paths, coniferous woodland and other lagoons. The lagoon was found to have water depth of approximately 1.5m to 2m around its margins. Common reed again grew extensively along the margins of the lagoon. The lagoon was largely unshaded, with the exception of localised shading provided by marginal vegetation. Towards the south-east corner of the largest body of water within the lagoon complex was a narrow 110m long peninsula, consisting of sections of sparsely vegetated rocky banks, and areas of marginal emergent vegetation (common reed).

Reedbeds and aquatic marginal vegetation

- 10.106 A fringe of aquatic marginal vegetation (f2d) surrounded the majority of the lagoon perimeters, and sections of reedbeds (f2e) were abundant on the north-eastern and southern boundaries of the lagoons. Reedbeds were dominated by common reed.

Buildings and bare ground (u1b5, u1b6)

10.107 Within the Main Site itself, numerous structures are present of varying form. Many of these are large, corrugated steel-clad warehouses, both utilised for storage of product, and to house plant machinery. A small number of office buildings are also present. Demolition of the Main Site paper mill buildings and other infrastructure commenced in early 2022 and was on-going at the time of preparation of this ES Chapter. Hardstanding surrounds the majority of buildings, and there are numerous roads with pavements across the Site. Rail tracks also cross through the Site. Elsewhere, a track of worn tarmac runs around the perimeter of the lagoons.

Summary

10.108 Baseline UKHab survey identified a number of Habitats of Principal Importance (HPI) as outlined under Section 41 of the NERC Act (2006) onsite. These comprise:

- *Open mosaic habitat on previously developed land (7.45ha); and*
- *Reedbeds (0.57ha).*

10.109 The total area of these HPI habitats onsite is 8.02ha, just under 10% of the total Site area. These habitats are identified as important linkages to other similar habitats in the area, in particular linking to designated and non-statutory designated sites such as the recolonised Shotton Steelworks Wildlife Site south of the Site, and the lagoons and reedbeds present in the Shotton Lagoons and Reedbeds SSSI. Therefore, these HPI habitats are valued at **County** importance and will be considered further in this assessment.

10.110 The remaining non-HPI habitats on-site are common and widespread across England and Wales, and are assessed as being of less than Local value. They are not considered further by this assessment.

10.3.4. Plants

10.111 CERC provided records for bluebell (*Hyacinthoides non-scripta*), and adder's tongue fern (*Ophioglossum vulgatum*), however, neither species was recorded on the Site itself. Plant species recorded within the Site are generally common and widespread, and the Site is valued at a less than local level for notable plant species.

10.112 CERC provided records of Schedule 9 invasive non-native species; Montbretia (*Crocsmia x crocosmiiflora*), Himalayan balsam, Japanese rose (*Rosa rugosa*) and Japanese knotweed (*Fallopia japonica*) within the search area, although these records do not relate to the Site itself.

10.113 Himalayan cotoneaster and wall cotoneaster were identified in planted hedges within the Main Site, and a single Himalayan cotoneaster was recorded in plot A4. Himalayan cotoneaster is listed as an invasive non-native species on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).

10.3.5. Freshwater biodiversity

- 10.114 CERC returned records of four fish species within a 2km radius of the Site: smelt (*Osmerus eperlanus*), Allis shad (*Alosa alosa*), eel (*Anguilla Anguilla*) and common carp (*Cyprinus carpio*). These relate to the River Dee, Connah's Quay and the Wirral and date from 2000-2004. Smelt and European eel are classed under Section 7 of the Environment (Wales) Act; Allis shad is protected under the EU Bern Convention, under Section 7 of the Environment (Wales) Act and under Schedule 5 of the WCA 1981; and all are local biodiversity action plan species (with the exception of carp).
- 10.115 The RECORD data search returned one result of Avocettina, a genus of eels in the snipe-eel family, occurring at Burton Mere Wetlands RSPB in 2013. A search of the NBN atlas for this genus returns only 9 results¹², none of which correspond to this record, with the nearest record to this occurring by Southport in 1981 which is unconfirmed. This species is therefore scoped out at this stage due to lack of confirmed records.
- 10.116 The aquatic walkover survey focussed on lagoon 2b and full detail is provided in **Technical Appendix 10.2**. At the time during which the surveys were conducted, the proposed scheme included the infilling of Lagoon 2b and ecological enhancement of Lagoon 3. It is for this is reason that much of the survey data presented relates to Lagoon 2B lagoon.
- 10.117 A total of six taxa were recorded in the aquatic invertebrate sample collected from this lagoon. The most abundant taxon present were *Chironomini* (non-biting midges), followed by *Oligochaeta* (segmented worms). These two taxa accounted for 98% of aquatic macroinvertebrates identified in the sample, both of which are classed as very insensitive to pollution. The overall results indicated that lagoon 2b falls into the Biological Monitoring Working Party (BMWP)¹³ Poor Water Quality category, indicating it is impacted by organic pollution.
- 10.118 An aquatic walkover survey and baseline data collection exercise were undertaken to support the application. The eDNA results of a fish barcoding survey did not yield any target (fish) taxa. Therefore, there are not considered to be the potential presence of vibration sensitive (fish) receptors in proximity to the proposed development and therefore no further requirements for assessment of vibration effects in relation to fish is required
- 10.119 The results of the aquatic walkover survey and aquatic macroinvertebrate survey indicate that lagoon 2b and lagoon 3 are generally suitable for supporting an aquatic flora and fauna, but that lagoon 2b in particular lacks a diverse faunal community and is impacted by organic pollution. Therefore, the conservation classification of this lagoon is likely to be low, with **Local** importance.

¹² [Avocettina | NBN Atlas](#)

¹³ The biological monitoring working party (BMWP) is a procedure for measuring water quality using species of macroinvertebrates as biological indicators. The method is based on the principle that different aquatic invertebrates have different tolerances to pollutants. (AEDA, [BMWP | environmentdata.org](#))

10.3.6. Terrestrial invertebrates

- 10.120 CERC provided records for small heath butterfly (*Coenonympha pamphilus*), grayling (*Hipparchia semele*), dingy skipper (*Erynnis tages*), and wall butterfly (*Lasiommata megera*), these records all relate to the A4 plot. Small heath butterfly, buff-tailed bumble bee (*Bombus terrestris*), common carder bee (*Bombus pascuorum*), early bumble bee (*Bombus pratorum*) and large red tailed bumble bee (*Bombus lapidaries*) were also recorded within the Main Site.
- 10.121 The majority of the Main Site is unlikely to be of importance to invertebrates and is unlikely to support a rare or notable invertebrate assemblage, due to the low species diversity. However, the area of Plot A4 with its neutral grassland and mix of herb and ruderal species may be of higher value to invertebrates such as butterflies and bees. It is assumed that the A4 Plot has **Local** value to invertebrates whereas the Main Site has a less than local value.

10.3.7. Amphibians

- 10.122 CERC provided no returns for any British newt species within the search area. Both the CERC and RECORD data search returned results for both common frog (*Rana temporaria*) and common toad (*Bufo bufo*) though neither of these relate to the Site itself or its immediate environs. Numerous records were located at Burton Mere Wetlands (RSPB). These sightings were recorded between 2013 and 2019. Natterjack toad (*Epidalea calamita*) is present within north Wales in coastal habitats but is not a qualifying feature in any of the nearby SACs and was not recorded on the data search, and is therefore presumed not to be present in the area around the Site.
- 10.123 One pond was found to be within 500m of the Site, this is a pond located in the northwest corner of Plot A4. This pond was subject to a Habitat Suitability Index (HSI) assessment for great crested newt, which scored “poor suitability”, and a great crested newt eDNA survey proved negative.
- 10.124 The Site is therefore unlikely to support great crested newts, with a low likelihood of supporting other common amphibian species, and they are not considered further in this chapter.

10.3.8. Reptiles

- 10.125 Two records of grass snake (*Natrix natrix*) were provided by CERC, 1.9km south-east of the Site, recorded in 1999. Furthermore, the remains of a young grass snake were found in the northeast corner of A4 Plot during the Preliminary Ecological Appraisal survey on 10 August 2021. CERC also provided a single record of common lizard (*Zootoca vivipara*) dating from 2013, of a single adult record at Broken Bank, 1.1 km to the west of the Site. RECORD data returned a total of seven records of common lizard on four different occasions between 2017 and 2018, which were located at Burton Mere Wetlands (RSPB).
- 10.126 The papermill Site itself is suboptimal for reptiles, lacking any suitable habitat. However, the Plot A4 scrub, open mosaic, ditches, and pond with surrounding rough grassland habitat, provide suitable habitat for grass snake and common lizard.
- 10.127 It is assumed that Plot A4 has a **Local** value to reptiles whereas the papermill Site has a less than local value.

10.3.9. Bats

- 10.128 The CERC data search returned records of four bat species: common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), noctule (*Nyctalus noctule*) and whiskered bat (*Myotis mystacinus*). RECORD returned results of common pipistrelle, soprano pipistrelle, noctule and Daubenton's bat (*Myotis daubentonii*), from Inner Marsh Farm and Burton Mere Wetlands (RSPB).
- 10.129 As part of the ecological walkover survey completed in August 2021, all trees and buildings were subject to a preliminary roost assessment for bats, which is reported in the Baseline Ecology Report (**Technical Appendix 10.1**). All of the trees and buildings onsite were found to have negligible potential for roosting bats.
- 10.130 One nocturnal bat transect survey, to monitor bat foraging and commuting activity, was undertaken at the Site in October 2021, which recorded no bats. Static detectors were also deployed for ten nights, and the following species were recorded: brown long-eared bat (*Plecotus auritus*), *Myotis spp.*, common pipistrelle and soprano pipistrelle. The majority of recordings were from pipistrelle bats at the main lagoon in the south west of the Site.
- 10.131 The open grassland and industrial infrastructure onsite is not likely to be of value to foraging and commuting bats. However, the mixed woodland and scrub habitats surrounding the lagoons in the south west of the Site are likely to be of higher value.
- 10.132 Overall, both the Main Site and the A4 Plot are valued to have **Local** importance to bat species for foraging.

10.3.10. Badger

- 10.133 Two records of badger (*Meles meles*) setts or field evidence were returned within 2km of the Site from the CERC data search. One of these relates to a dead juvenile, seen on the A648 c. 800 metres from the Site (2016), and one record 1.9 km to the north (pre-1994). A further three records were returned in the RECORD results, all of which were located at Inner Marsh Farm.
- 10.134 No field evidence of badger was recorded during the August or October 2021 ecological walkovers. Badger may use the fields from time to time to forage as part of a larger territory, but given the lack of field evidence the Site is unlikely to be an important foraging area for any local badger population.

10.3.11. Other mammals

- 10.135 CERC provided three records of otter (*Lutra lutra*) within the search areas, dating between 1999, and 2011. Two of the records relate to the finding of otter spraint at the Sealand rifle range 0.9 km north of the Site. A record of a live sighting was returned for the Connah's Quay dock, 1.9 km to the southwest of the Site.
- 10.136 There have been no signs of otter observed during surveys at the Site and there are no habitats on Site that are considered likely to represent important foraging or resting sites for this species. As

such this species is unlikely to be affected by proposed development this specie is not discussed further in this assessment.

- 10.137 CERC returned nine records of water vole (*Arvicola amphibius*) within the search area. Of these records, three relate to an offsite ditch, c. 700 m west of the Site, one 1.2 km to the southwest, and one 600 metres to the south, one 1.9 km to the south and three at the Sealands range c. 1.5 km to the north. These records are dated between 2008-09.
- 10.138 The ditches present onsite are not suitable for water vole, since they are stone lined and were dry at the time of survey, with no indication that they would support water in the autumn and winter. No water vole burrows or other evidence was noted during the August 2021 ecological walkover. Due to the lack of evidence of water vole and the lack of suitable habitat within Main Site and A4 Plot that would be affected by the proposed development, water vole are not considered further in this assessment.
- 10.139 CERC provided records of brown hare (*Lepus europaeus*), hedgehog (*Erinaceus europaeus*), and stoat (*Mustela erminea*), for the 2km search radius, though none of the records relate to the Site itself. The Site is unlikely to support these species, and no field evidence was recorded during Site visits. They are also consequently not discussed further in this report.

10.3.12. Birds

- 10.140 All desk study and survey data collected up until January 2022 are presented in the Baseline Ornithology Report, in **Technical Appendix 10.3**. In summary, BTO WeBS data for the lagoons within the Main Site, indicate the presence of four SPA designated species; common tern, oystercatcher, shelduck and teal recorded historically. Teal were recorded in the highest number, with 2% of the SPA population present with the lagoons on the Main Site. Teal were the only SPA species observed on the Main Site lagoons during the bird surveys between June 2021 and January 2022, with a peak count of 22 teal observed, 0.42% of the SPA population.
- 10.141 Waterfowl that contribute to the SPA waterfowl assemblage were also recorded during the surveys of the Main Site, A4 Plot and the adjacent Cop Hole and Marshes unit of the Dee Estuary SPA to the north, species include: cormorant (*Phalacrocorax carbo*), coot (*Fulica atra*), moorhen (*Gallinula chloropus*), little grebe (*Tachybaptus ruficollis*), gadwall (*Anas strepera*), mallard (*Anas platyrhynchos*), shoveler (*Anas clypeata*), tufted duck (*Aythya fuligula*), mute swan (*Cygnus olor*), snipe (*Gallinago gallinago*), little egret (*Egretta garzetta*), grey heron (*Ardea cinerea*), black-headed gull (*Chroicocephalus ridibundus*), common gull (*Larus canus*) and herring gull (*Larus argentatus*).
- 10.142 Within Cop Hole and Marshes WeBS count zone (which is entirely within the Dee Estuary SPA to the north of the A4 Plot), SPA species interest features (oystercatcher, shelduck and teal) were recorded in low numbers, with 10 teal being the highest five-year peak count.
- 10.143 Outside the proposed development, the Shotton BSC Lagoon WeBS count area and the Shotton reedbed and marshes SSSI (both part of the Dee Estuary SPA), recorded common tern, oystercatcher and teal with the last five years. The peak count of 400 for common tern, represents 51% of the SPA population. Information from the Merseyside Ringers Group highlights the importance of the tern colony, but also identifies that black-headed gulls, that breed earlier, are taking up space on the predator-proof rafts which have been created specifically to support the

breeding tern colony. This colonisation of black-headed gulls has led to a decline in tern numbers, along with reportedly poor foraging conditions in the Dee estuary impacting the success of the tern colony.

- 10.144 Land functionally linked to the Dee Estuary SPA has been identified by Natural England for the areas within England, to the north of the proposed development. Puddington Fields is in closest proximity to the proposed development and was identified as having low potential. This functionally linked land (FLL) was approximately 430m from any affected road network (ARN), 1.1km from the A4 land and 1.2km from the proposed development site. It is considered that this is a sufficient distance for any impacts associated with the proposed development to be negligible and this area of FLL is not considered further by this assessment.
- 10.145 FLL within Wales (broadly to the south of the proposed development) has not been identified in any documentation reviewed or provided by NRW during consultation. A review of aerial imagery and comparison of habitat with the SPA and habitat identified within England lead the ornithologist conducting this assessment to the conclusion that habitat either side of Chester Road near Oakenholt could be considered functionally linked. A proportion of this habitat is directly adjacent to an ARN and therefore with potential to be impacted by the proposed development through increased traffic during construction and operation.
- 10.146 Overall, the Main Site and Plot A4 upon which development is proposed is considered to have local value to the majority of non-SPA designated bird species, due to the number and diversity of the assemblage present. Bird interest features of the SPA would be characterised as nationally important, although data suggests that there are low numbers and a low proportion of the populations of SPA species interest features utilising the Site. The impact of the proposed development upon designated sites (and its designating interest features) are discussed further in this assessment and separately considered within a 'shadow' Habitat Regulations Assessment (HRA) Screening Report (**Technical Appendix 10.4**). Shotton Reedbed and Marshes SSSI, support a nationally important common tern breeding colony. Due to the rarity of tern colonies in the UK and the large proportion of the SPA population that this Site supports, the tern colony (which is located outside the proposed development) is valued as having **National** importance.

10.3.13. Further Survey Requirements

- 10.147 The following surveys are ongoing or scheduled to be undertaken at the Site, to further inform and mitigate for impacts of the proposed development:
- *Reptiles: Reptile presence/absence surveys on Plot A4, to determine whether reptiles occur on the Site, and if so whereabouts and at which densities. If reptiles were found on the Site, then a suitable mitigation strategy would be developed, to safeguard reptiles during construction, and, if necessary, to provide alternative habitat. If reptiles were absent, then clearance of the land can take place under methods set out in a Construction Environmental Management Plan (CEMP);*
 - *Bats: bat activity transect surveys and static deployment will be undertaken in 2022, undertaken once per season (i.e. once in spring: April – May, once in summer: June to August, and once in autumn: September to October). This level of survey effort complies with the requirements of a Site with low value for bats, given that much of the Site is industrial and heavily illuminated and open grassland.*

10.3.14. Summary of Important Ecological Features

10.148 Designated sites, non-statutory designated sites, habitats and species populations that have been identified as important ecological receptors within the zone of influence of the proposed development are summarised below in .

10.149 **Table 10- 4.**

Table 10- 4:
Summary of Important Ecological Features Subject to Detailed Assessment

Ecological Feature	Scale at which Feature is Important	Comments on Legal Status and/or Importance
Designated sites	International/National	Proposed development is located close to Dee Estuary SSSI, SAC, SPA, Ramsar, which supports internationally important numbers of wintering wader and wildfowl populations as well as a nationally important tern site. Several other designated sites are located within a 2km radius of the Site, including the River Dee SSSI SAC and Inner Marsh Farm SSSI. Proposed development contains habitats of a similar nature to nearby designated sites and reflects the landscape character of the area, particularly in relation to the lagoons and terns.
Sites of value for nature conservation	County	Proposed development is adjacent to Shotton Steelworks Wildlife site, and contains habitats of a similar nature.
Habitats, including: open mosaic habitat on previously developed land and reedbeds.	County	Habitats are listed on Section 41 of the NERC Act (2006). Habitats present form part of the wider ecological network surrounding the Dee Estuary. The variety and type of habitats present support a range of species assemblages.
Freshwater biodiversity	Local	The aquatic macroinvertebrate assemblage recorded in Lagoon 2b is classed of low conservation value.
Invertebrates	Local	Plot A4 has capacity to hold a number of notable or protected invertebrate species.
Reptiles	Local	All reptile species are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended).
Bird assemblage (non-SPA species)	Local	Based upon the number and diversity of non-SPA and non-SSSI designated bird assemblage reported from survey data.
Bird assemblage (SPA species)	National	Due to the status of the SPA, birds listed with in the designation are assessed as nationally important, although a small proportion of the SPA designated species populations utilising the site and surroundings.
Birds- Breeding common tern	National	The Shotton Reedbed and Marshes SSSI, which is also part of the Dee Estuary SPA, is the location of an important common tern colony, a feature that is of national importance.

Ecological Feature	Scale at which Feature is Important	Comments on Legal Status and/or Importance
Bats	Local	All bat species are listed on Schedule 2 of the Conservation of Habitats and Species Regulations 2017. Foraging habitats for bats are considered of local importance.

10.150 The following ecological features identified within the zone of influence of the survey area have been valued as less than local importance and unlikely to be affected by the proposed development, and have therefore been scoped out of further assessment in this ES:

- *Non-HPI habitats including scrub, grassland, woodland, hardstanding, and buildings;*
- *Plants;*
- *Amphibians, including great crested newt;*
- *Badger; and*
- *Otter, water vole and other mammals.*

10.4. Proposed Development and Embedded Mitigation

10.151 The proposed development, including the construction of the paper mill and associated infrastructure, the Combined Heat and Power Plant (CHP), water treatment, recycling and storage facilities within the Main Site and the A4 Plot Expansion Land are described in full in **Chapter 3** of the ES. The construction also includes the early commencement of piling works within the Main Site. Construction is intended to take between three – five years, although the phasing of construction will mean that some operations will commence prior to the end of construction.

10.152 The Site would operate as a paper mill using energy supplied by the onsite CHP plant with deliveries of recycled and virgin paper products and paper, card and wood feedstock arriving by HGV via the public highway network. The Transport assessment is provided in **Chapter 13**, the Air Quality assessment is presented in **Chapter 12** and the Noise and Vibration assessment is presented in **Chapter 11**. Each of these assessments recommends mitigation measures, which it has been assumed in this assessment will be incorporated into the scheme, either through relevant planning conditions or a detailed Construction Environmental Management Plan (CEMP). Where additional mitigation to further reduce impacts that could effect biodiversity resources, these are clearly stated in the relevant section below.

10.153 The Site will benefit from a landscape and habitat creation, as illustrated in the Illustrative Landscape Masterplan (**Figure 7.23**) and a drainage strategy, which includes elements of Sustainable Urban Drainage (SuDS) approaches, which is outlined in full in **Chapter 9**. The Site will operate with low level security lighting, with a commitment to reduce the number of lighting columns from the Site at present. The final lighting strategy will be agreed in consultation with Flintshire County Council post-determination.

10.5. Assessment of Effects

10.154 This section provides an outline of the potential ecological implications of the proposed development based on the baseline information identified from the desk-based study, baseline surveys and evaluation of the ecological features. Both qualitative and quantitative information has been used to identify likely significant ecological impacts, including the adverse, beneficial, direct, indirect and cumulative ecological effects of the proposed development.

10.155 Based upon knowledge of the Site, the development proposals and the likely effects on the relevant receptors it is possible to refine the scope of this impact assessment to focus on those receptor and impact interactions which are likely to be most significant **Table 10-5** presents a matrix of the potential impacts and receptors and identifies the interactions which are likely, or have the potential, to change baseline conditions through the construction and operational phases of the development. The matrix defines the potential impacts in respect to the construction phase (CP) and the operational phase (OP) of the proposed development. Impacts are described for each ecological receptor in the following sub-sections.

10.156 Impacts relating to birds are discussed in the separate Ornithology section below.

Table 10-5:
Scoping Matrix of likely impacts

	Habitat loss		Indirect effects through fragmentation and isolation		Physical disturbance or injury		Noise and visual disturbance		Changes in air quality		Alterations to water flow and quality		Lighting		Cumulative impacts	
Shotton Lagoons SSSI	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✓	✓
Dee Estuary SPA/SAC/Ramsar	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✓	✓
River Dee and Bala Lake SAC	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✓	✓
Locally designated sites	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✓	✓
Onsite Habitats (inc HPI)	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Freshwater biodiversity	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✓	✓	✗	✗	✓	✓
Terrestrial invertebrates	✓	✗	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓
Reptiles	✓	✗	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓
Birds	✓	✗	✓	✓	✓	✗	✓	✓	✗	✗	✓	✓	✓	✓	✓	✓
Bats	✗	✗	✓	✓	✗	✗	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓

Red = impacts during construction phase; blue = impacts during operation phase

10.5.1. Changes to designated and non-statutory designated sites

- 10.157 There is a potential for adverse impacts resulting from the proposed development upon nearby statutory designated and non-statutory designated sites, including Shotton Lagoons SSSI, Dee Estuary SPA/SAC/Ramsar/SSSI, the River Dee and Bala Lake SAC, and Local Wildlife Sites such as the Shotton Steelworks.
- 10.158 During construction, no direct habitat loss is predicted from any of these sites. However, impacts from dust, changes in air pollution, changes to hydrology, construction-related noise and cumulative impacts have been identified as having potential for adverse impacts upon designated sites. European designated sites within the zone of influence of the proposed development are considered in detail within the HRA Screening report (**Technical Appendix 10.4**). Mitigation in relation to dust, noise, aerial pollution, risks of water pollution during construction are set out in the relevant chapters and will be delivered through a CEMP, which is to be agreed with Flintshire County Council and other relevant stakeholders and consultees, such as NRW, post-consent. The detailed avoidance and mitigation measures relating to construction to be included within the CEMP are not yet finalised, although outline measures for biodiversity protection are set out in this chapter, therefore there is a degree of uncertainty relating to the likelihood of significant impacts upon designated sites and their interest features. However, noise modelling, mitigation for potential ground and surface water impacts and mitigation proposed to address air quality issues indicates that current commitments during construction would not lead to significant effects upon designated sites.
- 10.159 During operation, there are potential impacts resulting from changes in air pollution (from point and traffic sources), changes to hydrology (both ground and surface water), operational noise (including from regular operations and traffic) and cumulative impacts. Measures to reduce the emissions of air pollution from the proposed development are embedded within the design of the project. Mitigation measures and standard good practice measures would be included within a Site-specific Environmental Management Plan. Site operations include water discharge to the Dee Estuary, which is controlled by permit from NRW, details are provided in **Chapter 9**. There are no planned changes to the discharge regime at the Site as a result of the proposed development. Air Quality assessment of the operational emissions of the CHP plant has resulted in a proposed increase in height to the exhaust stack which are designed to ameliorate, but does not remove, the risk of deposition upon designated sites. Further details are presented in **Technical Appendix 10.5 (Air Quality Effects on Ecological Receptors)** and in **Chapter 12**. With the measures summarised above in place, operational impacts to designated sites are not predicted to still lead to significant effects upon designated sites as a result of changes in air quality.
- 10.160 No significant adverse effects upon groundwater dependent terrestrial ecosystems (GWDTE), ancient woodlands or habitats of principle importance within locally designated sites in proximity to the Site have been identified.
- 10.161 For local wildlife sites adjacent to or in the vicinity of Shotton Paper Mill, there is the potential for impacts relating to increased aerial deposition from the operation of the Site. These are described in full in **Technical Appendix 10.5 (Air Quality Effects on Ecological Receptors)** and in the **Chapter 12** of this ES, alongside proposed mitigation measures.

10.5.2. Habitat loss

10.162 Habitat loss involves the direct destruction or physical take-up of vegetation, or the removal of other habitat structures with conservation interest. Habitat loss may also occur indirectly as a result of a change in land-use or water management, for instance the drying-up of ponds or through induced successional events leading to a change in habitat type.

10.163 **Table 10-6** below provides a summary of the losses of different habitats from within the study area, calculated from the UK Habitat map (**Figure 10.1**), the proposed development scheme and the illustrative landscape masterplan (**Figure 7.23**).

Table 10-6:
Summary of predicted habitat losses (excluding hardstanding and buildings)

Habitat code (UKHab)	Habitat Description	Original habitat area (ha)	Habitat destroyed (ha, % loss)	Habitat created (ha)	Final habitat area (ha, % loss/gain)
f2d	Aquatic marginal vegetation	0.06	None	None	0.06 (None)
f2e	Reedbeds*	1.09	0.74	0.56	0.91 (16% loss)
g1c	Bracken	0.04	0.04 (100%)	None	0.04 (100% loss)
g3c	Neutral grassland (including Arrhenatherum neutral grassland)	16.98	14.46 (85%)	1.77	4.30 (75% loss)
g4	Modified grassland	7.62	5.15 (68%)	0.55	3.02 (60% loss)
h3	Scrub (including mixed scrub, bramble scrub and sea buckthorn scrub)	4.56	3.03 (66%)	0.94 (hawthorn scrub)	2.47 (46% loss)
r1	Existing lagoons	7.66	0.34 (converted to reedbed)	None	7.32 (4% loss)
u1a	Open mosaic habitats on previously developed land*	7.44	6.70 (90%)	5.1	5.84 (22% loss)
w1	Woodland (including wet woodland, broadleaved and mixed)	6.35	1.44 (23%)	2.17	7.08 (11% gain)
h2	Native hedgerow	0	N/A	0.90 km	N/A
r1	Ditches	1.3km	1.3km (100%)	1km (linear SUDS)	1km (23% lost)

*Habitats of Principal Importance

10.164 Habitat loss occurs across numerous habitat types onsite. Importantly, there will be a direct loss of 6.7 hectares of Open Mosaic Habitats (OMH) on Previously Developed Land of Local value, and a

loss of 0.76 hectares of reedbeds of Local value. In the short term, this would be a significant adverse impact at the Local Level. However, the predicted “no change” scenario where the proposed development does not proceed, it is considered likely that the condition of the OMH habitat may naturally decline due to encroaching grassland and scrub. It is proposed to retain, recreate and reinstate areas of OMH within the Site, principally on the northern boundary of the A4 Plot. Areas of reedbed are proposed in Lagoon 3 (**Figure 7.23**).

- 10.165 Over 80% of neutral grassland onsite and over 60% of scrub habitats would be lost to development. These are not Habitats of Principal Importance yet, are of moderate distinctiveness and therefore possess value for the Site. Additionally, all ditches present onsite will be lost during the development. The loss of these habitats, and other habitats listed in **Table 10-6** above is considered to be a significant impact at a Local level.
- 10.166 In the absence of mitigation, habitat loss may also adversely affect populations of protected or notable species which are reliant on them. Impacts to species are discussed in the relevant sections below.

10.5.3. Air Quality Effects on Ecological Resources

- 10.167 The proposed development has the potential to generate two sources of change in the level of air pollution at designated habitats. These sources are potential point sources and linear sources associated with the ARN in both construction and operational phases. A full assessment of the impacts of changes from the proposed development and air quality on ecological receptors is provided in **Technical Appendix 10.5 (Air Quality Effects on Ecological Receptors)**.
- 10.168 The deposition of dust has the potential to create an impact on ecological systems. This can result from the chemical or physical effects of particles on the vegetation surface or from changes in soil chemistry¹⁴. Fugitive dust from development sites is typically deposited within 100-200m of the source; the greatest proportion of which comprise larger particles (greater than 30 microns) is deposited within 100m. Where large amounts of dust are deposited on vegetation over a long-time scale (a full growing season for example) there may be some adverse effects upon the plants' photosynthesis, respiration and transpiration. The overall effect of significant amounts of dust could be a decline in plant productivity, which may then have indirect effects on fauna. The amounts of dust deposited and its effects are also dependent upon weather conditions as in wet weather less dust will be generated and that which has been deposited upon foliage is likely to be washed off.
- 10.169 During construction and operation of the proposed development, there is potential to affect air quality by air pollution and dust accumulation. Due to the Site's proximity to designated protected sites, the proposed development may produce indirect negative effects upon these sites. The full assessment of impacts of air quality on European level designated sites in the site's zone of influence is included in **Technical Appendix 10.4- Habitat Regulations Assessment**. That screening report concludes that there is uncertainty over the absence of likely significant effects including

¹⁴ CIEEM (2021): 'Advice on Ecological Assessment of Air Quality Impacts'. Chartered Institute of Ecology and Environmental Management, Winchester.

those associated with potential changes in air quality. Further work is ongoing to confirm the distribution of interest features within the areas of change in air quality.

- 10.170 **Chapter 12 Air Quality** of this ES provides an assessment of dust emissions, point source combustion emissions and road traffic emissions and includes further details on impacts upon ecological receptors. This is supplemented with information provided in **Technical Appendix 10.5 Air Quality Effects on Ecological Receptors**. In summary, the Dee Estuary SSSI, SAC, SPA and Ramsar site, the River Dee and Bala Lake SAC, Inner Marsh Farm SSSI and the Shotton Lagoons and Reedbeds SSSI, all located within 1km of the site boundary, have capacity to be adversely affected by changes in air quality as a result of the proposed development. In addition, consideration was also given to Deeside and Buckley Newt Sites SAC, Halkyn Mountain SAC, Mersey Estuary SPA/Ramsar site and Alyn Valley Woods SAC, which are within 15km of the proposed development. These sites did not meet the relevant screening criteria for air quality assessment, based on the level of change, and were not subject to further assessment.
- 10.171 Indirect effects from air quality includes changes to atmospheric concentrations or levels of pollutants, or the subsequent deposition of Nitrogen. These changes are associated with a range of potential responses and can include:
- *acute impacts to vegetation at very high concentrations;*
 - *changes that have the potential to cause discernible effects in lower plants;*
 - *worsening of existing air quality standard exceedances;*
 - *changes in extent and distribution of habitats or species;*
 - *changes in species richness; and*
 - *changes in the productivity of habitats in terms of biomass production.*
- 10.172 The identified level of change, from the proposed development, in Nitrogen deposition at the Dee Estuary SPA/SAC/Ramsar site (ER1) is above the level that can be considered inconsequential in accordance with Holman et al (2020). With reference to Caporn et al (2016) the levels of change are also above the level required to introduce a theoretical change in species richness at each of these sites. The extent of these changes is however limited and at less than 1% of the total area of the relevant interest feature (habitat) at the site can be described as inconsequential. It should be noted that this level of change adopts a precautionary allocation of habitat type which will overstate change and extent. In addition, this assessment assumes that there are interest features, or habitats supporting such features, within the area of change. Ongoing surveys will confirm whether this is the case, but this does not alter the conclusion of the assessment of changes in air quality.
- 10.173 **Table 10- 7** below provides a summary of the maximum level of change and extent over which theoretical changes in species richness may occur.

Table 10- 7:
Summary of predicted level and extent of habitat change associated with Nitrogen deposition

Site	Interest Feature	Maximum Change in Nitrogen Deposition Annual Mean (kg N/ha/yr)	Maximum Extent of Change	Extent of Change as % of Interest Feature
DEE ESTUARY Ramsar site (ER1)	Bird features (assumed from SPA data). Pioneer, low-mid, mid-upper saltmarshes.	0.49	0.10 ha	<1%
THE DEE ESTUARY SPA (ER1)	Bird features. Pioneer, low-mid, mid-upper saltmarshes.	0.49	0.10 ha	<1%
DEE ESTUARY SAC (ER1)	Salicornia and other annuals colonizing mud and sand; Estuaries	0.49	0.10 ha	<1%
RIVER DEE AND BALA LAKE SAC (ER2)	Fish interest features; Estuaries	0.04	N/A	N/A
Inner Marsh Farm SSSI ER5	Bird features; Littoral sediment; Standing open water and canals	0.13	N/A	N/A
Shotton Lagoons and Reedbeds SSSI (ER6)	Standing open water and canals; fen marsh and swamp	0.24	N/A	N/A

N/A – indicates a level of change that is below the level at which a theoretical change in species richness might occur.

10.174 The level and extent of change at these sites is considered to represent a non-significant impact.

10.5.4. Fragmentation and isolation

10.175 Habitat fragmentation is concerned with spatial processes, such as negative edge effects (e.g. colonisation by ‘aggressive’ species or successional changes) and dispersal problems that can become increasingly severe as habitat is lost and remaining habitat is divided into smaller units.

10.176 Fragmented habitats are likely to be more vulnerable to external factors that may have a negative effect upon them: e.g. disturbance, may be less resilient to change, including climate and management changes; than connected habitats because colonising species may be unable to reach the habitat to re-colonise in the event of species loss.

10.177 Clearance of vegetation from within the Plot A4 and to a lesser extent the Main Site may lead to habitat fragmentation impacts during the construction phase, as the development footprint occupies a vast majority of the application Site and nearly all habitats and areas will be disturbed during construction activity. During operation, the long-term reinstatement of habitats may not completely restore connectivity across the Site, due to the increased area of built development.

- 10.178 In the absence of mitigation, habitat fragmentation is predicted to lead to impacts upon the species groups that utilise these habitats. For example, commuting habitat for bats is predicted to be adversely affected where commuting routes are severed by the proposed development.
- 10.179 Clearance of vegetation to enable construction is predicted to reduce the extent and connectivity of suitable habitat for invertebrate and reptile species, which may isolate species' populations and render them more vulnerable to local extinction. In the absence of mitigation, fragmentation is assessed as a significant adverse effect upon populations of reptiles, invertebrates, birds and bats.
- 10.180 Habitat restoration and new planting is proposed, as set out in the Landscape Masterplan (**Figure 7.23**). This landscape plan ensures that connections around the perimeter of the site are maintained to minimise the impact of the re-development of the site.

10.5.5. Freshwater biodiversity

- 10.181 The aquatic ecology walkover survey and macroinvertebrate survey identified that the water quality of Lagoon 2b and Lagoon 3 is sufficient to support aquatic flora and fauna considered of Local value.
- 10.182 There are no adverse effects upon freshwater biodiversity predicted during the construction phase of the development, as the protection of water resources (as stated in the outline CEMP) and the implementation of mitigation measures proposed in **Chapter 9** would reduce the risk of any significant impact occurring.
- 10.183 Habitat degradation or loss is identified as a major source of impact arising from the operation of the paper mill upon freshwater biodiversity. Lagoon 2b will be converted into an operational lagoon within the paper manufacturing process. The operational impacts, including the predicted change in flows, temperature and water quality are predicted likely to render it incapable of supporting a healthy or diverse freshwater flora or fauna. This impact is deemed significant adverse and long-term.
- 10.184 Lagoon 3 will not become part of the operational facility and the creation of a new reedbed area at the in-flow of the lagoon is predicted to assist in the removal of organic pollution and nutrient enrichment resulting from water processing. There is predicted to be a neutral to beneficial impact upon Lagoon 3.

10.5.6. Ornithology

- 10.185 Impacts relating specifically to birds from each of the identified impacts in **Table 10-5 Error! Reference source not found.** have been detailed within the following sections. The association of bird species with the Dee estuary SPA is discussed throughout.

Functionally linked land

- 10.186 Due to the proximity of the Dee estuary SPA, land that is Functionally Linked to the SPA '*any land outside of the European designated site which is used by species that are qualifying interest features*

of that designated site' needs to be considered. This will occur in the assessment and from a HRA perspective (contained within a separate report).

- 10.187 Review of FLL presented in the ornithology appendix (**Appendix 10.3**) highlighted that habitat near Oakenholt, where Chester Road passes through, is classed as potential FLL. There is potential for this potential FLL to be impacted by the proposed development, as the road network in this vicinity will have extra traffic, with total vehicles reaching 13,748, with 19% being HGV (as outlined in **Chapter 11 Noise and Chapter 13 Traffic**). The noise modelling location RE8 is the closest location to this area and the sound modelling and within all phases the LAeqtdB were predicted to be 59. FLL identified by Natural England was located at sufficient distance not to be impacted by any changes to the proposed development Site or the ARN.

Habitat loss

Construction

- 10.188 The proposals do not include any habitat loss related to the Dee Estuary SPA or the Shotton lagoons and reedbed SSSI (also part of the SPA); the lagoons on Site will also remain intact.
- 10.189 Existing habitat, specifically grassland, scrub and open mosaic habitat will be lost from the Site, specifically within the A4 area, these habitats provide foraging opportunities for bird species and breeding habitat, specifically for passerine species.
- 10.190 Loss of foraging and breeding habitat will have a negative impact predominately on the passerine bird assemblage present on site that utilise these habitats. The negative impact would be approximately a mid- term impact (5- 10 years), as the construction will take three years and there would be additional time for planting to establish. Waterfowl species primarily utilise the lagoons and would still have access these habitat features. However indirect loss of habitat through disturbance needs to be considered specifically, as even though lagoon habitat would remain it may not be utilised by bird species, due to other factors, this is discussed in a later section.
- 10.191 Before any mitigation, the impact of habitat loss, specifically scrub and mosaic habitat, for bird species, specifically passerines, was considered to be a significant impact in the mid-term on a local receptor.

Operation

- 10.192 The final development would provide some habitat for foraging and nesting bird species, in the form of landscape planting. Less habitat would be available overall, due to the development taking up previously available habitat, however, the proposed illustrative landscape masterplan has the potential to provide habitat of higher quality. The landscape plan (**Figure 7.23**) proposes to use native species, add reedbed habitat, plant hawthorn scrub and reinstate open mosaic habitat within A4 to the north. The quality of the habitat has the potential to provide beneficial habitat for foraging and breeding birds excluding common tern and specifically for passerines. However, there would be a lag time - three to five years, for the proposed planting to become established. Therefore, erection of additional options for breeding bird species should be incorporated in the form of nest boxes in locations free of disturbance. These should be targeted toward the species recorded on

Site. Boxes should be incorporated before landscape planting installation, to provide additional habitat while such planting establishes.

- 10.193 If, once the proposed planting is established, these habitats are maintained and are of the higher quality as proposed, then the impact on birds of habitat loss during the operational phase of the project, is not considered to have a negative impact.

Indirect effects through fragmentation and isolation

Construction

- 10.194 Although birds are more mobile than other species the supporting habitat needs to be of a certain size, accessible and not suffering from factors that indirectly exclude birds (e.g. visual or noise disturbance- discussed further in subsequent sections). In the breeding season displacement from previous territories could reduce breeding success, if there are no suitable habitats nearby or if such habitats are at capacity (essentially preventing breeding attempts). Lighting of the project during construction, if required also has the potential to impact upon bird species within the Site and potentially beyond the boundaries, dependant on the level of light spill. Illumination can aid species that visually forage for food, by illuminating habitat and increasing time they can forage, for example wading species¹⁵, equally illumination has been found to extend the start of the singing season in some species¹⁶, that may impact on fitness. As there is currently no lighting plan available, the area impacted is unknown, this cannot be assessed at this time.
- 10.195 The main effect of fragmentation and isolation during construction relates to noise and visual disturbance.

Operation

- 10.196 Once the development is operational and between three and five years have passed for vegetation planting to establish, the landscape planting will provide habitat for breeding and foraging birds once again, however the habitat areas will be smaller and more fragmented due to the presence of the development. The bird species assemblage recorded on Site are likely to be able to utilise these habitats despite the fragmentation, therefore no significant impact is likely during operation.

Physical disturbance/or injury during construction

- 10.197 Demolition on the Site has already commenced under a separate authorisation, however, there is a risk to breeding birds during construction, if removal of any suitable habitat or bird nest boxes require removal during the breeding season. Destroying an active nest would be a breach of the Wildlife and Countryside Act. No nest boxes or suitable habitat will be removed until it has

¹⁵ Santos, C.D. Miranda, A.C., Saraiva, S., Lourenco, .M (2010) Effects of artificial illumination on the nocturnal foraging of waders *Acta Oecologica* 36 (2): 166-172

¹⁶ Da Silva, A, Samplonius, J. M, Schlicht, E., Valcu, M. and Kempenaers (2014) Artificial lighting rather than traffic noise affects the daily timing of dawn and dusk singing in common European songbirds. *Behavioural Ecology* 25 5 1037-1047

undergone a check by a suitably qualified ecologist to ensure no active bird nests are accidentally destroyed or can only be removed outside of the bird breeding season (September – February)

Noise and visual disturbance

Construction

- 10.198 Birds can be affected by either visual, noise or a combination of both resulting from development schemes¹⁷. The susceptibility of birds to disturbance depends on the intensity, frequency and duration of the source of disturbance. In general, infrequent, high-intensity activities tend to cause more disturbance than continuous low-intensity activities¹⁸. In terms of visual disturbance vehicles and vehicle-movements tend to be tolerated much better than people on foot. With noise disturbance, birds appear to quickly habituate to continual noises so long as there are no large amplitude ‘startling’ components¹⁹.
- 10.199 The waterbird tool kit²⁰ provides a means of understanding specific species sensitivity to visual and noise disturbance.
- 10.200 This resource classifies visual disturbance in three ways:
- *High level disturbance - Regular reactions by birds to stimuli, birds remaining in the affected area may not forage efficiently. Caused by workers operating outside equipment, fast movement of plant, large plant in close proximity to birds.*
 - *Moderate level - High level disturbance that has occurred over a long time, so birds are habituated or less intrusive works, that cause a degree of disturbance.*
 - *Low level - Stimuli that is unlikely to cause a response from birds, i.e. work out of sight of birds. Plant that birds have become habituated to.*
- 10.201 A visual representation is provided in **Figure 10.4** a ‘visual representation of visual disturbance’ from Cutts et al 2009.

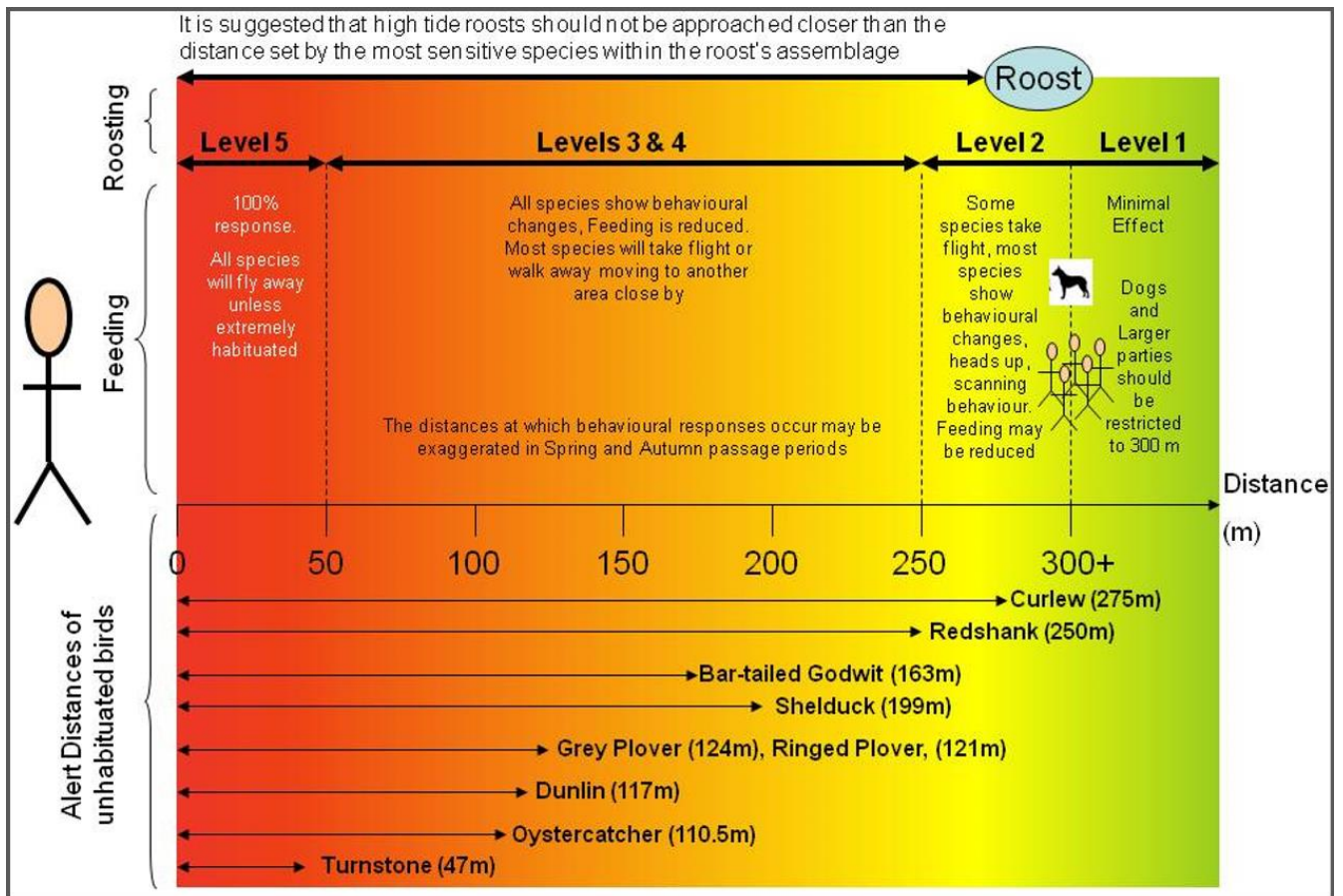
Figure 10.4: Visual representation of visual disturbance from Cutts et al 2009

¹⁷Prater, A. 1978. The effect of estuarine engineering schemes on birds. *Hydrobiological Bulletin*. Vol. 12. 322-332.

¹⁸ Hill, D., Hockin, D., Price, D., Tucker, G., Morris, R. & Treweek, J. 1997. Bird Disturbance: Improving the Quality and Utility of Disturbance Research. *The Journal of Applied Ecology*, Vol **34**, No. 2, pp 275-288.

¹⁹ Burton, N.H.K., Rehfish, M.M. and Clark, N.A. 2002. Impacts of disturbance from construction work on the densities and feeding behaviour of waterbirds using the intertidal mudflats of Cardiff Bay, UK. *Environmental Management* Vol. 30, No. 6, pp865-871.

²⁰ Cutts, N., A. Phelps, and D. Burdon. 2009. “Construction and Waterfowl: Defining Sensitivity, Response, Impacts and Guidance, Report to Humber INCA.” ZBB710-F-2009. Institute of Estuarine and Coastal Studies University of Hull.



10.202 Noise disturbance was also classified in three ways:

- *High level noise - sudden noises over 60dB (at the bird), continuous repetitive noises over 72dB (at the bird).*
- *Moderate level noise - high level noise that has occurred over a long period so that birds become habituated or irregular low-level noise that causes some disturbance. Occasional noise events above 55dB, regular noise between 60-72dB and long-term regular noise above 72 dB, that birds have become habituated to.*
- *Low level noise - noise which is unlikely to cause a response in birds using an intertidal area. Any noise at less than 55dB at the bird.*

10.203 Overall, this leads to categories for disturbance that cover visual and noise cues:

- *High level disturbance stimuli- Sudden noise over 60dB at the bird, continuous noise over 72 dB at the bird, close proximity of activity, 100m from the bird, workers on foreshore and workers operating outside of plant.*
- *Moderate level disturbance stimuli- Sudden noise over 55-60dB at bird, Continuous repetitive noise 60-72 dB at the bird, high level disturbance activities, that have a reduced impact due to habituation.*

- *Low level disturbance stimuli- Noise less than 55db (at the bird), noise of 55dB -72dB in a highly disturbed environment, moderate levels of disturbance that have reduced impact due to habituation, works outside the sight of birds, high level works where birds are always 500m away or medium level works 300m away.*

- 10.204 In general, larger bird species, particularly those which form flocks in open habitats, tend to be more vulnerable to noise and visual disturbance than smaller species in more enclosed habitats. Although different species vary in their tolerance of noise and visual disturbance, waterbirds are generally susceptible to disturbance and tend to preferentially select roosting or foraging sites where levels of disturbance are low.
- 10.205 Taken in isolation, disturbance from a single development may simply result in birds being displaced into alternative habitat further from the source of disturbance. In many cases this may have no discernible effect on the population of the species concerned. However, if birds are unable to compensate for lost feeding time, disturbance can affect their ability to maintain their energy reserves and may therefore affect individuals' chances of surviving cold weather. A study from Cardiff Bay highlighted that redshank displaced to other habitat in the winter had lower survival rates and adults were significantly lighter than non-displaced redshank²¹. Sustained disturbance can also affect numbers of birds using a site in the longer term. The impact of disturbance on whole sites depends on the availability and carrying capacity of alternative habitats within the site. The carrying capacity of sites is rarely known with certainty and as such a precautionary approach should be adopted.
- 10.206 Visual and noise disturbance has the potential to impact not only species present within the Site, but also species associated with the nearby SPA. Causes for concern are the potential impact on:
- *The SPA habitat to the north beyond the A548- Cop Hole and Marsh SPA;*
 - *The common tern colony at Shotton reedbed and marshes SSSI (part of the SPA);*
 - *Any impacts on functionally linked land associated with the Dee Estuary SPA and*
 - *The onsite lagoons.*
- 10.207 Areas where waterfowl have been observed (Cop Hole and Marshes area of the Dee Estuary SPA, the lagoons on Site and A4) are unscreened from the proposed development site, especially the lagoons on Site are likely to be subject to considerable visual and noise disturbance.
- 10.208 Baseline noise data for the Cop hole and Marshes part of the Dee Estuary SPA area beyond the A548 currently experience noise during the day at 58 (range 50-65) dB $L_{Aeq,T}$ and during the night 54 (range 44-64) dB $L_{Aeq,T}$. This is consistently above or close to the threshold of 55 dB, suggesting that species using this area are habituated to higher noise levels. The noise modelling location ER2 was used as a worst-case scenario for the Cop Hole and Marsh SPA area, as the location was directly adjacent to the A548 boundary, there would be habitat, for example at ER1 that would be further from the proposed development site and the ARN within the Cop Hole and Marsh area.

²¹ Burton, N. H., Rehfisch, M. M., Clark, N. A., & Dodd, S. G. (2006). Impacts of sudden winter habitat loss on the body condition and survival of redshank *Tringa totanus*. *Journal of Applied Ecology*, 43(3), 464-473.

- *At ER2 the predicted cumulative noise during all phases of construction was 64 dB LAeq,T, at ER1 this was 57 dB LAeq,T;*
- *For a single noise event, the maximum noise level at ER2 was 52 dB LAeq,T and for ER1 46 dB LAeq,T; and*
- *During operation the predicted noise was 62 dB LAeq,T for ER2 and 50 dB LAeq,T for ER1.*

- 10.209 The noise modelling data highlights that the Cop Hole and Marshes area of the Dee estuary SPA beyond the A548 would likely experience noise levels greater than 55dB during construction and operation, specifically close to the road. During construction, there is the potential to mitigate some sound dissipation from the proposed construction site by the use of acoustic screening along Weighbridge Road, this would also reduce the impact of potential visual disturbance impacting this area during construction.
- 10.210 The noise during operation however is likely to be caused by increased road traffic along the A548, this would be beyond any screening. The bird survey data highlighted minimal SPA designated species using A4 land or the Cop Hole and Marshes; Teal- SPA designated species, were observed on one occasion only. Waterfowl assemblage species were also infrequently observed, and more often observed in flight, these included lapwing, grey heron, mute swan, snipe and little egret. Gull species (black-headed and herring gull) that would contribute to the waterfowl assemblage were also recorded, however these species are known to be relatively unaffected by noise and visual disturbance, as they are found in urban centres and nest on factory roofs for example. Numbers were limited, this could suggest that even preconstruction (i.e. the baseline) habitat is being impacted by noise disturbance and was therefore suboptimal for SPA designated species.
- 10.211 The Shotton reedbed and marshes SSSI had a baseline noise level of 53 (range 43-61) dB LAeq,T during the day and 49 (range of 40-60) dB LAeq,T during the night. This baseline was recorded during the winter, but noise levels were assumed to be similar during the breeding season when common terns would be nesting, because there is minimal trees and vegetation to offer screening that would change throughout the year and industrial practices are not seasonally variable.
- 10.212 There is no other tern colony with capacity to support the number of terns associated with the Shotton colony. In 2010 the Merseyside Ringing group witnessed the closest tern colony at Seaforth, at the mouth of the Mersey, struggle with overcrowding when the Shotton lagoon was not used in that year, leading to loss of eggs and a vast reduction in fledged young. Common tern are amber listed species and in the Dee estuary it has been highlighted that they are also suffering due to poor fish availability in their foraging grounds
- 10.213 The noise level at the noise modelling location EC3 was used as a worst-case scenario proxy for the tern colony lagoons, as this location is closer to the proposed development than the majority of the lagoon area. During construction the predicted cumulative noise level at ER3 was 55 dB LAeq,T and for a single event, specifically piling operations, the maximum noise level was predicted to be 51 dB LAeq,T. This meets or is less than the 55dB threshold from the water bird handbook and is below the sound levels recorded during the baseline noise data, although tern species are not included in the waterbird handbook specifically. Therefore, noise and vibration are unlikely to have a significant impact on the Shotton lagoon and marshes SSSI and the associated common tern breeding colony.

- 10.214 The Shotton lagoon and marshes SSSI and associated tern colony is located to the southwest of the proposed development Site by approximately 230m, with the on-site lagoons the closest habitat. As there will be no construction within the lagoons or to the south of the lagoons, the nearest construction from the active tern colony would be approximately 470m. With this larger distance considered, visual stimuli was considered not to have a disturbance impact on the tern colony.
- 10.215 Functionally linked land identified by Natural England to the north was over 300m from the ARN and therefore it was considered that there would be no impact on these areas of habitat.
- 10.216 Potential functionally linked land within Wales was identified near the ARN therefore there is potential for an increase in noise associated with additional traffic during construction specifically. During construction the noise at noise modelling location ER8 was predicted to reach noise levels of 59 dB $L_{Aeq,T}$ at the road. This is above the 55dB threshold and there is potential for impacts on SPA designated species using habitat close to the road network. However, it is likely that habitat near to the road network is already impacted by noise disturbance and as the baseline noise levels here are unknown there may not be much of an increase, however this is unknown. Equally, we do not have an understanding of the use of the habitat at this locality by SPA species, as no survey has been undertaken here, therefore a worst case scenario has been assumed.
- 10.217 Wintering birds associated with the SPA were not recorded in significant numbers within the Site, refer to **Appendix 10.3**, however waterfowl were present, specifically SPA designated teal were observed at this locality. No noise data are provided in relation to locations within the Site, but it is assumed that this will be the habitat with the biggest noise increase and the most likely to suffer from visual disturbance. This will likely displace waterfowl temporarily from the lagoons during construction. As only a small proportion of the SPA use this habitat, the impact is considered to be minimal and temporary, during the winter for the duration of construction.

Operation

- 10.218 The amount of noise emitted during operation of the proposed paper mill has been modelled and for all receptor locations, except ER2, ER6, ER8, ER10, ER11, ER 12 and ER13 the noise during operation is predicted to be less than 55 dB $L_{Aeq,T}$. Receptors ER1, 12 and 13 are likely to already be louder locations, as these are within the urban environment and ER2, 6 and 8 are equally along the road network and likely to suffer from greater noise at the baseline. Therefore, overall noise disturbance during operation was considered to be unlikely to have a significant negative impact.

10.5.7. Other species groups

Physical disturbance or injury

- 10.219 The following protected species are present, or likely to be present, onsite and have capacity to be physically harmed or disturbed during construction of the Site:
- *Terrestrial invertebrates;*
 - *Reptiles; and*
 - *Birds (dealt with separately).*

- 10.220 As there are no suitable bat roosting opportunities available onsite, there is not deemed to be a risk of physically disturbing or injuring bats during construction and operation of the Site.
- 10.221 In the absence of mitigation, there is a moderate risk that these species groups may be encountered onsite during the construction works, resulting in their death or injury. With the exception of birds the species groups are deemed to have local value, and so this impact is deemed significant and adverse at a local level.
- 10.222 In the absence of mitigation, the impact of habitat loss on reptiles and birds, including by reference to the assessment/evaluation of the importance of the site in **Technical Appendix 10.1 - Ecology baseline report**, could result in a reduction in overall species populations in the vicinity, and is deemed adverse at a local level.
- 10.223 In the absence of mitigation, the impact of habitat loss on terrestrial invertebrates and bats, including by reference to the assessment/evaluation of the importance of the site in **Technical Appendix 10.1 - Ecology baseline report**, could result in a reduction in overall species populations in the vicinity, and is on precautionary basis adverse at a district level.
- 10.224 Mitigation measures pertinent to each species group will be detailed in a Construction Environmental Management Plan (CEMP) or species-specific Mitigation Strategy document. In the case of reptiles and bats additional survey work will be undertaken to further inform the appropriate mitigation required, and may involve a translocation exercise in the case of reptiles.

Noise and visual disturbance

- 10.225 Short-term increases in disturbance levels as a direct result of human activity (i.e. visual disturbance) and through increase generation of noise as well as vibration during the construction phase can have a range of impacts depending upon the sensitivity of the ecological receptor, the nature and duration of the disturbance and its timing. For the Site, increases in traffic during both CP and OP, duration and frequency of piling during CP, and operation of plumes during OP all have capacity to generate noise and disturbance.
- 10.226 The increases in disturbance relating to noise and visual effects have capacity to impact upon the nearby designated sites, including Shotton Lagoons SSSI and the Dee Estuary Ramsar/SAC/SPA/SSSI, as well as nearby locally designated sites such as the Shotton Steelworks LWS. The specific impacts, if any, relating to the Dee Estuary Ramsar/SAC/SPA/SSSI will be detailed within the Habitats Regulations Assessment (HRA) Screening report (**Technical Appendix 10.4**) for the Site.
- 10.227 The area surrounding the Site is heavily industrialised (Tata steel), and with noise and visual disturbance occurring during the previous working of the paper mill. This may mean that species already present within the SPA closest to the Site would likely be acclimated to human disturbance.
- 10.228 For species which occur onsite, birds and bats are likely to be affected adversely by alterations to sound and noise at the site. The majority of noise and disturbance will be concentrated in the central portion of the site, which is unlikely to significantly affect bats, as this specific area onsite is not deemed of any value to commuting and foraging bats, from existing survey data, although further survey data is being collected. Noise impacts to birds are dealt with in a separate section.

- 10.229 **Chapter 11** details the noise impact assessment including consideration of impacts upon the Dee Estuary Ramsar/SAC/SPA/SSSI. Impacts associated with European sites are considered in full in the accompanying HRA (**Technical Appendix 10.4**).

10.5.8. Changes to water flow and quality

- 10.230 Groundwater and surface water is often important in supporting wetland ecosystems, including man-made systems such as the onsite lagoons and natural systems, such as the Dee Estuary which is downstream and connected to the Site via the outfall from Lagoon 3.
- 10.231 Any significant alterations to the groundwater regime therefore has the potential to affect both locally and on a much wider scale a wide range of wetland habitats and the species which rely upon these habitat types. In particular, pollution events that enter water courses or groundwater base flows can have negative impacts a considerable distance away from the construction site. **Chapter 9** provides a detailed hydrological assessment and further details on impacts of water flow and quality on ecological receptors are provided there.
- 10.232 Without suitable mitigation in place, foul or dirty water has capacity to exit the Site and pollute the Dee Estuary SAC/SPA/Ramsar Site and SSSI. This would result in a significant adverse effect on receptors deemed of international importance.
- 10.233 Appropriate measures to protect the aquatic environment from pollution are proposed during CP of the proposed development in order to eliminate or minimise risk to aquatic flora and fauna. Such measures include best environmental practice guidance outlined in Construction Industry Research and Information Association guidance (CIRIA)²². These will be outlined in the CEMP prepared for the Site, with more details provided in 10.236. With these measures in place, it is predicted that significant adverse effects can be minimised.

10.5.9. Lighting

- 10.234 Construction lighting can provoke short-term behavioural changes in sensitive species but the level of impact will be dependent upon the type and intensity of lighting and its timing.
- 10.235 During construction and operation, inappropriate lighting at the Site could result in light spill onto the lagoons, or areas of woodland, which would lead to adverse impacts upon birds and bats in particular. Without mitigation, this impact during construction and operation, would result in a permanent decline in suitability of the foraging habitats onsite for bats and would be adverse at a Local level. It is proposed that a construction and operational lighting plan is prepared post-consent that accords with current good practice guidance in relation to lighting impacts to wildlife, e.g. Institute of Lighting Professional (2018)²³. Such a lighting plan will include details on maximum lux levels allowed in affected areas onsite, as well as providing detail on the timing, type and angle of

²² Construction Industry Research and Information Association (CIRIA) (2015). *Environmental good practice on site (fourth edition)* (C741) Charles, P., Edwards, P. (eds). CIRIA, London.

²³ <https://theilp.org.uk/publication/guidance-note-8-bats-and-artificial-lighting/>

lighting recommended. With such a lighting plan in place, the risk of adverse effects upon sensitive species from construction or operational lighting at the Site is reduced and is not predicted to be significant.

10.5.10. Cumulative Effects

- 10.236 Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. Cumulative effects can occur where a proposed development results in individually insignificant impacts that, when considered in combination with impacts of other proposed or permitted plans and projects, can result in significant effects.
- 10.237 The phased nature of works occurring at Shotton Paper Mill mean that impacts will be cumulative over the period of construction and operation. For the purposes of this ecological assessment, impacts from all phases have been considered together therefore negating the need for a cumulative impacts assessment.
- 10.238 There are no other related operations, or other major developments, occurring in close proximity to the Site that would give rise to any significant cumulative effects with regards to the identified ecological interest features. The potential for cumulative impacts therefore anticipated to be minimal.

10.5.11. Further Survey Requirements and Monitoring

- 10.239 Where significant adverse environmental effects are reported for a proposed development, the relevant regulations require a description of any proposed monitoring arrangements for any identified significant adverse effects on the environment.
- 10.240 There are no further survey or monitoring requirements associated with identified significant adverse effects. Monitoring requirements during the construction phase are detailed in the Construction Phase mitigation and would be incorporated into a Construction Environmental Management Plan (CEMP), see **Technical Appendix 5.3** of the ES. Monitoring of proposed mitigation associated with Protected Species Licence requirements, including as required during both construction and operation, will be stipulated by NRW in the relevant Protected Species Licences.

10.6. Mitigation and Compensation

- 10.241 This section outlines the mitigation measures considered appropriate in order to prevent, reduce or offset any potential adverse effects on the ecological resource present on and within the zone of influence of the application Site as a result of the development proposals.
- 10.242 The mitigation and enhancement strategy should be implemented by means of a CEMP and a Biodiversity Management Plan covering the pre-construction, construction and post-construction phases.

- 10.243 In line with current best practice and planning policy the scheme has been designed adopting the Mitigation Hierarchy, which provides a structured approach to minimising impacts upon valued ecological receptors. The applicability of the hierarchy to this development are as follows:
- **Avoidance** - *Avoiding adverse effects through good design should be the primary objective of any proposal. This may be achieved, for example, through either the selection of alternative designs, alterations to Site layout, or by selecting an alternative site where no harm to biodiversity would occur. However, due to Site constraints avoidance is not feasible as development is scheduled to occur across the majority of the Site.*
 - **Mitigation** - *Adverse effects that cannot be avoided should be adequately mitigated. Mitigation measures minimise the negative impact of a plan or project during or after its completion. Examples of mitigation include the use of pollution interceptors on the surface drainage scheme, dust suppression and the minimisation of light spill.*
 - **Compensation** - *The protection of biodiversity assets should be achieved through avoidance and mitigation wherever possible. Compensation, the next step in the hierarchy, is proposed for unavoidable impacts, such as habitat loss in the case of this development.*
 - **Enhancement** - *The mitigation hierarchy involves a step-by-step approach of avoiding, mitigating or, where necessary, providing compensation for any adverse effects of development. Almost all development proposals provide opportunities to enhance or create new benefits for wildlife, which should be explored alongside the application of the hierarchy of measures to resolve potential adverse effects. Examples at Shotton Paper Mill include enhancing amenity grassland within the Site to a species-rich neutral grassland mix, and installing roosting boxes for bats.*

10.6.1. Statutory and Non-Statutory Designated Sites

- 10.244 Mitigation proposed for predicted impacts of the proposed development on Dee Estuary European sites will be considered as part of the Habitat Regulations Assessment process.
- 10.245 Direct impacts through habitat destruction within designated sites, including SAC, SPA, Ramsar, SSSI and LWS within a 2km radius of the Site are not predicted and no mitigation is proposed. Mitigation for indirect effects, including effects resulting from changes in surface and ground waters, traffic, air quality and noise are described in the relevant chapters of the ES.
- 10.246 Best practice techniques in relation to Hydrology are set out in **Chapter 9** and are summarised below for construction works which would be incorporated within the management procedures for construction activities onsite in order to protect the water environment from pollution incidents. This would involve the preparation of a detailed 'construction -site water management plan' which would be incorporated into the CEMP and agreed with NRW prior to work commencing at the application site. This will include;
- *avoidance of any onsite batching through the use of ready mixed concrete;*
 - *direct all cement delivery vehicles to return to depot (offsite) for washout;*
 - *locate mixing of grout within areas with lining and a suitable bunding;*
 - *washout area for onsite equipment to be lined and bunded and also be subject to regular (weekly) check for the integrity of the containment;*

- *wash out areas will be located away from any of the water / SuDS features – they should not be located within the southern area (where the lagoon is infilled) until releveling ensures any accidental escapes of washout water can not enter the water environment;*
- *alkaline water from concrete wash out would not be disposed of at the Site unless subject to appropriate treatment and specific agreement with NRW. At the stage it is assumed this would be tanked from Site for treatment and disposal at an appropriate licenced facility.*
- *the use and storage of potentially polluting materials on site, including oils and fuel, would be minimised as far as is reasonably possible;*
- *all on-site fuel, chemical storage, and potentially polluting materials, would be above ground and would be situated in areas that are lined and bunded;*
- *emergency spill response kit would be provided and maintained on site and site personnel would be trained in their use;*
- *a vehicle management system including strict speed limits and road markings would be put in place wherever possible to reduce the potential conflicts between vehicles and thereby reduce the risk of collision;*
- *direct discharge of sediment laden water to adjacent surface water bodies would be forbidden;*
- *spoil heaps should be minimised and kept covered as far as possible; and*
- *wheel cleaning should be carried out on exit to the Site to minimise tracking of sediment onto adjacent roads.*
- *Monitoring of adjacent surface water features to check for pollution entering the wider water environment; and*
- *enhanced checks on this discharge, primarily visual checks on suspended sediments and oils with monthly spot checks*

10.247 Best practice techniques in relation to Hydrology during operation are set out in **Chapter 9** and are summarised below this will include;

- *Production of an Environmental Management Plan;*
- *the use and storage of potentially polluting materials on site, including oils and fuel, would be minimised as far as is reasonably possible;*
- *all on-site fuel, and chemical storage would be above ground and would be situated in areas that are lined and bunded;*
- *tankers for delivery of liquids will be required to park up for offloading in areas that drain to the foul water system;*
- *emergency spill response kit would be provided and maintained on site and Site personnel would be trained in their use; and*
- *a vehicle management system including strict speed limits and road markings would be put in place wherever possible to reduce the potential conflicts between vehicles and thereby reduce the risk of collision.*

- 10.248 The mitigation measures in relation to traffic are set out in **Chapter 13** and these will include; the production of Construction Traffic Management Plan and implementation of a Delivery and Servicing Management Plan during construction and operation.
- 10.249 The mitigation measures in relation to air quality are set out in **Chapter 12** and these will include;
- *Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place*
 - *Ensure effective water suppression is used during demolition operations. Handheld sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.*
 - *Avoid explosive blasting, using appropriate manual or mechanical alternatives.*
 - *Bag and remove any biological debris or damp down such material before demolition*
 - *Carry out regular site inspections to monitor compliance with the Dust Management Plan (DMP), record inspection results, and make an inspection log available to the local authority when asked*
 - *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*
 - *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.*
 - *Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.*
 - *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 and appropriate.*
 - *Use enclosed chutes and conveyors and covered skips.*
 - *Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.*
 - *Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.*
- 10.250 The mitigation measures in relation to noise are set out in **Chapter 11** and these will include;
- *European Commission (EC) Directives and United Kingdom (UK) Statutory Instruments to control noise emissions from construction plant; The guidance within BS5228-1:2009+A1:2014 on the control of noise from construction sites; and*

- *Section 60 of the Control of Pollution Act 1974, which gives local authorities the power to control noise from construction sites.*

- 10.251 The adoption of Best Practicable Means is usually the most effective means of controlling noise from construction sites. Experience has shown that by implementing these measures, typical noise levels from construction activities could be reduced by 5 dB or more. Furthermore, problems concerning noise from construction works can sometimes be avoided by taking a considerate and neighbourly approach with local residents.
- 10.252 Best Practicable Means measures to minimise noise and vibration during construction are included within the Outline CEMP (**Technical Appendix 5.3 Outline CEMP**).
- 10.253 With these mitigation actions in place, no residual impacts upon internationally, nationally and locally designated sites and non-statutory designated sites are anticipated.

10.6.2. Habitat creation

- 10.254 Avoidance or mitigation of habitat loss is not possible for this development, yet a number of compensatory actions will occur and are proposed via the landscaping scheme. Areas within Plot A4 will be retained or created as OMH and managed in the long-term to achieve an early successional community.
- 10.255 In addition, the woodlands in the west of the Site will be managed to improve structural and species diversity, and two areas north of Lagoon 3 will be allocated for natural regeneration to provide a woodland-scrub-grassland ecotone. The large region of bramble scrub located south of Lagoon 3 will be managed to improve diversity with the intention of creating a mixed scrub transitional habitat. All areas of amenity grassland planting will be sown with a species-rich grassland mix and managed to improve species diversity with the target of a wildflower meadow style habitat.

10.6.3. Freshwater biodiversity

- 10.256 Direct habitat loss through conversion of Lagoon 2b into an operational lagoon could lead to an adverse impact aquatic invertebrate populations on-site. Whilst this cannot be mitigated for, the habitat enhancement of Lagoon 3 through reedbed establishment will increase its suitability for a variety of freshwater species, leading to an overall positive effect. Further details are presented in the Baseline Aquatic Ecology Report **Technical Appendix 10.2**.
- 10.257 In addition, impacts affecting water quality, such as pollution and temperature fluctuations, have capacity to negatively affect freshwater biodiversity.
- 10.258 Appropriate measures to protect the aquatic environment should be implemented during the construction phase of the proposed scheme in order to eliminate or minimise risk to aquatic flora

and fauna. Such measures include best environmental practice guidance outlined in Construction Industry Research and Information Association guidance (CIRIA)²⁴ and include:

- *Construction materials should be stored and maintained away from water bodies. Silt fences or similar should be placed around exposed ground and stockpiles.*
- *Surface water runoff from the construction site into the water bodies should be avoided and a system of cut-off ditches or other appropriate surface water attenuation/treatment measures, silt fencing and/or bunds should be installed if required.*
- *Chemicals and fuels must be stored in secure containers located away from water bodies. No refuelling of plant or machinery should take place near the watercourse.*
- *Run-off and drainage from any newly created hardstanding areas should be collected by appropriately designed drainage systems and should not directly flow into Lagoons 2B and Lagoon 3.*

10.259 Provided the above best-practice methods for working above are employed, there are not anticipated to be any residual impacts upon freshwater biodiversity.

10.6.4. Birds

10.260 Removal of any remaining suitable habitat for nesting birds (e.g. with the A4 land), including ground nesting species and boxes should be timed to occur outside of the breeding season (March – August inclusive). If habitat removal is due to occur outside of these times, a suitably experienced ecologist will be required to undertake a nesting bird check in advance of any vegetation removal. If any active bird nest is found, habitat removal will not proceed until the nest has fledged or failed naturally. A suitable buffer from the nest, dependant on the species, will be set up to reduce disturbance and prevent destruction. Sensitive monitoring of the nest will be required by an ecologist, to establish when the nest is no longer active, and works can proceed. Boxes used by birds but associated with buildings due for demolition will require removal before the breeding season. Of particular note, a kestrel was observed using a nest box in 2021, this should be removed before the breeding season, if located in an area earmarked for demolition.

10.261 It is advisable to include suitable landscape planting to encourage nesting birds incorporated within the proposed development. Inclusion of nest boxes tailored to suitable species, known to be present within the site or nearby from survey data, would also be beneficial for ensuring breeding locations are available while vegetation establishes.

10.262 Acoustic screening along Weighbridge Road and/ or the A548 would be beneficial to attenuating noise and reducing visual disturbance.

10.263 The CEMP will detail possible options for reducing noise disturbance in relation to birds. Factors to include would be to ensure different phases do not overlap, meaning the max cumulative noise impact would not occur. Also, timing noisy activities for low tide, as most waterfowl are present

²⁴ Construction Industry Research and Information Association (CIRIA) (2015). *Environmental good practice on site (fourth edition)* (C741) Charles, P., Edwards, P. (eds). CIRIA, London.

within the vicinity of the development site at high tide or cancelling these entirely in cold temperatures (14 days below freezing²⁵) when waterfowl will be energetically stressed and disturbance causing movement is more likely to increase mortality.

10.6.5. Other species

Terrestrial invertebrates

- 10.264 Direct habitat loss and habitat fragmentation could lead to an adverse impact on any potential invertebrate populations on-site. Should notable or protected terrestrial invertebrate species or species assemblages be identified onsite during additional surveys in 2022, mitigation for impacts to this group will involve preferentially undertaking Site clearance at the least damaging time of year, when the invertebrates are at their most mobile life stages (typically late summer/early autumn). Full details will be contained within a Invertebrate Method Statement to be agreed with the Local Planning Authority/NRW in advance of starting work on Site.
- 10.265 Following this, mitigation for loss of habitats will take the form of the creation and management of appropriate habitat within the scheme landscaping, which will be maintained in the early successional stages of OMH as favoured by potential target invertebrate species.
- 10.266 With the above mitigation and compensation measures in place, no residual impacts upon terrestrial invertebrates are anticipated to occur.

Reptiles

- 10.267 Should a population of reptile species be confirmed present onsite during additional surveys in 2022, a translocation exercise will be undertaken in advance of any work that may kill or injure these species. It is anticipated that individuals will be removed from the development footprint to the Site margins, from where appropriate habitat adjacent to the Site can be accessed. Full details of the translocation will be contained within a Reptile Method Statement to be agreed with the Local Planning Authority/NRW in advance of starting work on site.
- 10.268 To compensate for habitat lost to the proposed development, suitable reptile habitat would be included in the restoration scheme as well as the provision of hibernacula. Details of suitable placement and management of these features will be described in the BMP prepared for the site.
- 10.269 With the above mitigation and compensation measures in place, no residual impacts upon reptiles are anticipated to occur.

Bats

- 10.270 Compensation for the loss of foraging and commuting bat habitats is proposed in the form of enhancing and strengthening boundary features across the Site and improving the management of the woodland to improve structural and species diversity. This will ensure that post-habitat establishment, the areas and quality of foraging areas for bats will not decrease onsite.

²⁵ <https://basc.org.uk/advice/severe-weather-and-waterfowl-shooting/>

- 10.271 Enhancement measures for bats include the installation of a minimum of ten bat boxes within the Site, installed under the direction of an ecologist on buildings and retained trees to provide roosting opportunities throughout the landscaping.
- 10.272 Suitable mitigation to prevent impacts of lighting upon bats will take the form of an ecologically sensitive lighting strategy, detailing how certain areas onsite should remain unlit during both the construction and operational phases. For construction, this can be detailed within the Construction Environmental Management Plan. Provided this mitigation is in place, no residual effects of lighting are anticipated upon bats during construction. An operational lighting plan will require assessment in relation to bats.
- 10.273 With the above mitigation and compensation measures in place, no residual impacts upon bats are anticipated to occur.

10.6.6. Outline Construction Environmental Management Plan

- 10.274 An Outline Construction Environmental Management Plan, **Technical Appendix 5.3** will be produced to cover the construction phases of the development at Shotton Paper Mill and will include:
- *Construction methods: details of materials, how waste generated will be managed;*
 - *General Site Management details;*
 - *Biodiversity Management: details of tree and hedgerow protection; any invasive species management; species and habitats protection, avoidance and mitigation measures;*
 - *Soil Management;*
 - *Traffic Management;*
 - *Pollution Prevention;*
 - *Reduction of noise disturbance, e.g. timing noisy activities with regard to waterfowl (see paragraph 10.252);*
 - *Details of the persons and bodies responsible for activities associated with the CEMP and emergency contact details; and*
 - *Landscape/ecological clerk of works to ensure construction compliance with approved plans and environmental regulations.*
- 10.275 A Biodiversity Management Plan will also be prepared post consent to cover the specific aspects of the construction phase impacts with regard to ecological receptors as well as detail on the long term establishment and management of habitats onsite to ensure they meet the criteria necessary to deliver ecological value.
- 10.276 Details species-specific Mitigation Strategies will be developed where the presence of protected species has been ascertained onsite (in relation to terrestrial invertebrates and reptiles) which will also detail best-practice working methods to ensure compliance with legal provisions.



10.7. RESIDUAL EFFECTS

10.277 A summary of potential impacts, proposed mitigation, residual effects and, where relevant, proposed compensation measures is provided for each important ecological feature included in the assessment in **Table 10- 8**. Assuming the mitigation and enhancements are implemented as described, no further residual impacts are anticipated with regards to species as a result of the proposal

Table 10- 8:
Summary of Residual Effects- construction and operation

Ecological Feature	Potential Impacts	Proposed Mitigation	Means of Delivering Mitigation	Residual Effects
Statutory and non-statutory designated sites				
Dee Estuary SAC, SPA and Ramsar	Potential change in species richness associated with air quality Potential disturbance due to increased noise and visual disturbance	Standard good-practice methods of working to minimise impacts from changes in air quality, increased traffic, hydrology and increase in noise and visual disturbance including screening.	CEMP, EMP	Not Significant
River Dee and Bala Lake SAC	Potential change in species richness associated with air quality	Non required	N/A	Not Significant
Shotton Lagoons and Reedbeds SSSI	Potential change in species richness associated with air quality Potential disturbance due to increased noise and visual disturbance	Standard good-practice methods of working to minimise impacts from changes in air quality, increased traffic, hydrology and increase in noise and visual disturbance including screening.	CEMP, EMP	Not Significant



Habitats				
Habitats of Principal Importance	Loss of open mosaic habitat and reedbed, which cannot be mitigated.	Creation of additional reedbed in Lagoon 3 Creation and maintenance of additional OMH Details on appropriate habitat management for plant species to be outlined in the Biodiversity Mitigation Plan (BMP); and Standard good-practice methods of working.	BMP	Not Significant
Habitats; Woodland	Potential Change is species composition relating to air quality	Production of an Ancient Woodland Site Management Plan to employ all relevant actions to reduce the impact, which comply with NE Standing Advice on Ancient Woodlands.	AWSMP	Not Significant
Species				
Invertebrates	Freshwater biodiversity Intensification of the use of Lagoon 2b may reduce the biomass of invertebrate species in Lagoon 2b	Appropriate measures to protect the aquatic environment will be detailed in the CEMP; Construction materials should be stored and maintained away from water bodies. Silt fences or similar should be placed around exposed ground and stockpiles; Surface water runoff from the construction site into the water bodies should be avoided and a system of cut-off ditches or other appropriate surface water attenuation/treatment measures, silt fencing and/or bunds should be installed if required;	CEMP	Not Significant

		<p>Chemicals and fuels must be stored in secure containers located away from water bodies. No refuelling of plant or machinery should take place near the watercourse;</p> <p>Run-off and drainage from any newly created hardstanding areas should be collected by appropriately designed drainage systems and should not directly flow into onsite ponds; and</p> <p>Standard good-practice methods of working.</p>		
	<p>Terrestrial Invertebrates</p> <p>Loss of habitat (Open Mosaic habitat)</p>	<p>Undertaking Site clearance at the least damaging time of year, when the invertebrates are at their most mobile life stages (typically late summer/early autumn).</p> <p>Production of an Invertebrate Method Statement to be agreed with the Local Planning Authority/NRW in advance of starting work on site.</p> <p>Creation and management of appropriate habitat within the scheme landscaping, which will be maintained in the early successional stages of OMH as favoured by potential target invertebrate species.</p>	CEMP	Not Significant
Reptiles	<p>Potential injury, harm or death of individual reptiles during the clearance of terrestrial habitat and loss of habitat.</p>	<p>Appropriate measures to avoid harm to reptiles detailed in the CEMP; and</p> <p>Standard good-practice methods of working.</p>	CEMP	Not Significant
Birds	<p>Birds (non-SPA assemblage):</p> <p>The proposed development will lead to a direct loss of bird nesting habitat. In compensation, additional suitable habitat will be created and no significant adverse impact on breeding and wintering birds (non-SPA species) is predicted in the long-term.</p>	<p>Pre-vegetation removal/ management check;</p> <p>Bird box enhancement scheme detailed in the BMP; and</p> <p>Standard good-practice methods of working.</p>	CEMP & BMP	Not Significant

	<p>Bird assemblage (SPA species)</p> <p>In the absence of mitigation, the likelihood of significant impacts cannot be ruled out and therefore mitigation measures are proposed to minimise the risk of significant adverse effects upon designating SPA bird populations.</p>	<p>Avoidance and mitigation measures in respect of ground and surface water, air quality and construction noise are proposed, although there is a degree of uncertainty in relation to these impacts and their effects. With these mitigation actions in place, no residual impacts upon bird populations are anticipated.</p> <p>Standard good-practice methods of working.</p>	CEMP & BMP	Not Significant
Bats	<p>There is the potential for direct negative effects to the foraging and commuting behaviour of bat species associated with the application Site from an increase in artificial light.</p>	<p>Sensitive lighting scheme for bats designed in CEMP and BMP;</p> <p>Planting of new woodland and trees within grassland;</p> <p>Bat box enhancement scheme detailed in BMP.</p>	CEMP & BMP	Not Significant

- 10.278 Avoidance, mitigation and compensation has been proposed to address the impacts of the proposed development upon the ecological receptors identified. There is a degree of uncertainty about the requirements for additional mitigation, e.g. in relation to additional mitigation for noisy construction such as piling. It is recommended that sensitive sites and species populations, in particular ornithological receptors, are monitored during construction and any identifiable effects upon sensitive species or habitats would be addressed through a modification of construction practices.
- 10.279 Residual impacts have been identified upon open mosaic habitats, reedbeds and terrestrial invertebrate assemblages, which are predicted to be associated with the open mosaic habitats. This is assessed as a significant adverse impact at the local level before any mitigation. However, similar habitats are proposed within the landscape scheme and, with maturation of the landscaping and management to maintain the open mosaic habitats in the early successional stages (that would otherwise be lost); it is considered that in the long term the overall impact would be neutral.
- 10.280 During construction, prior to landscape planting becoming established, suitable habitat for nesting birds will be reduced. This would have an adverse impact at a local level. Therefore, the erection of suitable nest boxes as soon as there are appropriate buildings present is recommended, although it is noted that this would only cater for some species. During operation, once landscape planting is established (three to five years) the habitat is considered likely to improve in quality for nesting bird species, due to the use of native species and increased planting of trees and hedgerow compared to the current baseline, therefore it is predicted to have an overall neutral impact on nesting birds locally.
- 10.281 Disturbance at the onsite lagoons would increase during construction, with visual and noise disturbance impacting habitat features used by waterfowl and specifically teal, associated the Dee Estuary SPA. These areas are already subject to some noise and visual disturbance, due to the location in proximity to the existing now demolished factory and the neighbouring Tata Steel site, so there is some habituation by the species that have been recorded using the habitat. The predicted disturbance during construction would likely be a substantial increase for the duration of construction only. This would have a negative impact on waterfowl on a site level, including teal, a species designated as part of the Dee estuary SPA. Although this is not considered to be significant negative effect, as other habitat will still be available in the local area (e.g. Shotton lagoons and reedbeds) for use by waterfowl. Once construction is complete and landscape planting established, specifically the reedbed proposed to be associated with the lagoons, the disturbance (noise and visual) was considered likely to be similar to the previous levels of disturbance experienced when the paper mill was active previously. The additional reedbed would provide more shelter and cover for individual waterfowl. During operation, the impact on waterfowl was considered to be neutral.
- 10.282 Identified potentially land functionally linked to the Dee Estuary SPA within Wales also has the potential to be impacted by the proposed development, with increased noise associated with traffic along the ARN. The use of the potential functional linked land by SPA designated species identified in Wales is not known and species may already avoid habitat in proximity to the road, more information is required to reach a conclusion in relation to the predicted impacts on this receptor. The Cop Hole and Marshes part of the SPA to the north of the Site has the potential to be impacted by noise disturbance associated with potential construction, however the noise was similar to the range experienced during the baseline surveys, minimal numbers of SPA designated waterfowl

were observed in this locality and the use of acoustic fences to reduce dissipation of construction noise and reduce visual disturbance is an alternative option that can be added to reduce the negative impacts.

10.8. CONCLUSION

- 10.283 This chapter describes the baseline ecological conditions at Shotton Paper Mill and provides an evaluation of the ecological resources that occur within the Site or have potential to be affected by operations within it. The chapter describes in detail the potential ecological impacts resulting from the proposed scheme and describes the mitigation and avoidance measures that are required to reduce the magnitude of these effects.
- 10.284 The ecological receptors that have been identified include designated sites (Dee Estuary SPA/SAC/SSSI, River Dee and Bala Lake SAC, Shotton Lagoons and Reedbeds SSSI, Inner Marsh Farm SSSI and locally designated sites such as Shotton Steelworks LWS), habitats of principal importance (open mosaic habitat and reedbeds), freshwater biodiversity, the capacity for a reptile and terrestrial invertebrate assemblages of local importance, commuting and foraging bats, and birds.
- 10.285 The ecological assessment has identified residual impacts of habitat loss and fragmentation upon open mosaic habitat and reedbeds of up to county value that cannot be ameliorated in the short-term. Mitigation measures are required to reduce risks to populations of bird species, including those associated with the Dee Estuary European Sites. These can be delivered through a CEMP for construction phase and through best practice environmental management within the operational Site.
- 10.286 Impacts to internationally designated sites are detailed within a HRA Screening report.
- 10.287 With the proposed mitigation in place, it is considered that additional compensatory or avoidance measures are not required. However, additional survey work and monitoring is suggested to inform the impact assessment and assist with the design and details of mitigation measures proposed.

10.9. APPENDICES

The following appendices are attached as separate pdf documents:

- *Technical Appendix 10.1- Ecology baseline report;*
- *Technical Appendix 10.2- Aquatic Ecology report;*
- *Technical Appendix 10.3- Ornithology baseline;*
- *Technical Appendix 10.4- Habitat Regulations Assessment; and*
- *Technical Appendix 10.5- Air Quality Effects on Ecological Receptors*

10.10. FIGURES

Figure 10. 1: UK Habitat Map of Shotton Paper Mill

Figure 10. 2: Designated sites within a 2km radius of Shotton Paper Mill

Figure 10. 3: Designated sites within a 15km radius of Shotton Paper Mill

Figure 10.4: Visual representation of visual disturbance from Cutts et al 2009 (within text)

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11.1 INTRODUCTION

- 11.1 This Chapter considers the impact of the proposed development upon the existing noise and vibration environment at identified human sensitive receptor locations. It describes the scope, relevant legislation and guidance, assessment methodology, and the baseline conditions existing at the study area and its surroundings. It considers any potential significant effects the proposed development would have on this baseline environment; the mitigation measures required to prevent, reduce or offset any significant adverse effects; and the likely residual effects after these measures have been employed. Cumulative noise and/or vibration effects with other proposed developments that may also have an impact on sensitive receptors are also considered.
- 11.2 The impact of the proposed development during its construction (including demolition) has been considered and this has been referenced to the guidance of BS5228-1:2009+A1:2014, *Code of practice for noise and vibration control on construction and open sites – Part 1: Noise*. The impact of construction road traffic has been considered with reference to the Design Manual for Roads and Bridges (DMRB) LA111 Noise and Vibration.
- 11.3 The assessment has also considered the noise impact of the proposed development on sensitive receptors with reference to BS4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound* in relation to the operation of fixed plant. The impact of development road traffic has been considered with reference to the DMRB LA111 Noise and Vibration.
- 11.4 Where considered necessary, mitigation measures have been recommended to ensure that identified impacts are kept to a minimum.
- 11.5 Noise effects upon ecological receptors are considered separately within **Chapter 10: Ecology and Ornithology**. Baseline noise conditions at relevant ecological receptors are provided within this Chapter for reference only.

11.2 APPROACH AND METHODOLOGY

- 11.6 The Chapter reports on the likely significance of the following noise and vibration effects:
- the noise and vibration effects during construction at the Main Site, Expansion Land and Combined Heat and Power (CHP) boiler upon existing sensitive receptors, this includes piling for the Paper Machine Building;
 - the noise effects arising from construction road traffic using the local road network upon existing sensitive receptors;
 - the noise effects arising from operation of the Main Site and Expansion Land upon existing sensitive receptors; and
 - the noise effects arising from operational road traffic using the local road network upon existing sensitive receptors. It is noted that the traffic data included within this assessment

includes for cumulative developments (as identified in Chapter 17: Cumulative Effects) and does not assess the Proposed Development in the absence of committed flows.

11.2.1 Data sources and guidance

- 11.7 A summary of the relevant legislation, planning policy and technical guidance utilised within this Chapter is given below.

Planning Policy Wales

- 11.8 Planning Policy Wales (PPW) (February 2021) sets out the Government’s planning policies for Wales and how they are expected to be applied. PPW, Technical Advice Notes (TAN’s), circulars and policy clarification letters comprise national planning policy. Paragraph 6.7.15 of PPW states that, regarding the location of commercial, industrial and other potentially polluting development, *“Such development should be located in areas where there is low potential for public exposure, or where its impact can be minimised.”*
- 11.9 Paragraph 6.7.16 goes on to advise that, *“Relevant considerations in making planning decisions for potentially polluting development are likely to include: ... the risk and impact of potential pollution from the development, insofar as this might lead to the creation of, or worsen the situation in, an air quality management area, a noise action planning priority area or an area where there are sensitive receptors;...”*
- 11.10 With regard to mitigation, PPW advises at Paragraph 6.7.17 that, *“The location of potentially polluting development adjacent to sensitive receptors will be unacceptable where health and amenity impacts cannot be minimised through appropriate design and mitigation measures. It is the overall expectation that levels of pollution should be reduced as far as possible and for this reason the location of potentially polluting development should be taken into account as part of overall strategies in development plans to ensure it can be appropriately located and maximum environmental benefits can be gained through measures such as green infrastructure.”*
- 11.11 With regard to managing potential environmental risks during construction, Paragraph 6.7.26 advises that, *“Planning authorities must consider the potential for temporary environmental risks, including airborne pollution and surface and subsurface risks, arising during the construction phases of development. Where appropriate planning authorities should require a construction management plan, covering pollution prevention, noisy plant, hours of operation, dust mitigation and details for keeping residents informed about temporary risks.”*
- 11.12 In addition to human receptors, paragraph 6.7.18 of PPW requires that, *“Early consideration is required to ascertain whether the location and design of proposed development is acceptable where air pollution or noise generating development is likely to affect a protected species, or is proposed in an area likely to affect a statutorily designated site (such as Natura 2000 sites or SSSIs) or a tranquil urban green space (including but not limited to formally designated ‘quiet areas’) valued for the restorative respite and contact with nature that they offer to residents of busy towns and cities.”*

Technical Advice Note (Wales), Noise

- 11.13 Planning Guidance (Wales), Technical Advice Note (Wales) 11, Noise (TAN 11), “provides advice on how the planning system can be used to minimise the adverse impact of noise without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens of business”. TAN 11 provides general guidance with respect to matters to be taken into account in determining planning applications both for noise-sensitive developments and for those activities that will generate noise. However, the principal purpose of TAN 11 is to determine the suitability of land for residential development where land is affected by noise from transportation or industrial sources.

Flintshire Unitary Development Plan

- 11.14 The Flintshire Unitary Development Plan (FUDP) is the adopted development plan for Flintshire, for the 15-year period 2000 – 2015. Although the adopted FUDP became time expired at the end of 2015 it remains the adopted development plan for the County. The FUDP contains strategic policies and policies relating to general development considerations. The following policies relate to noise in the context of the proposed development:

- *Policy STR1 (New Development): “new development will be:...f. required to minimise or negate pollution to air, water and land; and g. assessed in terms of a precautionary approach whereby development proposals that would have a significant and uncertain environmental, social, economic or cultural impact, will be refused, in the absence of the best available information which proves that the impact can be negated or mitigated through proper risk control measures.”*
- *Policy STR7 (Natural Environment): “The natural environment of Flintshire will be safeguarded by:...g. the protection of the quality of land, soil and air.”*
- *Policy GEN1 (General Requirements for Development): “Development that requires planning permission and is in accordance with the Plan’s other policies, should be located on land, or within suitable buildings, which satisfies the following requirements:...d. the development should not have a significant adverse impact on the safety and amenity of nearby residents, other users of nearby land/property, or the community in general, through increased activity, disturbance, noise, dust, vibration, hazard, or the adverse effects of pollution;...”*

Flintshire Local Development Plan

- 11.15 The Flintshire Local Development Plan (LDP) is in preparation and will replace the FUDP in due course. The following LDP policies relate to noise in the context of the proposed development:

- *Policy STR14 (Climate Change and Environmental Protection): “The Council will seek to mitigate the effects of climate change and ensure appropriate environmental protection in the County through: ... vi. Ensuring that new development has regard to the protection of the environment in terms of air, noise and light pollution, unstable and contaminated land and former landfill sites; ...”*

- *Policy PC2: (General Requirements for Development): “All development should, where appropriate: ... b. not have a significant adverse impact on the safety and living conditions of nearby residents, other users of nearby land/property, or the community in general, through increased activity, disturbance, noise, dust, vibration, hazard, or the adverse effects of pollution; ...”.*

The Guidelines for Environmental Noise Impact Assessment

- 11.16 This assessment has been conducted in accordance with The Guidelines for Environmental Noise Impact Assessment, produced by the Institute of Environmental Management and Assessment, and published in October 2014.
- 11.17 The guidelines address the key principles of noise impact assessment and are applicable to all development proposals where noise effects are likely to occur. The guidelines provide specific support on how noise impact assessments fit within the Environmental Impact Assessment (EIA) process. They cover:
- *how to scope a noise assessment;*
 - *issues to be considered when defining the baseline noise environment;*
 - *prediction of changes in noise levels as a result of implementing development proposals; and*
 - *definition and evaluation of the significance of the effect of changes in noise levels.*
- 11.18 The guidelines offer advice on how to establish the baseline noise level and suggest that, *“it is good practice to measure over shorter time periods even though the required indicator is to be averaged over a longer period”¹.*
- 11.19 The guidelines also state that monitoring should be avoided when the wind speed exceeds 5 ms⁻¹, unusual temperature conditions exist, or when there is significant precipitation, unless these are normal conditions for the area.
- 11.20 In terms of cumulative effects, these are defined as: *“those that result from additive impacts caused by other past, present or reasonably foreseeable actions together with the plan, programme or project itself and synergistic effects (in combination) which arise from the reaction between impacts of a development plan, programme or project on different aspects of the environment.”*

Control of Pollution Act, 1974

- 11.21 Section 60 of the Control of Pollution Act, 1974, Part III - Noise enables a local authority to serve notice on a person (this includes a company) who is carrying out, or who are planning to carry out, works of construction, demolition, roadworks, railway maintenance etc. in order to control the

¹ *IEMA Noise Guidelines Second Edition; Measurement Period paragraph 5.16*

noise from those operations. Section 61 of the Act also enables such a person to apply to the local authority for consent in respect of such works.

- 11.22 The Act introduces the concept of using Best Practicable Means (BPM) to control the impact of noise, where significant impacts are likely to occur. BPM essentially means selection of the quietest techniques and equipment, in addition to considering factors such as timing, duration, location and opportunities for acoustic screening or separation, to ensure that impacts are controlled in so far as is reasonably practicable. The demonstrable use of BPM can also be used as a defence to enforcement action under nuisance legislation.

British Standard 5228-1:2009+A1:2014 Part 1: Noise

- 11.23 BS5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Part 1: Noise*, sets out a methodology for predicting noise levels arising from a wide variety of construction activities and contains tables of sound power levels generated by fixed and mobile plant. Compliance with BS5228-1:2009+A1:2014 is expected as a minimum standard when assessing the impact of construction noise upon the existing noise environment at the closest noise sensitive receptors.

- 11.24 Noise levels generated by construction and demolition activities and experienced at local receptors will depend on a number of variables, the most significant of which are likely to be:

- *the amount of noise generated by plant and equipment being used, generally expressed as a sound power level;*
- *the periods of operation of the plant and equipment, known as the ‘on-time’;*
- *the distance between the noise source(s) and the closest receptor(s);*
- *the attenuation due to ground absorption or barrier screening effects; and*
- *reflection of noise due to the presence of hard vertical surfaces, such as walls.*

- 11.25 There are currently no specific EIA assessment criteria for construction or demolition noise; however, BS5228-1:2009+A1:2014 does provide advice on acceptable noise levels. The ‘ABC’ method (as detailed in Annex E (E.32) of the standard) is used to determine the appropriate threshold value at the closest receptors. The ABC method is described as follows:

- *a threshold value noise level is determined by establishing the existing ambient noise level at each receptor;*
- *the measured ambient noise level is rounded to the nearest 5 dB; and*
- *the threshold noise value for each receptor is then established from Table E.1 of the standard.*

- 11.26 Table E.1 of the standard is reproduced as **Table 11-1**.

Table 11-1
Example Threshold Values for Construction Noise

Assessment Category and Threshold Value Period (L _{Aeq})	Threshold Value, in decibels (dB)		
	Category A ^(A)	Category B ^(B)	Category C ^(C)
Night-time (23:00 – 07:00)	45	50	55
Evenings and weekends ^(D)	55	60	65
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75

NOTE 1: A significant effect has been deemed to occur if the total L_{Aeq} noise level, including construction, exceeds the threshold level for the category appropriate to the ambient noise level.

NOTE 2: If the ambient noise level exceeds the threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a significant effect is deemed to occur if the total L_{Aeq} noise level for the period increases by more than 3 dB due to construction activity.

NOTE 3: Applied to residential receptors only.

^{A)} Category A: Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.

^{B)} Category B: Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as Category A values.

^{C)} Category C: Threshold values to use when the ambient noise levels (when rounded to the nearest 5 dB) are higher than Category A values.

^{D)} 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.

- 11.27 If the threshold value is exceeded, then the effect of construction noise upon the closest receptors may be significant. However, BS5228-1:2009+A1:2014 states that the significance of the effect will depend on, “*other project-specific factors, such as the number of receptors affected and the duration and character of the impact*”.

British Standard 5228-1:2009+A1:2014 Part 2: Vibration

- 11.28 BS5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration* gives recommendations for basic methods of vibration control relating to construction and open sites where work activities/ operations generate significant vibration levels.
- 11.29 High vibration levels generally arise from ‘heavy’ construction works such as piling, deep excavation, dynamic ground compaction or drilling.

- 11.30 The primary cause of community concern in relation to vibration generally relates to building damage from both construction and operational sources of vibration, although, the human body can perceive vibration at levels which are substantially lower than those required to cause building damage.
- 11.31 Damage to buildings associated solely with ground-borne vibration is not common and although vibration may be noticeable, there is little evidence to suggest that they produce cosmetic damage such as a crack in plaster unless the magnitude of the vibration is excessively high. The most likely impact, where elevated levels of vibration do occur during the demolition and construction phases, is associated with perceptibility.
- 11.32 There are currently no British Standards that provide a methodology to predict levels of vibration from construction activities, other than that contained within BS5228: Part 2, which relates to percussive or vibratory piling only. Therefore, it is not possible to accurately predict levels of vibration during site preparation and construction phases of development. As such, to control the impact of vibration during site preparation and construction of a development, limits relating to the perceptibility of vibration are typically set.
- 11.33 BS5228 indicates that the threshold of human perception to vibration is around 0.15 mms^{-1} , although it is generally accepted that for the majority of people vibration levels in excess of between 0.15 and 0.3 mms^{-1} peak particle velocity (PPV) are just perceptible, which forms the basis of the recommend maximum permitted vibration levels of 1 mms^{-1} PPV within occupied residential dwellings.
- 11.34 BS5228 also sets out the distances (based on historical field measurements) at which certain activities could give rise to a just perceptible level of vibration. These distances are presented in **Table 11-2**.

Table 11-2
Distances at which Vibration May Just Be Perceptible

Construction Activities	Distance from activity when vibration may just be perceptible (metres)
Excavation	10 - 15
Heavy Vehicles (e.g. dump trucks)	5 – 10
Hydraulic Breaker	15 – 20
Rotary Bored Piling	20 - 30

- 11.35 In accordance with the guidance given in BS5228, 1 mms^{-1} PPV has been selected as the target criteria to control the impact of demolition and construction vibration, with the criteria for assessing the magnitude of vibration impacts according to the margin by which this target criterion is achieved or exceeded presented in **Table 11-3**. This target criterion is based on the guidance contained within BS5228, experience from previous sites and accepted vibration policy criteria across a range of enforcing authorities elsewhere in the UK. The limits are presented in terms of PPV as it is the simplest indicator for both perceptibility and building damage.

- 11.36 The purpose of the target construction vibration criteria is to control the impact of construction vibration insofar as is reasonably practicable and is entirely based on the likelihood of the vibration being perceptible, rather than causing damage to property. Hence, although vibration levels in excess of 1 mms^{-1} PPV would be considered major adverse in respect of the likelihood of perceptibility, they would not be considered significant in terms of the potential for building damage, which would require levels of at least 15 mms^{-1} PPV to result in minor cosmetic damage in light / unreinforced buildings.

Table 11-3
Construction Vibration Impact Magnitude

Vibration Level, mms^{-1} PPV	Magnitude
> 1.0	Large/Very Large
0.3 – 1.0	Medium
0.15 – 0.3	Small
< 0.15	Negligible

Notes: The above vibration limits relate to maximum PPV ground borne vibration occurring in any one of three mutually perpendicular axes (one of which may be vertical). Vibration is to be measured on the foundation or on an external façade no more than 1m from the ground, or failing this, solid ground as near to the building façade as possible.

BS4142:2014+A1:2019

- 11.37 BS4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound* is used to assess the potential adverse impact of operational sound, of an industrial nature, at the closest receptors within the context of the existing sound environment. The assessment of impacts contained in BS4142:2014 is undertaken by comparing the rating level, i.e. the specific sound level of the source plus any acoustic feature corrections, to the measured representative background sound level outside the receptor(s).
- 11.38 In accordance with BS4142:2014+A1:2019, the significance of an industrial sound source depends on both the margin by which the rating level exceeds the background sound level and the context in which the sound occurs. It is therefore essential to place the sound in context.
- 11.39 BS4142:2014+A1:2019 (Section 3) provides the following definitions:
- **Ambient Sound:** *Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far. Note: The ambient sound comprises the residual sound and the specific sound when present.*
 - **Ambient Sound Level, $L_a = L_{Aeq,T}$:** *Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T.*
 - **Background Sound Level, $L_{A90,T}$:** *A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90 % of a given interval, T, measured using the time weighting F and quoted to the nearest whole number of decibels.*

- **Rating Level, $L_{A,r,T}$:** Specific sound level plus any adjustment for the characteristic features of the sound.
- **Specific Sound Level, $L_s = L_{Aeq,T}$:** Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T.
- **Specific Sound Source:** Sound source being assessed.

11.40 To account for the acoustic character of sound sources, BS4142:2014+A1:2019 provides the following guidance with respect to the application of acoustic feature corrections to account for, “the subjective prominence of the character of the specific sound at the noise-sensitive locations and the extent to which such acoustically distinguishing characteristics will attract attention”.

- **Tonality** – For sound ranging from not tonal to predominantly tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a correction of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible and 6 dB where it is highly perceptible;
- **Impulsivity** – A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in the sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible, and 9 dB where it is highly perceptible;
- **Intermittency** – When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. If the intermittency is readily distinctive against the residual acoustic environment, a correction of 3 dB can be applied; and
- **Other Sound Characteristics** – Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a correction of 3 dB can be applied.

11.41 BS4142:2014+A1:2019 defines the impact of the specific sound by subtracting the measured background sound level from the rating level once an initial estimate of the impact is determined, by subtracting the measured background sound level from the rating sound level, BS4142:2014+A1:2019 states that the following should be considered:

- typically, the greater the difference, the greater the magnitude of the impact;
- a difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- a difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context; and

- *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. It is an indication that the specific sound source has a low impact, depending on the context.*

11.42 In addition, BS4142:2014+A1:2019 states:

- *“The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context”.*

11.43 BS4142:2014+A1:2019 also notes that, *“adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact”.*

11.44 Finally, BS4142:2014+A1:2019 outlines guidance for the consideration of the context of the potential impact including consideration of the existing residual sound levels, location and/or absolute sound levels.

The Calculation of Road Traffic Noise 1988

11.45 To undertake a quantitative analysis of the changes in sound levels at existing sensitive receptors as a result of construction and development-related road traffic, baseline noise levels (BNLs) for ‘do nothing’ and ‘do something’ construction and development scenarios have been calculated, with reference to procedures contained within the *Calculation of Road Traffic Noise (CRTN) 1988*.

11.46 The CRTN describes procedures for measuring and predicting noise levels from road traffic in terms of the $LA_{10,1\text{hour}}$ or $LA_{10,18\text{hour}}$. The $LA_{10,T}$ is the A-weighted sound level exceeded for 10 % of the time, which in this case is the 18-hour period between 06:00 and 24:00 hours. This noise index has been shown to correlate best with resident’s expressed dissatisfaction with traffic noise over a wide range of exposures.

11.47 The calculation method takes into account a number of variables to calculate the BNL at a reference distance of 10 m from the nearside carriageway edge, at 0.5 m above the ground. Factors include 18-hour Annual Average Weekday Traffic flows (AAWT), speed, percentage of heavy vehicles, road surface and gradient. The procedures also allow for the calculation of noise levels at specific receptors up to 300 m from a road.

11.48 However, for construction traffic, the methodology presented in CRTN cannot be used, as the standard states that the calculation algorithms presented in the guidance are not reliable when traffic flows are less than 50 movements per hour.

11.49 Therefore, the haul route methodology presented in BS5228-1:2009+A1:2014 will be used when predicting noise levels from construction traffic associated with the development proposals.

DMRB LA111 Noise and Vibration

11.50 In order to determine whether changes in traffic noise levels are likely to occur as a result of the proposed development, changes in road traffic flows have been assessed in accordance with the principles and guidance presented within the DMRB LA111 *Noise and Vibration*. This guidance presents a significance matrix for assessing the magnitude of changes in sound levels resulting from the proposed development.

11.2.2 Study Area

11.51 The following off-site noise sensitive receptors (NSRs) have been identified as those being in areas closest to the proposed development and therefore at the highest risk of significant effect from construction and operation of the Main Site and Expansion Land. Assessment at these locations is expected to represent the worst-case scenario; NSRs further from the proposed development would be expected to experience a similar or lower level of effect than the following locations, detailed below and which can be seen on **Figure 11.1**.

- NSR1 Burton Marsh Farm (approximately 2,200 m to the north);
- NSR2 Barn Farm (approximately 1,900 m to the north east);
- NSR3 Sealand Avenue (approximately 2,400 m to the south east);
- NSR4 Shotwick (approximately 2,700 m to the east);
- NSR5 Dee View Road (approximately 1,300 m to the south west); and
- NSR6 The residential Airfields development (approximately 2,200 m to the south-east).

11.52 The construction and operational phase road traffic increases for the proposed development in combination with committed developments is assessed at NSRs located along nearby roads which are expected to experience a cumulative change in traffic flows. Road links for inclusion within the assessment have been informed by information provided by the transport consultant for the proposed development (**Chapter 13: Traffic and Transport**) and by the presence of NSRs. Residential properties are present on all of the roads identified and are therefore classed as highly sensitive. The following roads have been included in the assessment of operational cumulative effects:

- B5129 Kelsterton Road (south west of the proposed development), using traffic data for the adjacent A548.

11.53 Road links identified for inclusion within the ecological assessment (addressed in **Chapter 10: Ecology and Ornithology**) are as follows:

- Weighbridge Road (north of the proposed development);
- A458 (south west of the proposed development); and

- Shotwick Road (north east of the proposed development).

11.2.3 Approach and Methods

Assessment Scope

- 11.54 In the context of this study, noise is defined as unwanted or undesirable sound derived from construction and operational sources. Vibration is defined as the transmission of energy through the medium of ground or air resulting in small movements of the transmitting medium, such as a building, which can cause discomfort to people or even damage to structures if the movements are large enough.
- 11.55 The magnitude of noise arising from the proposed development will also be quantified in order to inform **Chapter 10: Ecology and Ornithology**.
- 11.56 SLR submitted a formal scoping request to Flintshire County Council (see **Technical Appendix 5.1**). In addition to the scoping request, SLR also corresponded via email with officers in the Environmental Health departments at Flintshire County Council and Cheshire West and Chester Council. Cheshire West and Chester Council were contacted as three noise sensitive receptors considered within the assessment are within their area.
- 11.57 In this correspondence it was agreed that:
- 11.58 The assessment would be completed in accordance with BS5228:2009+A1:2014, BS4142:2014+A1:2019, DMRB LA111 and the Institute of Environmental Management and Assessment (IEMA) *Guidelines for Environmental Noise Impact Assessment*.
- 11.59 Two separate baseline sound surveys at locations representative of six nearest noise sensitive receptors to the Site. The first survey would be undertaken whilst the existing papermill is operating normally (during September 2021) and the second survey would be undertaken once all operations have ceased at the existing site (post September 2021). At each location measurements would be undertaken continuously, to include weekday and weekend periods. It is noted that since the consultation was undertaken, Planning and Environment Decisions Wales (PEDW) Scoping Direction has been received (see **Technical Appendix 5.2**), which requires that the baseline once activities have ceased should be considered. Therefore, only the baseline post-September (when operations that will cease were ceased) survey data will be utilised within this assessment. The key aspects of the PEDW Scoping Direction as relevant to noise and vibration are included in **Table 11-4**.

Table 11-4
PEDW Scoping Direction

Scoping Direction ID	Reference in Scoping Direction	Scoping Direction Issue	Scoping Direction Comment	Reference within ES
ID.37	9.4.1.1	Ecological Impact Assessment	The assessment should be informed by and prepared along with the Land Quality assessment, the Air quality Assessment, the hydrological assessment, the noise assessment, transport assessment and the LVIA. No information is provided regarding the potential impact of air quality emissions on susceptible habitats, not just from the stacks but as a results of the volume of traffic connected with the operation of the Site. Main transportation routes should also be considered with regards to the effect of air quality pollutants on sensitive habitats. Traffic disturbance on notable and protected species should be considered. The effects of pollution from site construction, remediation and operation (including effluent) should form part of the assessment. Noise and vibration disturbance during construction and operation should be also addressed in the ES.	Chapter 12: Air Quality
ID.41	10.1.1.1	Potential source of impact	Construction operations should also include remediation works.	Section 11.77
ID.42	10.3.1	Baseline	As per ID.3: The SR states that the production of newsprint will cease by the end of 2021. It is understood that the Site will be redeveloped or sold. As such, the ES should consider as baseline the state of the development as close as possible to the time of submission of the application, i.e. where the activities have ceased but demolition has not yet taken place. This approach should be consistent throughout the ES.	Section 11.147
ID.43	10.4.4.2	Construction and operational noise and vibrations	The assessment should include the effects on protected and notable species and other nature conservation sites – see above.	Chapter 10: Ecology and Ornithology
ID.44	10.5	Matter to be scoped out	Not enough information has been provided in the SR to exclude operational vibrations from the assessment. A full justification should be included in the ES to explain why operation vibrations from a paper mill of this scale can be scoped out from the EIA process.	Section 11.70

- 11.60 Construction noise and vibration assessments would be undertaken for both the demolition of the existing Site and the construction of the new buildings. The assessments would be undertaken in conjunction with BS5228:2009+A1:2014, *Code of Practice for Noise and Vibration Control on Construction and Open Sites Part 1 Noise and Part 2 Vibration*.
- 11.61 Sound levels from operational plant associated with the proposed development, including noise breakout from any buildings housing operational plant and on-site vehicle movements would be predicted at the nearest noise-sensitive locations using the proprietary software-based noise model, CadnaA, which implements the full range of calculation methods. The measured background sound levels would then be compared to the fixed plant rating levels and assessed in accordance with BS4142:2014+A1:2019, which would also incorporate observations made by the surveyor regarding the context of each location, to determine whether operations at the Site would be likely to give rise to adverse impacts at the nearest residential properties.
- 11.62 Sound levels generated by the additional off-site vehicle movements associated with the proposed development would be predicted and compared to the ambient sound levels at the nearest noise sensitive receptors.
- 11.63 As there are a number of ecological designated sites in the vicinity of the study area, noise effects upon these receptors will be considered further within **Chapter 10: Ecology and Ornithology**, where required.

Effects Scoped Out

- 11.64 Vibration from operation of the Main Site and Expansion Land is considered to be scoped out of the assessment. The nearest sensitive receptor is NSR5 Dee View Road, which is located at approximately 1,300 m from the nearest site boundary and 1,800 m from the nearest proposed machine building. Due to the distance between potential vibration producing operational sources (for example paper machines) and the receptors it is unlikely that vibration effects will result at receptor locations.

Methodology

Baseline Data Collection

- 11.65 Baseline sound surveys were undertaken at the nearest noise-sensitive receptors to the Site, over representative daytime and night-time periods. Further information on the baseline noise survey is provided in Section 11.3.

Construction Noise and Vibration – Main Site and Expansion Land

- 11.66 Construction noise and vibration assessments have been undertaken for the Main Site and Extension Land. The assessments have been undertaken in conjunction with BS5228:2009+A1:2014, *Code of Practice for Noise and Vibration Control on Construction and Open Sites Part 1 Noise and Part 2 Vibration*.
- 11.67 Construction noise limits have been set at the identified NSRs in conjunction with the measured baseline levels and the ABC Method contained in BS5228:2009+A1:2014. For the purposes of this

assessment, a daytime threshold value of 65 dB L_{Aeq} has been adopted. This is the lowest threshold value for the daytime period and is the L_{Aeq} noise level that should not be exceeded externally at the closest receptors due to construction activities.

- 11.68 Construction noise levels have been predicted at the identified NSRs using the proprietary software based CadnaA noise modelling software and the calculation algorithms contained in BS5228:2009+A1:2014. The model assumes:
- a ground absorption factor of 0.8;
 - a reflection factor of 2; and
 - a receiver height of 1.5 m.
- 11.69 The techniques available to predict the likely noise effects from construction are necessarily based on information on the type and number of plant that will be used, their location within the Site and the length of time they are in operation. At the time of writing, a detailed programme of demolition and construction works, hours and likely plant is not available; therefore, the assessment of construction noise has been based on information and data from experience with similar developments. This includes reference to Annex C of BS5228:2009+A1:2014 where appropriate, in order to present a robust assessment.
- 11.70 Construction is anticipated to be undertaken across a timescale of four 'zones':
1. *piling for the Paper Machine Building;*
 2. *paper machine and CHP, warehouse and dispatch, new OCC, EFT, chemical building, ancillary plant;*
 3. *tissue mills, pulp storage, reel storage, converting building, finished goods (Area 4); and*
 4. *corrugator plant.*
- 11.71 For the purposes of this construction noise assessment, noise levels during four typical construction working phases have been determined. The following tables outline the items of plant which are anticipated to be utilised during each activity, the equipment sound power levels (determined from BS5228:2009+A1:2014), and the expected percentage on-time of each plant item.
- *phase 1: site clearance and enabling works (including demolition)*
 - *phase 2: groundworks*
 - *phase 3: substructure works*
 - *phase 4: superstructure works*
- 11.72 It is accepted that the construction phases/activities may vary from the activities presented, but as it would not be feasible to assess all construction configurations, the assessments undertaken in

this section are considered a robust representation of anticipated construction noise levels. To provide a precautionary approach, the assessment has assumed that the four working phases could occur simultaneously within each zone.

- 11.73 For each construction working phase, the items of plant and equipment which could be utilised have been considered, and with reference to Annex C of BS5228:2009+A1:2014, the corresponding sound power levels (L_{WA}) have been determined for each. This information is detailed in **Tables 11-5 to 11-8**, which also present the assumed percentage (%) on-time for each item of plant and/or equipment per phase.
- 11.74 It is noted that at this stage, rotary bored piling is the likely preferred piling method however, to provide a robust scenario, driven piling has been assumed within the calculations as $L_{Aeq,T}$ levels from driven piling are normally higher than those associated with rotary bored piling. Regarding the noise characteristics of piling, rotary bored piling is less likely to be disturbing as it usually produces a relatively steady and continuous level with intermittent peaks super imposed on it, whereas hammer strikes from driven piling produce many impulsive higher level noise events.
- 11.75 Phase 1 - Site Clearance and enabling works: It is envisaged that this phase would include demolition of structures on the site, the breaking of concrete and levelling of the site. **Table 11-5** details plant that is typically utilised during site clearance and enabling works.

Table 11-5
Site Clearance and Enabling Works – Plant List

Type of Machinery	Quantity on Site	Sound Power Level, dB	Percentage Use, %
Large Excavator Mounted Breaker	2	110	20
Tracked Excavator	2	107	80
Hand Held Circular Saw	2	109	15
Spreading Fill	2	109	25
Vibratory Roller	2	102	30
Lorry (Unloading)	3	108	40
Concrete Truck Mixer	1	103	5
Concrete Crusher	2	110	40
Road Sweeper	1	104	5

- 11.76 Phase 2 – Groundworks: **Table 11-6** details plant that is typically utilised during groundworks.

Table 11-6
Groundworks – Plant List

Type of Machinery	Quantity on Site	Sound Power Level, dB	Percentage Use, %
Concrete Truck Mixer	3	103	25
Piling Rig	1	111	90
Mewp - Cherry Picker Genie	1	95	30
Small Breaker	2	110	20
Compressor	2	106	50
Poker Vibrator	3	97	15
Lorry Mounted Concrete Pump	1	109	80
Concrete Agitator	3	103	80
Lorry (Unloading)	2	108	40
Petrol Saw	3	109	20
Tracked Excavator	2	107	80
Hand Held Circular Saw	2	109	35
Dumper Trucks	2	106	25
Diesel Jet Washer	1	108	25
Mobile Crane	1	103	90
Vibratory Roller	2	102	30

11.77 Phase 3 - Substructure Works: **Table 11-7** details plant that is typically utilised during substructure works.

Table 11-7
Substructure Works – Plant List

Type of Machinery	Quantity on Site	Sound Power Level, dB	Percentage Use, %
Concrete Truck Mixer	2	103	25
Small Breaker	2	110	20
Compressor	2	106	70
Lorry (Unloading)	2	108	40
Petrol Saw	2	109	40
Tracked Excavator (Rubber Tracks)	2	107	80
Dumper Trucks	2	106	25

Type of Machinery	Quantity on Site	Sound Power Level, dB	Percentage Use, %
Vibratory Roller	2	102	30
Poker Vibrator	2	97	40
Mobile Crane	1	103	100
Telescopic Forklift (17m) JCB 540	2	107	80
Hand Tools (Hammers)	8	98	80

11.78 Phase 4 - Superstructure Works: It is envisaged that this phase would include the erection of buildings. **Table 11-8** details the plant that is typically utilised during this phase.

Table 11-8
Superstructure Works – Plant List

Type of Machinery	Quantity on Site	Sound Power Level, dB	Percentage Use, %
Concrete Truck Mixer	2	103	25
Mewp-Cherry Picker Genie	2	95	60
Lorry (unloading)	3	108	20
Petrol Saw	2	109	40
Tracked Excavator (rubber tracks)	2	107	70
Dumper Trucks	2	106	25
Poker Vibrator	2	97	40
Mobile Crane Operation	2	103	90
Telescopic Forklift (17m) JCB 540	1	107	80
Hand Tools (hammers)	8	98	40
Concrete Pump (pumping)	2	112	70

11.79 In order to model barrier attenuation from local topography, topographical data has been incorporated into the CadnaA noise model. Barrier attenuation from existing buildings within the Site has also been considered.

11.80 Using the sound power levels and associated on-times shown in **Tables 11-5 to 11-8**, the noise levels associated with each working phase have been predicted at the identified NSRs. These predictions have been undertaken within the proprietary noise modelling software CadnaA, which incorporates the calculation methodology outlined in BS5228:2009+A1:2014. The model assumes mixed ground ($G = 0.8$) and applies the screening effect of barriers from Figure F.3 (of BS5228-1:2009+A1:2014) at a standard frequency of 500Hz.

- 11.81 For the majority of the phases, it has been assumed that the plant would be operating at ground level. In this respect, a height of 2 m above ground level of each item of plant has been used. However, during the foundations and construction phase, it has been assumed that some plant would be required to operate at increased heights.
- 11.82 The location of each item of plant during each phase of construction has been positioned within and across the Site; however, at times plant would be closer or further away from the closest receptor. For the construction during Zones 3 and 4, two separate scenarios were modelled with plant located either towards the north or the south of the development. The higher resulting scenario is presented.
- 11.83 The predicted construction noise levels have assumed the concurrent use of plant for each phase of working. In all cases, it is likely that plant would operate for shorter periods and not all activities would occur at the same time, resulting in lower noise levels.

Construction Noise and Vibration – Road Traffic

- 11.84 This assessment has been based on a comparison of the following scenarios:
- *without construction (i.e. 2021 Baseline); and*
 - *with construction (i.e. 2021 Baseline + Construction Traffic).*
- 11.85 To determine whether changes in cumulative traffic noise levels are likely to occur as a result of the operation of the proposed development in combination with the other developments, noise levels have been predicted in accordance with the methodology contained within the CRTN.
- 11.86 The calculation method uses a number of input variables to predict the $L_{A10,18\text{hour}}$ noise level for any receptor point at a given distance from the road. In this assessment however, the key factors are changes in traffic flows. Therefore, the likely increase in road traffic noise levels as a direct result of the construction phase has been calculated in accordance with the BNL prediction methodology detailed in CRTN. This methodology considers the relative change in noise level for a notional road-side receptor at a distance of 10 m from the kerb and at a height of 1.5 m (free-field).
- 11.87 The traffic data used in the assessment has been provided by the project’s transport consultant and shown in **Table 11-9**. The data includes details of 18-hour (AAWT) and percentage heavy goods vehicle (HGV) for the assessment scenarios considered.

Table 11-9
Construction: Traffic Data

Link	Without Construction		With Construction		Speed (km/h)
	18 Hour AAWT	% HGV	18 Hour AAWT	% HGV	
A458 West of Flintshire Bridge (Kelsterton Road NSRs)	13599	22	13748	22	99

Operational Noise – Main Site and Expansion Land

- 11.88 Operational noise assessment has been undertaken for Main Site and Extension Land in conjunction with BS4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound*.
- 11.89 Specific sound levels ($L_{Aeq,T}$) have been determined by a combination of measurement and calculation, as per the guidance of BS4142:2014+A1:2019. This method makes use of a site-specific noise model, whereby predictions of the specific (operational) sound levels from the proposed development have been undertaken within the CadnaA noise model using the calculation algorithms set out in ISO 9613-2:1996².
- 11.90 As the Site would operate on a 24/7 basis, both a daytime and night-time noise model has been developed.
- 11.91 The noise model has also incorporated the following assumptions:
- downwind propagation, i.e. a wind direction that assists the propagation of sound from source to receptor;
 - a ground absorption factor of $G=0.8$ for the intervening ground between Site and the NSRs (representing predominantly soft ground);
 - a reflection factor of 2; and
 - a receptor height of 1.5 m for daytime (living room window) and a receptor height of 4 m for night-time (bedroom window).
- 11.92 In addition, the noise model includes topographical data for the study area.
- 11.93 Sound level inputs to the model have been informed by internal measurements taken within the buildings, and from external sources (where these were operational at the time of the noise survey). Where sound sources were not operational or will be new (where noise source data is not available at this stage), SLR library data (utilised within noise assessments for similar papermill developments) has been utilised.
- 11.94 Model inputs include buildings; the sound reduction indices of the façades have been assumed to be R_w 15 dB based upon low performance for the external walls (concrete panels with lightweight cladding) and roof (lightweight cladding), and roller doors being open 100 % of the time, as a robust scenario.
- 11.95 Significant noise sources proposed as part of the development are shown in **Table 11-10**, together with sound level data.

² ISO 9613-2:1996, *Acoustics – Attenuation of Sound during Propagation Outdoors – Part 2: General Method of Calculation*

Table 11-10
Operational Plant Sound Levels

Noise Source	dB										Data Source	% On-time/ No Movements
	L _{Aeq}	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz		
Paper Machine internal (also assumed for Corrugated Machine and Tissue Machine buildings)	97.3	87.8	88.50	86.2	87.1	85.9	87.7	93.9	89.7	82.2	Measured on site by SLR (internal)	100%
Bucket Loader: Hyundai TPH:HL960 (wood processing)	75.4	82.2	82.1	80.4	78	71.1	65.4	68.8	63.8	52.1	Measured on site by SLR	100%
Grabber (raw material area, wood processing)	81.1	80.6	81.1	78.4	79	80.3	75.1	72.9	67.4	60.8	Measured on site by SLR	100%
Wood conveyor	79.8	82.7	85.5	79.5	75.5	74.3	74.1	72.6	69.8	71.9	Measured on site by SLR	100%
Boiler 7	74.5	70	70.4	67.1	69.1	67.6	68.5	68.9	66.1	63.1	Measured on site by SLR (internal)	100%



NOISE AND VIBRATION 11

Noise Source	dB										Data Source	% On-time/ No Movements
	L _{Aeq}	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz		
Wood shredder	86.4	83.7	84.8	82	82.5	86.9	79.5	76.9	71.8	65.1	Measured on site by SLR	100%
Over magnet for wood processing	87.3	83.3	83.2	81.8	81.5	83.2	82	81.2	77.6	71.8	Measured on site by SLR	100%
Wood processing dust extraction filter fan	83.1	86.4	87.6	89.3	85.2	77.1	71	76.9	74.3	60.2	Measured on site by SLR	100%
Vibrating screen and dust extraction	77.4	85.3	83.2	83.7	80.8	72.8	69	69.5	64	56.5	Measured on site by SLR	100%
MRF Building	-	-	-	-	-	102	-	-	-	-	Measured on site by SLR	100%
Film vacuum MRF (x2)	90.2	92	92.9	104.6	90.8	82.1	74.9	74.3	70.4	65.2	Measured on site by SLR	100%
Conveyors (New Old Corrugated Cardboard building – internal)	78.4	79.1	80.2	81.7	77.7	75.8	73.4	70.4	63	53.7	SLR historically measured	100%

Noise Source	dB										Data Source	% On-time/ No Movements
	L _{Aeq}	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz		
Forklift pass by (Warehouse, Recovered Fibre, New Old Corrugated Cardboard & Dispatch buildings-internal)	78.3	83	88.4	81.5	76.3	76.7	71.8	69.9	66.9	59.4	SLR historically measured	100%
Forklift loading/unloading (Dispatch Area, Paper Machine, Corrugated Cardboard, Tissue Machine, Truck Loading)	79.5	84.7	80.6	81.8	77.1	78.5	72.5	71.5	68.1	59	SLR historically measured	100%
CHP building- internal	85										Provided by Applicant	100%
CHP stack	80.8	89.6	91.8	87.1	81.7	78	73.8	72.6	67.1	53.9	SLR historically measured	100%
ETP pump (x4)	90	-	-	-	-	-	-	-	-	-	SLR historically measured	100%



NOISE AND VIBRATION 11

Noise Source	dB										Data Source	% On-time/ No Movements
	L _{Aeq}	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz		
ETP air blower (x2)	84.3	73.4	72.7	73.3	85.5	83.3	73.4	78.3	64.1	53.3	SLR historically measured	100%
Clamp truck (Reel Storage building – internal)	99.2	109.1	103.4	98.1	92.1	97.6	94.2	91.2	87.4	81.7	SLR historically measured	100%
Roof stack/exhausts (CHP, Paper Machine & New Old Corrugated Cardboard buildings)	85	-	-	-	-	-	-	-	-	-	SLR historically measured	100%
106kV substation	60	-	-	-	-	-	-	-	-	-	SLR historically measured	100%
HGV	89.8	89.7	88.4	87.5	81.7	83	85.6	84.4	78.7	70.6	SLR historically measured	See Table 11-9
Reverse alarms (Dispatch Area, Paper Machine, Corrugated Cardboard, Tissue Machine, Truck Loading)	93.0	91.9	95.4	91.8	89.5	88.1	88.4	86.9	81.3	70	SLR historically measured	15 seconds per movement

Noise Source	dB										Data Source	% On-time/ No Movements
	L _{Aeq}	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz		
Vents (CHP x5)	80	-	-	-	-	-	-	-	-	-	SLR historically measured	100%
HGV weighbridge (x3)	73.2	85.9	75.4	76.8	71.1	69.8	68.6	66	57.5	46.4	SLR historically measured	12 per hour

- 11.96 In addition, the movement of HGVs and car movements within the Site boundary have been considered and have been applied to internal roads and weighbridges within the model. Internal HGV and additional car movements have been informed by information provided by the Applicant and transport consultant.
- 11.97 The majority of HGV arrivals and departures to the Site will be between the hours of approximately 06:00 to 18:00 hours. Daily internal HGV movements to and from the Paper Machine building, Corrugated Machine building and Tissue Machine building have been informed by the Applicant. Additional daily HGV movements associated with other aspects of the development, and car movements have been informed by the transport consultant.
- 11.98 As the majority of HGV movements will occur within a 12-hour period, the provided daily flows have been divided by 12 to give the average hourly flow for input to the model. Car arrivals and departures have been assumed to be split across three shifts. Internal HGV and car movements are shown in **Table 11-11**.

Table 11-11
Internal HGV and Car Movements

Area	Incoming Daily	Outgoing Daily	Total Daily Movements	Incoming Hourly	Outgoing Hourly
Paper Machine HGV	152	145	298	13	12
Corrugated Machine HGV	22	94	116	2	8
Tissue Machines HGV	70	125	195	6	10
Other HGV	166	166	332	14	14
Cars (to car parks)	1091		1091	363	

Operation Noise – Road Traffic

- 11.99 This assessment has been based on a comparison of the following scenarios:
- *without development (i.e. 2021 baseline + committed development); and*
 - *with construction (i.e. 2021 baseline + committed development + proposed development).*
- 11.100 It is noted that, although the scenario years are 2021, the committed development flows are based on the opening year timescale of 2025. This is because the Northern Gateway and Logik sites generate the growth in the area for the intervening period and are therefore considered within the assessment (as agreed with the highway authority).
- 11.101 To determine whether changes in cumulative traffic noise levels are likely to occur as a result of the operation of the proposed development in combination with the other developments, noise levels have been predicted in accordance with the methodology contained within the CRTN.

- 11.102 The calculation method uses a number of input variables to predict the $L_{A10,18\text{hour}}$ noise level for any receptor point at a given distance from the road. In this assessment however, the key factors are changes in traffic flows. Therefore, the likely increase in road traffic noise levels as a direct result of the proposed development in combination with the other developments has been calculated in accordance with the BNL prediction methodology detailed in CRTN.
- 11.103 The traffic data used in the assessment has been provided by the project’s transport consultant and shown in **Table 11-12**. The data includes details of 18-hour (AAWT) and percentage HGV for the assessment scenarios considered.

Table 11-12
Operation: Traffic Data

Link	Without Development		With Development		Speed (km/h)
	18 Hour AAWT	% HGV	18 Hour AAWT	% HGV	
A458 West of Flintshire Bridge (Kelsterton Road NSRs)	15242	15	15838	16	99

11.2.4 Assessing Significance

Significance Criteria

Guidelines for Environmental Noise Impact Assessment

- 11.104 The Guidelines for Environmental Noise Impact Assessment, produced by IEMA, address the key principles of noise impact assessment and are applicable to all development proposals where noise effects are likely to occur. The guidelines state that “*noise measurement and quantification is concerned with the effect of noise which varies significantly with time*”. The guidelines go on to state:
- “Measuring in decibels means that a 3dB change is a doubling of the sound energy and a 10dB change is a tenfold increase. For sounds which are very similar in all but magnitude, a change or difference of 1dB is just perceptible under laboratory conditions, 3dB is perceptible under most normal conditions and a 10dB increase appears to be twice as loud”.*
- 11.105 The guidelines provide specific support on how noise impact assessments fit within the EIA process. These are outlined earlier at paragraph 11.17.
- 11.106 The key terms within this assessment, which are relevant to the EIA process, are Sensitivity, Magnitude and Significance. In accordance with the IEMA guidelines, the noise impact, the noise effect and the significance of the effect must be determined.
- 11.107 In accordance with the IEMA guidelines, noise impact may be determined by comparing the predicted noise level with an absolute noise limit and/or by calculating the change in the noise level.

11.108 The impact of construction noise on receptors has been determined with reference to the guidance within BS5228-1:2009+A1:2014, as shown in **Table 11-13**.

Table 11-13
Construction Noise – Impact Magnitude

Magnitude	Definition
Major	Threshold value exceeded by more than 10 dB
Moderate	Threshold value exceeded by a value between 6.0 and 9.9 dB
Minor	Threshold value exceeded by a value between 3.0 and 5.9 dB
Negligible	Threshold value exceeded by a value between 0.1 and 2.9 dB
None	Threshold value not exceeded

11.109 The impact of vibration associated with construction activity on receptors has been determined with reference to the guidance within BS5228-2:2009+A1:2014, as shown in **Table 11-14**.

Table 11-14 Construction Vibration – Impact Magnitude

Magnitude	Definition
Major	Threshold value exceeded by more than 5 mms^{-1}
Moderate	Threshold value exceeded between 0.15 and 1.0 mms^{-1}
Minor	Threshold value exceeded between 0.10 and 0.14 mms^{-1}
Negligible	Threshold value exceeded between 0.05 and 0.09 mms^{-1}
None	Threshold value not exceeded

11.110 The impact of noise associated with construction and operational traffic on receptors has been determined with reference to the guidance of LA111, as shown in **Table 11-15**.

Table 11-15
Traffic Noise – Impact Magnitude

Magnitude	Definition
Major	Change in $L_{A10,18hr}$ noise level of 10 dB or more
Moderate	Change in $L_{A10,18hr}$ noise level between 3.0 and 9.9 dB
Minor	Change in $L_{A10,18hr}$ noise level between 1.0 and 2.9 dB
Negligible	Change in $L_{A10,18hr}$ noise level between 0.1 and 0.9 dB
None	No change in $L_{A10,18hr}$ noise level

11.111 The impact of operational sound on residential receptors has been determined with reference to BS4142:2014, as shown in **Table 11-16**.

Table 11-16
Operational Sound – Impact Magnitude

Magnitude	Definition
Major	Rating level is 10 dB or more above the background sound level, L_{A90}
Moderate	Rating level is between 5.0 and 9.9 dB above the background sound level, L_{A90}
Minor	Rating level is between 0.1 and 4.9 dB above the background sound level, L_{A90}
Negligible	Rating level is between 0 and 9.9 dB below the background sound level, L_{A90}
None	Rating level is 10 dB or more below the background sound level, L_{A90}

11.112 The impact of operational sound on residential receptors has been determined with reference to BS8233:2014, as shown in **Table 11-17**.

Table 11-17
Operational Sound – Impact Magnitude on Commercial Receptors

Magnitude	Definition
Major	Threshold values exceeded by more than 5 dB
Moderate	Threshold values exceeded by a value between 3 and 4.9 dB
Minor	Threshold values exceeded by a value between 1 and 2.9 dB
Negligible	Threshold values exceeded by a value between 0.1 and 0.9 dB
None	Threshold values not exceeded

11.113 The significance of the effect will depend on the receptor type and its sensitivity to the impact. The sensitivity of the receptor is shown in **Table 11-18**.

Table 11-18
Sensitivity Criteria for Receptors

Sensitivity	Definition
Very High	Residential properties (night-time) Schools and healthcare buildings (daytime)
High	Residential properties (daytime) SAC, SPA, SSSI (or similar areas of special interest)
Medium	Offices and other non-noise producing employment areas

Sensitivity	Definition
Low	Industrial areas

11.114 The sensitivity of the receptor, together with the magnitude of the impact, defines the significance of the effects as shown in **Table 11-19**.

Table 11-19
Significance of Noise Effect

Magnitude	Sensitivity Very High	Sensitivity High	Sensitivity Medium	Sensitivity Low
Major	Major	Major	Major	Moderate
Moderate	Moderate	Moderate	Moderate	Minor
Minor	Minor	Minor	Minor	Negligible
Negligible	Negligible	Negligible	Negligible	None
None	None	None	None	None

11.115 The characteristics of the impacts are described in terms of direct / indirect, secondary, cumulative, transboundary, temporary (reversible) / permanent (irreversible), together with duration short, medium, long term).

11.2.5 Residual Effects

11.116 Mitigation is designed reduce the magnitude of the impact either by decreasing the results of the impacts or by reducing the probability of the impact occurring. Residual effects resulting from the proposed development after the effective implementation of the mitigation measures has been assessed.

11.2.6 Cumulative Effects Assessment

11.117 The cumulative noise effects of the proposed development in terms of operational road traffic effects at NSRs have been assessed in combination with Logik and Gateway sites; the traffic data included within this assessment includes for these cumulative developments.

11.118 The cumulative noise effects of the proposed development in terms of construction noise effects at NSRs have also been qualitatively assessed in combination with Logik and Gateway sites.

11.2.7 Statement of Significance

11.119 Where the significance of the noise effect is described as Moderate (with reference to **Table 11-19**), then this would be a “*significant effect*” in the context of the EIA Regulations.

11.3 BASELINE CONDITIONS

11.3.1 Baseline Noise Environment

- 11.120 As agreed during formal scoping, two separate baseline sound surveys have been undertaken, one whilst the existing Main Site is operating normally (during September 2021) and the second survey undertaken once all operations have ceased at the Main Site (post September 2021).
- 11.121 To assist with the assessment within **Chapter 10: Ecology and Ornithology**, a separate baseline sound survey was undertaken when all operations had ceased at the Main Site.
- 11.122 The noise monitoring equipment used during the surveys is detailed in **Technical Appendix 11.1: Noise Survey Equipment**. The sound level meter was calibrated before the measurements using the handheld acoustic calibrator and the calibration was checked upon completion of the survey. No significant drift was observed with calibration offsets of ≤ 0.2 dB. The calibration chain of equipment has been maintained to UKAS requirements, no greater than one year for sound calibrators and two years for sound level meters.
- 11.123 An environmental noise survey during papermill operations was carried out between Thursday 23 September to Tuesday 28 September 2021. The non-operational environmental noise survey was carried out between Thursday 7 October to Monday 11 October 2021. The ecological receptor noise survey was carried out between Thursday 24 February to Tuesday 1 March 2022.
- 11.124 During the September 2021 survey the weather conditions were dry, overcast and temperatures of 18 °C however they were not always conducive to surveying, as windspeeds exceeded 5 ms⁻¹. The high winds mostly affected the monitoring at Location 1, Burton Marsh Farm, given how exposed the area is.
- 11.125 During the October 2021 survey the weather conditions were dry, sunny, temperatures of 21 °C and cloud cover at 50 %. The wind speed was lower than in the September survey being acceptable for noise monitoring as generally it remained below 5 ms⁻¹.
- 11.126 During the February/March 2022 survey the weather conditions were dry, sunny, temperatures of 6 °C and cloud cover at less than 50 %. The wind speeds were below 5 ms⁻¹, acceptable for noise monitoring.
- 11.127 For all surveys, the microphone was placed 1.5 m above the ground in free-field conditions, i.e. at least 3.5 m from the nearest vertical, reflecting surface.
- 11.128 During the September 2021 survey, when the papermill was operational, noise measurements were taken at the following locations representative of the soundscape at the receptor:
- *location 1 – Burton Marsh Farm to the north of the site (considered representative of receptor R1);*
 - *location 2 – At Barn Farm to the north of the site (considered representative of Receptor R2);*

- location 3 – Opposite 21 Kenneth Cross Way to the south east of the site (considered representative of receptors R3 and R6);
- location 4 – Shotwick to the east of the site (considered representative of receptor R4); and
- location 5 – Rock Cottages to the south west of the site (considered representative of receptor R5).

11.129 For the October 2021 survey, when the papermill had ceased operations, it was not possible to monitor at all five locations due to access restrictions. Instead, the survey was carried out at Locations 1, 3 and 5 which provided representative data for all six receptors.

11.130 For the February/March 2022 survey, for use in **Chapter 10: Ecology and Ornithology**, the noise measurements were taken at the following locations:

- ML1 – to the north of the Main Site within the Expansion Land and;
- ML2 – to the south west of the Main Site.

11.131 The noise survey locations are shown on **Figure 11.2**.

11.3.2 Protocol

11.132 The measurement protocol at each location consisted of continuous monitoring with sound levels logged every 15 minutes.

11.133 At all measurement locations the following noise level indices were recorded:

- $L_{Aeq,T}$ – The A-weighted equivalent continuous noise level over the measurement period.
- L_{A90} – The A-weighted noise level exceeded for 90 % of the measurement period.
- L_{A10} – The A-weighted noise level exceeded for 10 % of the measurement period.
- L_{Amax} – The maximum A-weighted noise level during the measurement period.

11.3.3 Environmental Noise Survey Results

11.134 The results of the noise surveys are presented in full in **Technical Appendix 11.2: Noise Survey Results** are summarised in **Table 11-20**, **Table 11-21** and **Table 11-22**.

11.135 The 'typical' background sound levels are shown in **Tables 11-20** and **Table 11-21**, in accordance with BS 4142 as established from histograms of the recorded dB $L_{A90,15min}$ data at each measurement Location, shown in **Technical Appendix 11.3: Noise Survey Histograms**.

11.136 In line with Section 8.1.4 of BS 4142, the monitoring duration should reflect the range of background noise levels for the period assessed. In practice, there is no single level for background

sound as this is a fluctuating parameter, although a representative value of the period should be used. Note this is not either the lowest or mean average value of dB $L_{A90, T}$.

- 11.137 A meter failure occurred at Location 5, Rock Cottages, the data is presented but with a strikethrough as it is not considered to provide reliable data.

Table 11-20
Summary of Measured Noise Levels in September 2021, free-field, dB

Measurement Details			Background sound level dB $L_{Aeq, 15 \text{ min}}$		Residual sound level dB $L_{Aeq, T}$	
Location	Time & Date Range	Period	Range	Typical*	Range	Typical*
1 – Burton Marsh Farm	14:00 23/09/2021 – 15:30 28/09/2021	Daytime (07:00 – 23:00 hours)	26 - 44	35	29 - 60	43
		Night-time (23:00 – 07:00 hours)	21 - 48	33	22 - 54	41
2 – Barn Farm	14:45 23/09/2021 – 15:15 28/09/2021	Daytime (07:00 – 23:00 hours)	31 - 52	39	34 - 57	47
		Night-time (23:00 – 07:00 hours)	27 - 54	35	29 - 58	45
3 – Kenneth Cross Way	13:00 23/09/2021 – 14:45 28/09/2021	Daytime (07:00 – 23:00 hours)	35 - 59	43	36 - 65	51
		Night-time (23:00 – 07:00 hours)	33 - 49	39	35 - 52	42
4 - Shotwick	15:45 23/09/2021 – 14:00 28/09/2021	Daytime (07:00 – 23:00 hours)	39 - 55	47	41 - 70	48
		Night-time (23:00 – 07:00 hours)	35 - 56	44	38 - 57	54
5 – Rock Cottages	11:45 23/09/2021 – 17:00 26/09/2021	Daytime (07:00 – 23:00 hours)	32 - 51	40	41 - 73	62
		Night-time (23:00 – 07:00 hours)	28 - 48	33	33 - 66	55

* Typical values of background sound level have been established from histogram counts of data. Typical residual sound levels have been equated at times of typical background sound as 1-hour daytime.

Table 11-21
Summary of Measured Noise Levels in October 2021, free-field, dB

Measurement Details			Background sound level dB L _{Aeq, 15 min}		Residual sound level dB L _{Aeq, T}	
Location	Time & Date Range	Period	Range	Typical*	Range	Typical*
1 – Burton Marsh Farm	14:00 23/09/2021 – 15:30 28/09/2021	Daytime (07:00 – 23:00 hours)	21 - 42	33	23 - 62	46
		Night-time (23:00 – 07:00 hours)	19 - 39	29	21 - 47	36
3 – Kenneth Cross Way	13:00 23/09/2021 – 14:45 28/09/2021	Daytime (07:00 – 23:00 hours)	32 - 50	41	34 - 61	48
		Night-time (23:00 – 07:00 hours)	31 - 45	34	33 - 46	40
5 – Rock Cottages	11:45 23/09/2021 – 17:00 26/09/2021	Daytime (07:00 – 23:00 hours)	31 - 52	42	44 - 62	52
		Night-time (23:00 – 07:00 hours)	28 - 49	32	33 - 54	45

* Typical values of background sound level have been established from histogram counts. Typical residual sound levels have been equated at times of typical background sound as 1-hour daytime.

Table 11-22
Summary of Measured Noise Levels in February/March 2022, free-field, dB

Measurement Details			Residual sound level dB L _{Aeq, T}	
Location	Time & Date Range	Period	Range	Typical
ML1	12.30 24/02/2022 – 12.15 01/03/2022	Daytime (07:00 – 23:00 hours)	49 - 66	58
		Night-time (23:00 – 07:00 hours)	44 - 64	54
ML2	13.30 24/02/2022 – 12.45 01/03/2022	Daytime (07:00 – 23:00 hours)	43 - 61	53
		Night-time (23:00 – 07:00 hours)	40 - 60	49

11.3.4 Noise Climate Descriptions

11.138 The noise climate at each location may be described as follows:

- location 1: The soundscape consisted of local road traffic, bird song and sheep. Sound from the papermill was not perceptible during operation;

- location 2: The soundscape consisted of bird song, distant road traffic and wind from the trees. Sound from the papermill was not perceptible during operation;
- location 3: The soundscape consisted of occasional noise from the nearby construction site, activities included drilling and reverse beepers were audible. Sound from the papermill was not perceptible during operation;
- location 4: Road traffic noise dominated with wind from the trees audible during the September survey. Sound from the papermill was not perceptible during operation;
- location 5: Bird song along with distant road traffic noise dominated the soundscape. There were occasional passing trains which elevated the background sound level. Sound from the papermill was not perceptible during operation;
- ML1: Road traffic from the A548 dominated. Occasionally sound from the direction of the papermill was perceived however specific operations could not be discerned; and
- ML2: Distant road traffic dominated with bird song audible when road noise reduced.

11.3.5 Environmental Noise Discussion

11.139 A comparison of the measured levels during the September 2021 survey when the papermill was operational and when it was not operational in October 2021 have been made in **Table 11-23**. The comparison has been made for Locations 1, 3 and 5 as these were the three locations monitored at for both surveys.

Table 11-23
Comparison of Measured Noise Levels, free-field, dB

Measurement Details		Background sound level dB $L_{Aeq, 15 \text{ min}}$			Residual sound level dB $L_{Aeq, T}$		
Location	Period	September 2021	October 2021	Difference	September 2021	October 2021	Difference
1 – Burton Marsh Farm	Daytime	35	33	-2	43	46	+3
	Night-time	33	29	-4	41	36	-5
3 – Kenneth Cross Way	Daytime	43	41	-2	51	48	-3
	Night-time	39	34	-5	42	40	-2
5 – Rock Cottages	Daytime	40	42	+2	62	52	-10
	Night-time	33	32	-1	55	45	-10

11.140 From reviewing **Table 11-23** it would appear that almost consistently the measured levels in October 2021 when the papermill was not operational are lower than the September 2021 survey when the papermill was operational. The margin of difference is as high 5 dB but it is difficult to conclude whether this is solely as a result of the papermill operations.

11.3.6 Environmental Noise Summary

11.141 **Table 11-24** contains the baseline noise survey results for the six receptors being assessed. The data presented uses the October 2021 survey when the papermill was not operational. For receptor locations where it was not possible to monitor, an appropriate proxy location has been selected.

Table 11-24
Summary of Baseline Survey Results, free-field, dB

Location	Period	Representative L _{A90} dB	L _{Aeq,1hour} dB(A)
Receptor R1 – Burton Marsh Farm	Daytime (07.00 – 23.00 hours)	33	46
	Night-time (23.00 – 07.00 hours)	29	36
Receptor R2 – Barn Farm <i>* Location 1 used as proxy</i>	Daytime (07.00 – 23.00 hours)	33	46
	Night-time (23.00 – 07.00 hours)	29	36
Receptor R3 – Sealand Avenue	Daytime (07.00 – 23.00 hours)	41	48
	Night-time (23.00 – 07.00 hours)	34	40
Receptor R4 – Shotwick <i>* Location 3 used as proxy</i>	Daytime (07.00 – 23.00 hours)	41	48
	Night-time (23.00 – 07.00 hours)	34	40
Receptor R5 – Dee View Road	Daytime (07.00 – 23.00 hours)	42	52
	Night-time (23.00 – 07.00 hours)	32	45
Receptor R6 – The Proposed Airfields Development <i>* Location 3 used as proxy</i>	Daytime (07.00 – 23.00 hours)	41	40
	Night-time (23.00 – 07.00 hours)	34	48

11.4 ASSESSMENT OF EFFECTS

- 11.142 The potential impacts and significance of the effects of noise and vibration are characterised in the absence of mitigation measures, for the construction and operational phases of the proposed development.
- 11.143 Impacts may be direct or indirect. The effects during construction are anticipated to be short to medium term duration (temporary) while effects during operation are anticipated to be of long-term duration (permanent) unless otherwise stated.
- 11.144 Impacts are only considered in detail where there is a reasonable likelihood of a significant effect upon a receptor.

11.4.1 Potential Construction Phase Effects

Noise - Main Site and Expansion Land

- 11.145 With reference to the methodology described, the predicted noise levels for each phase of the demolition and construction works at each of the closest noise-sensitive receptors are shown in **Tables 11-25 to Table 11-27**. These values represent the maximum ambient daytime noise levels expected from the simultaneous operation of the expected plant during each working phase and have been rounded to the nearest decibel (dB).
- 11.146 **Table 11-25** presents predicted sound levels from Zone 1 piling for the Paper Machine Building. **Table 11-26** presents predicted sound levels from Zones 2 and 3 during Phases 1 to 4. **Table 11-27** presents predicted sound levels from Zone 4 Corrugator Plant Building during Phases 2 to (due to the location of the Corrugator Plant within the Site it is assumed that Phase 1 will take place during construction Zones 2 and 3). In addition to the consideration of each phase in isolation, the combined sound level assuming all phases take place concurrently is also presented within **Tables 11-26 and 11-27**.

Table 11-25
Predicted Construction Noise Levels from Zone 1 Piling for Paper Machine Building, L_{Aeq} dB

Receptor	Construction Activity	Baseline Noise Level	Threshold Value	Predicted Noise Level	Difference	Impact	Effect
NSR1 – Burton Marsh Farm	Piling	46	65	23	-42	No Change	None
NSR2 – Barn Farm		46	65	15	-50	No Change	None
NSR3 – Sealand Avenue		48	65	5	-60	No Change	None
NSR4 - Shotwick		48	65	9	-56	No Change	None
NSR5 – Dee View Road		52	65	13	-52	No Change	None
NSR6 – The Proposed Airfields Development		40	65	16	-49	No Change	None

Table 11-26
Predicted Construction Noise Levels from Zones 2 & 3, L_{Aeq} dB

Receptor	Construction Activity	Baseline Noise Level	Threshold Value	Predicted Noise Level	Difference	Impact	Effect
NSR1 – Burton Marsh Farm	Phase 1: Site Clearance and Enabling Works	46	65	33	-32	No Change	None
	Phase 2: Groundworks			35	-30	No Change	None

Receptor	Construction Activity	Baseline Noise Level	Threshold Value	Predicted Noise Level	Difference	Impact	Effect
	Phase 3: Substructure Works			33	-32	No Change	None
	Phase 4: Superstructure Works			38	-27	No Change	None
	Combined Phases			41	-24	No Change	None
NSR2 – Barn Farm	Phase 1: Site Clearance and Enabling Works	46	65	33	-32	No Change	None
	Phase 2: Groundworks			35	-30	No Change	None
	Phase 3: Substructure Works			34	-31	No Change	None
	Phase 4: Superstructure Works			38	-27	No Change	None
	Combined Phases			42	-23	No Change	None
NSR3 – Sealand Avenue	Phase 1: Site Clearance and Enabling Works	48	65	28	-37	No Change	None
	Phase 2: Groundworks			28	-37	No Change	None
	Phase 3: Substructure Works			30	-35	No Change	None
	Phase 4: Superstructure Works			32	-33	No Change	None

Receptor	Construction Activity	Baseline Noise Level	Threshold Value	Predicted Noise Level	Difference	Impact	Effect
	Combined Phases			36	-29	No Change	None
NSR4 - Shotwick	Phase 1: Site Clearance and Enabling Works	48	65	29	-36	No Change	None
	Phase 2: Groundworks			31	-34	No Change	None
	Phase 3: Substructure Works			30	-35	No Change	None
	Phase 4: Superstructure Works			35	-30	No Change	None
	Combined Phases			38	-27	No Change	None
NSR5 – Dee View Road	Phase 1: Site Clearance and Enabling Works	52	65	34	-31	No Change	None
	Phase 2: Groundworks			35	-31	No Change	None
	Phase 3: Substructure Works			34	-31	No Change	None
	Phase 4: Superstructure Works			38	-27	No Change	None
	Combined Phases			42	-23	No Change	None
NSR6 – The Proposed Airfields Development	Phase 1: Site Clearance and Enabling Works	40	65	28	-37	No Change	None
	Phase 2: Groundworks			27	-38	No Change	None

Receptor	Construction Activity	Baseline Noise Level	Threshold Value	Predicted Noise Level	Difference	Impact	Effect
	Phase 3: Substructure Works			30	-35	No Change	None
	Phase 4: Superstructure Works			26	-40	No Change	None
	Combined Phases			34	-31	No Change	None

Table 11-27
Predicted Construction Noise Levels from Zone 4 Corrugator Building, L_{Aeq} dB

Receptor	Construction Activity	Baseline Noise Level	Threshold Value	Predicted Noise Level	Difference	Impact	Effect
NSR1 – Burton Marsh Farm	Phase 2: Groundworks	46	65	34	-31	No Change	None
	Phase 3: Substructure Works			33	-32	No Change	None
	Phase 4: Superstructure Works			37	-28	No Change	None
	Combined Phases			40	-25	No Change	None
NSR2 – Barn Farm	Phase 2: Groundworks	46	65	34	-31	No Change	None
	Phase 3: Substructure Works			33	-32	No Change	None
	Phase 4: Superstructure Works			37	-28	No Change	None

Receptor	Construction Activity	Baseline Noise Level	Threshold Value	Predicted Noise Level	Difference	Impact	Effect
	Combined Phases			40	-25	No Change	None
NSR3 – Sealand Avenue	Phase 2: Groundworks	48	65	27	-38	No Change	None
	Phase 3: Substructure Works			23	-42	No Change	None
	Phase 4: Superstructure Works			21	-44	No Change	None
	Combined Phases			30	-35	No Change	None
NSR4 - Shotwick	Phase 2: Groundworks	48	65	22	-43	No Change	None
	Phase 3: Substructure Works			21	-44	No Change	None
	Phase 4: Superstructure Works			24	-41	No Change	None
	Combined Phases			27	-38	No Change	None
NSR5 – Dee View Road	Phase 2: Groundworks	52	65	35	-30	No Change	None
	Phase 3: Substructure Works			34	-31	No Change	None
	Phase 4: Superstructure Works			39	-27	No Change	None
	Combined Phases			41	-24	No Change	None

Receptor	Construction Activity	Baseline Noise Level	Threshold Value	Predicted Noise Level	Difference	Impact	Effect
NSR6 – The Proposed Airfields Development	Phase 2: Groundworks	40	65	25	-40	No Change	None
	Phase 3: Substructure Works			24	-41	No Change	None
	Phase 4: Superstructure Works			23	-42	No Change	None
	Combined Phases			29	-36	No Change	None

- 11.147 The predicted construction noise levels in **Tables 11-25 to 11-27** are shown to be below the adopted daytime threshold value of $L_{Aeq,T} 65$ dB (see paragraph 11.72 above) at all NSRs. With reference to **Table 11-13**, this results in an impact magnitude of None since the adopted threshold value is not predicted to be exceeded.
- 11.148 With reference to **Table 11-19**, associated effects are None, which is not significant.
- 11.149 Specific mitigation measures to reduce noise from construction activities are therefore not required in the context of this Chapter.

Vibration - Main Site and Expansion Land

- 11.150 It is anticipated that vibration from piling, excavation works, breakers and dump trucks require consideration during construction
- 11.151 The nearest NSR is located approximately 1350 m from the proposed development. With reference to **Table 11-2**, vibration produced by the construction activities is not expected to be perceptible within existing receptors and as such the threshold value is not expected to be exceeded.
- 11.152 With reference to **Table 11-14**, vibration from construction works is therefore expected to result in an impact magnitude of None, with associated effects of None, which is not significant.

Noise - Road Traffic

- 11.153 The likely change in road traffic noise levels as a direct result of the construction traffic has been determined by comparing the predicted noise levels for the “Without Construction” and “With Construction” scenarios.
- 11.154 The predicted sound levels and changes in sound levels are presented in **Table 11-28** below.

Table 11-28
Predicted Changes in Construction Road Traffic Sound Levels

Link	Without Construction Predicted Change $L_{A10,18\text{-hour}}$ dB	With Construction Predicted Change $L_{A10,18\text{-hour}}$ dB	Predicted Change in Road Traffic Noise – $L_{A10,18\text{-hour}}$ dB	Impact Magnitude
A458 West of Flintshire Bridge (Kelsterton Road NSRs)	76.1	76.1	0.0	None

- 11.155 With regard to the comparison exercise set out in **Table 11-28**, the impact magnitude is predicted to be None, with associated effects of None, which would not be significant.

11.4.2 Potential Operational Phase Effects

Noise - Main Site and Expansion Land

11.156 Predicted operational sound levels from the Main Site and Expansion Land are shown in **Table 11-29**. Daytime sound levels have been predicted to 1.5 m above ground level, the approximate height of a ground floor window. Night-time sound levels have been predicted to 4.0 m above ground level, the approximate height of a first-floor window.

Table 11-29
Predicted Operational Specific Sound Levels, Free-Field dB

Location	Period	Predicted Sound Level, $L_{Aeq,T}$
Receptor R1 – Burton Marsh Farm	Daytime (07.00 – 23.00 hours)	23.7
	Night-time (23.00 – 07.00 hours)	24.4
Receptor R2 – Barn Farm	Daytime (07.00 – 23.00 hours)	24.1
	Night-time (23.00 – 07.00 hours)	24.8
Receptor R3 – Sealand Avenue	Daytime (07.00 – 23.00 hours)	24.3
	Night-time (23.00 – 07.00 hours)	25.4
Receptor R4 – Shotwick	Daytime (07.00 – 23.00 hours)	22.6
	Night-time (23.00 – 07.00 hours)	23.1
Receptor R5 – Dee View Road	Daytime (07.00 – 23.00 hours)	29.3
	Night-time (23.00 – 07.00 hours)	30.9
Receptor R6 – The Proposed Airfields Development	Daytime (07.00 – 23.00 hours)	24.3
	Night-time (23.00 – 07.00 hours)	25.5

- 11.157 In accordance with BS4142:2014+A1:2019 the noise levels have been rounded to the nearest whole number.
- *Tonal Penalty: 0 dB; It is anticipated that none of the proposed sound sources would be tonal at the receptors. No tonal feature correction is required.*
 - *Impulsive Penalty: 0 dB. It is anticipated that none of the proposed sound sources would be impulsive. No impulsivity feature correction is required.*
 - *Intermittency: 0 dB. No adjustment has been made for intermittency due to distance and screening by the intervening buildings.*
 - *Other sound characteristics: 3 dB. It is anticipated that some of the noise sources could have a sound characteristic that differs to those already existing at the site. A 3 dB correction has been applied as a precautionary measure.*
 - *Total penalty: 3 dB at all NSRs.*
- 11.158 The acoustic feature corrections described above have been added to the predicted sound levels shown in **Table 11-29** to derive the rating levels at each of the nearest noise-sensitive receptors.
- 11.159 The rating levels have then been compared to the derived background sound levels to calculate the assessment levels, and then assessed accordingly.
- 11.160 The results of the BS4142:2014+A1:2019 assessment is shown in **Table 11-30**. It is noted that rating levels and the background sound levels have been rounded to the nearest decibel.

Table 11-30
BS4142 Assessment without Mitigation, dB

Receptor	Period	Predicted Specific Sound Level, $L_{Aeq,T}$	Predicted Rating Level, $L_{Ar,T}$	Derived Background Sound Level L_{A90}	Predicted Rating Level, $L_{Ar,T}$ - Background Sound Level L_{A90} Difference (Assessment Level)
Receptor R1 – Burton Marsh Farm	Daytime	24	27	33	-6
	Night-Time	24	27	29	-2
Receptor R2 – Barn Farm	Daytime	24	27	33	-6
	Night-Time	25	28	29	-2
Receptor R3 – Sealand Avenue	Daytime	24	27	41	-14
	Night-Time	25	28	34	-6
Receptor R4 – Shotwick	Daytime	23	26	41	-15
	Night-Time	23	26	34	-8

Receptor	Period	Predicted Specific Sound Level, $L_{Aeq,T}$	Predicted Rating Level, $L_{Ar,T}$	Derived Background Sound Level L_{A90}	Predicted Rating Level, $L_{Ar,T}$ - Background Sound Level L_{A90} Difference (Assessment Level)
Receptor R5 – Dee View Road	Daytime	29	32	42	-10
	Night-Time	31	34	32	+2
Receptor R6 – The Proposed Airfields Development	Daytime	24	27	41	-14
	Night-Time	26	29	34	-5

11.161 The results in **Table 11-30** show that the magnitude of noise impacts associated with the operation of the proposed development is predicted to be None at NSRs R3, R4, R5 and R6, and Negligible at NSRs R1 and R2 during the daytime. During the night-time, impact magnitude would be Negligible at NSRs, R1, R2, R3, R4 and R6.

11.162 At NSR R5, the predicted rating level is shown to be +2 dB above the background level. Therefore, with reference to **Tables 11-16** and **11-19**, the greatest impact would result at NSR R5, with an impact magnitude of Minor and a permanent associated effect of Minor, which is not significant.

Noise - Road Traffic

11.163 The likely change in road traffic noise levels as a direct result of the operational road traffic has been determined by comparing the predicted noise levels for the “Without Construction” and “With Construction” scenarios.

11.164 The predicted sound levels and changes in sound levels are presented in **Table 11-31**.

Table 11-31
Predicted Changes in Operational Road Traffic Sound Levels

Link	Without Development Predicted Change $L_{A10,18-hour}$ dB	With Development Predicted Change $L_{A10,18-hour}$ dB	Predicted Change in Road Traffic Noise – $L_{A10,18-hour}$ dB	Impact Magnitude
A458 West of Flintshire Bridge (Kelsterton Road NSRs)	75.8	76.1	0.3	Negligible

11.165 With regard to the comparison exercise set out in **Table 11-31**, the impact magnitude is predicted to be Negligible. The sensitivity of each NSR is considered to be high to very high; this will result in a temporary Negligible effect, which is not significant.

11.4.3 Cumulative Effects Assessment

- 11.166 This section summarises the residual cumulative construction effects of the proposed development in combination with:
- *Logik; and*
 - *Northern Gateway.*
- 11.167 The developments are anticipated to have overlapping construction programmes and will be operational concurrently with the proposed development. To this end, this section summarises the residual cumulative effects during construction followed by operation of all the developments.
- 11.168 Due to the close proximity both geographically and temporarily of the developments', impacts and effects will be similar and in some cases identical between the developments.
- 11.169 If there is any requirement for additional mitigation measures to be implemented to minimise any potentially significant adverse cumulative effects, these will be highlighted and taken into account in the assessment.

Construction

Noise - Main Site and Expansion Land

- 11.170 Cumulative noise effects could be experienced where construction activities of the nearby cumulative developments overlap, potentially increasing construction sound levels at nearby NSRs
- 11.171 The assessment of any such effects is not possible without detailed information relating to the proposals. However, all schemes which are considered to pose a risk of cumulative effects will have been required to undertake a construction noise assessment relating to their own site activities, with the recommendation of best practice mitigation to remedy residual effects not significant. These measures will be integrated into a Construction Environment Management Plan (CEMP) or similar, to be adhered to during construction, as part of their own environmental responsibilities and commitment.
- 11.172 As such, it is not anticipated that there would be significant cumulative effects associated with construction noise. Therefore, it is concluded that construction activities of adjacent cumulative developments will result in a temporary cumulative effect of slight adverse significance at most.

Vibration - Main Site and Expansion Land

- 11.173 Vibration produced by construction activities at the proposed development is not expected to be perceptible within existing receptors and as such the threshold value is not expected to be exceeded. Vibration from cumulative construction works is therefore expected to be None with resulting effects rendered not significant.

Noise - Road Traffic

- 11.174 With regard to the comparison exercise set out in **Table 11-31**, there is not any predicted impact or effects relating to changes in road traffic sound levels resulting from construction of the proposed development. Noise from cumulative construction works is therefore expected to result in no impact with no associated effects, which is therefore not significant.
- 11.175 With reference to **Tables 11-15** and **11-19**, an increase in sound levels of 3 dB would be required to result in a Moderate (significant) effect at NSRs. Therefore construction-related road traffic flows from committed developments would need to be a significantly higher to lead to any increase in sound levels.
- 11.176 Calculation of BNLs with reference to CRTN shows that an increase in construction HGV traffic flows of approximately 5,400 vehicles would be required to result in Moderate impact and Moderate effects. As it is very unlikely that the committed developments will produce this level of construction traffic, it is considered that cumulative construction traffic flows will not lead to significant effects.

Operation

Noise - Main Site and Expansion Land

- 11.177 Predicted operational noise levels from the proposed development have been shown to be not significant. A noise assessment was undertaken for the Logik planning application (planning reference 063104), which included the prediction of operational sound levels at NSRs R1, R2, R6 and R5. Operational sound levels from Logik at these NSRs were all 0 dB. Therefore, there would be no contribution from the operation of the Logik development to sound levels at any assessed NSRs, and it is concluded that the cumulative impact magnitude will therefore be Minor with a permanent associated effect of Minor, which is not significant.

Noise - Road Traffic

- 11.178 The traffic data used for the noise assessment includes vehicle movements associated with identified committed developments in the assessment area – as documented in **Chapter 13: Traffic and Transport**. As such, the noise assessment, and the results presented are cumulative in nature.

11.4.4 Mitigation

Construction Noise and Vibration Mitigation

- 11.179 The assessment has shown that specific mitigation measures to reduce noise and vibration levels during demolition and construction are not required.
- 11.180 Notwithstanding the above, several safeguards exist in order to control and minimise the effects of construction noise, and these would apply during the construction phase. These include:
- European Commission (EC) Directives and United Kingdom (UK) Statutory Instruments to control noise emissions from construction plant;

- The guidance within BS5228-1:2009+A1:2014 on the control of noise from construction sites; and
- Section 60 of the Control of Pollution Act 1974, which gives local authorities the power to control noise from construction sites.

11.181 The adoption of Best Practicable Means is usually the most effective means of controlling noise from construction sites. Experience has shown that by implementing these measures, typical noise levels from construction activities could be reduced by 5 dB or more. Furthermore, problems concerning noise from construction works can sometimes be avoided by taking a considerate and neighbourly approach with local residents.

11.182 Best Practicable Means measures to minimise noise and vibration during construction are included within the Outline CEMP (**Technical Appendix 5.3 Outline CEMP**).

11.4.5 Operational Noise Mitigation

11.183 The assessment has shown that specific mitigation measures will not be required to achieve acceptable sound levels at NSR locations.

11.4.6 Residual Effects

11.184 As the assessment has shown that specific mitigation measures will not be required, residual effects remain as anticipated during construction and operation, above.

11.4.7 Further Survey Requirements and Monitoring

11.185 None identified.

11.5 SUMMARY AND STATEMENT OF SIGNIFICANCE

11.186 This Chapter has considered the potential noise and vibration effects arising from construction and operational activities associated with the proposed development, based upon available information.

11.187 This Chapter has reported on the likely significance of the following noise and vibration effects:

- the noise and vibration effects during construction at the Main Site and Expansion Land upon existing sensitive receptors;
- the noise effects arising from construction road traffic using the local road network upon existing sensitive receptors;
- the noise effects arising from operation of the Main Site and Expansion Land upon existing sensitive receptors; and
- the noise effects arising from operational road traffic using the local road network upon existing sensitive receptors.

11.188 During construction of the Main Site and Expansion Land, the magnitude of impact arising from construction noise and vibration would be None, with an associated effect of None, which is not significant.

11.189 During construction the magnitude of impact arising from construction road traffic using the local road network would be None, with an associated effect of None, which is not significant.

11.190 Specific mitigation measures to reduce construction noise and vibration are therefore not required, however Best Practicable Means measures to minimise noise and vibration during construction are recommended and are included within the Outline CEMP (**Technical Appendix 5.3**)

11.191 During operation of the Main Site and Expansion Land, the magnitude of impact arising from operational noise would be None or Negligible at the majority of sensitive receptors assessed. The greatest impact is expected to result at NSR R5, with an impact magnitude of Minor and a permanent associated effect of Minor, which is not significant.

11.192 During operation the magnitude of impact arising from operational road traffic using the local road network would be Negligible, with an associated permanent effect of Negligible, which is not significant.

11.193 In combination with construction activities at nearby cumulative developments, noise and vibration from construction activities and road traffic would result in a magnitude of impact of None, with an associated effect of None, which is not significant.

- 11.194 In combination with operational activities at nearby cumulative developments, noise from operation of the Main Site and Expansion Land would result in a magnitude of impact of Minor, with an associated effect of None, which is not significant.
- 11.195 During operation the magnitude of impact arising from operational road traffic using the local road network would be Negligible, with an associated effect of Negligible, which is not significant.
- 11.196 The assessment has shown that specific mitigation measures will not be required, therefore residual effects remain as anticipated during construction and operation, above.

11.6 REFERENCES

The Guidelines for Environmental Noise Impact Assessment, produced by Institute of Environmental Management and Assessment (IEMA), 2014

BS5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Part 1: Noise*, produced by the British Standards Institution (BSI) in 2014.

BS5228-2:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration*, produced by the British Standards Institution (BSI) in 2014.

Guidance in the Design Manual for Roads and Bridges (DMRB) - Note LA111 *Noise and Vibration*, produced by Highways England in 2020.

BS4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound*, produced by the British Standards Institution (BSI) in 2019.

ISO9613-2 Acoustics – *Attenuation of sound during propagation outdoors – General method of calculation*, produced by the International Organisation for Standardisation (ISO) in 1996.

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12.1 INTRODUCTION

- 12.1 This Chapter of the Environmental Statement (ES) assesses the effects of the proposed scheme, as described in Chapter 3, on air quality and odour surrounding the Site.
- 12.2 The baseline situation is considered before the likely environmental effects of the development are identified, both during the construction and operational phases of the development. Mitigation measures to reduce any negative environmental effects are identified as appropriate, before the residual environmental effects are assessed.
- 12.3 The Chapter is supported by **Technical Appendices 12.1 Detailed Air Quality Assessment**', and **12.2 'Construction Dust Assessment'**, and **12.3 'Baseline Air Quality Monitoring'**.

12.2 APPROACH AND METHODOLOGY

12.4 The scope of the assessment comprises:

- baseline air quality review;
- construction phase impacts as a result of dust emissions from Site and vehicle emissions on surrounding road network. The assessment of construction phase effects includes the 'demolition' phase of existing buildings / structures present on Site prior to construction;
- operational phase impacts:
 - point source combustion emissions associated with Combined Heat and Power (CHP) plant, Biogas boiler, Dryer and odour emissions from Effluent Treatment Plant (ETP) and
 - vehicle emissions on surrounding road network. In relation to the assessment of vehicle emissions on ecological receptors, this is termed the 'affected road network'.

12.2.1 Data sources and guidance

- 11.6.1 The following data sources and guidance has been considered as part of the assessment, and is discussed further in **Technical Appendix 12.1 'Detailed Air Quality Assessment'**:
- Local Air Quality Management Technical Guidance LAQM.TG(16);
 - Design Manual for Roads and Bridges (DMRB) LA 105 Air Quality, Welsh Government (2019);
 - Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM), 'Land-Use Planning and Development Control: Planning for Air Quality', 2017;
 - Institute of Air Quality Management (IAQM) 'Guidance on the assessment of dust from demolition and construction' (v1.1, 2016);
 - Institute of Air Quality Management (IAQM) 'Guidance on the assessment of odour for planning' (v1.1, 2018);
 - Institute of Air Quality Management (IAQM) 'A guide to the assessment of air quality impacts on designated nature conservation sites' (v1.1, May 2020);
 - Local Air Quality Management (LAQM) Air Quality Annual Status Reports (ASR) for Flintshire County Council;

- The Department for Environment, Food and Rural Affairs (DEFRA), on behalf of Welsh Government, Air Information Resource (UK-AIR) for background air quality maps (August 2020 update);
- Air Pollution Information System (APIS) for Critical Loads and baseline conditions at designated ecological receptors;
- Environment Agency guidance ‘Simple assessment of the impact of aerial emissions from new or expanding IPPC regulated industry for impacts on nature conservation’, termed ‘Operational Instruction 66_12’; and
- Natural Resource Wales (NRW) Permitting Guidance 'Air emissions risk assessment for your environmental permit' (the 'AERA' guidance).

12.2.2 Study Area

12.5 The study areas for the different aspects of the assessment are as follows:

- 1km from the Site for construction phase dust emissions;
- a 10km radius from the Site for consideration of point source combustion emissions;
- 200m from the A548 between Oakenholt and the A458/A494 junction for road traffic emissions.

12.6 Further details of the consideration of particular receptors and assessment of impacts within the study area are provided in the following sections. **Figure 12.1** and **Figure 12.2** illustrate the Study Area and **Table 12-1 to Table 12-2** present details of the human and ecological receptor locations considered in the assessment.

Table 12-1
Assessed Human Receptor Locations

Reference	NGR-x (m)	NGR-y (m)	Description / Notes
HR1	329983	375917	Residential
HR2	330134	374813	Residential
HR3	331350	374134	Residential
HR4	331412	373423	Leisure (Birdwatching Area)
HR5	332445	373388	Residential
HR6	333654	371858	Residential
HR7	332510	369352	Residential
HR8	330501	369144	Residential
HR9	329734	369569	Residential
HR10	328944	370085	Residential
HR11	327979	370707	Residential / Close to affected road - in-combination effects
HR12	327881	370739	Residential / Close to affected road - in-combination effects
HR13	328010	370672	Residential / Close to affected road - in-combination effects
HR14	328042	370651	Residential / Close to affected road - in-combination effects
HR15	333627	370879	Residential / Close to affected road - in-combination effects
HR16	327421	371095	Residential / Close to affected road - in-combination effects
HR17	327262	371142	Residential / Close to affected road - in-combination effects
HR18	327155	371215	Residential / Close to affected road - in-combination effects
HR19	327118	371125	Residential / Close to affected road - in-combination effects

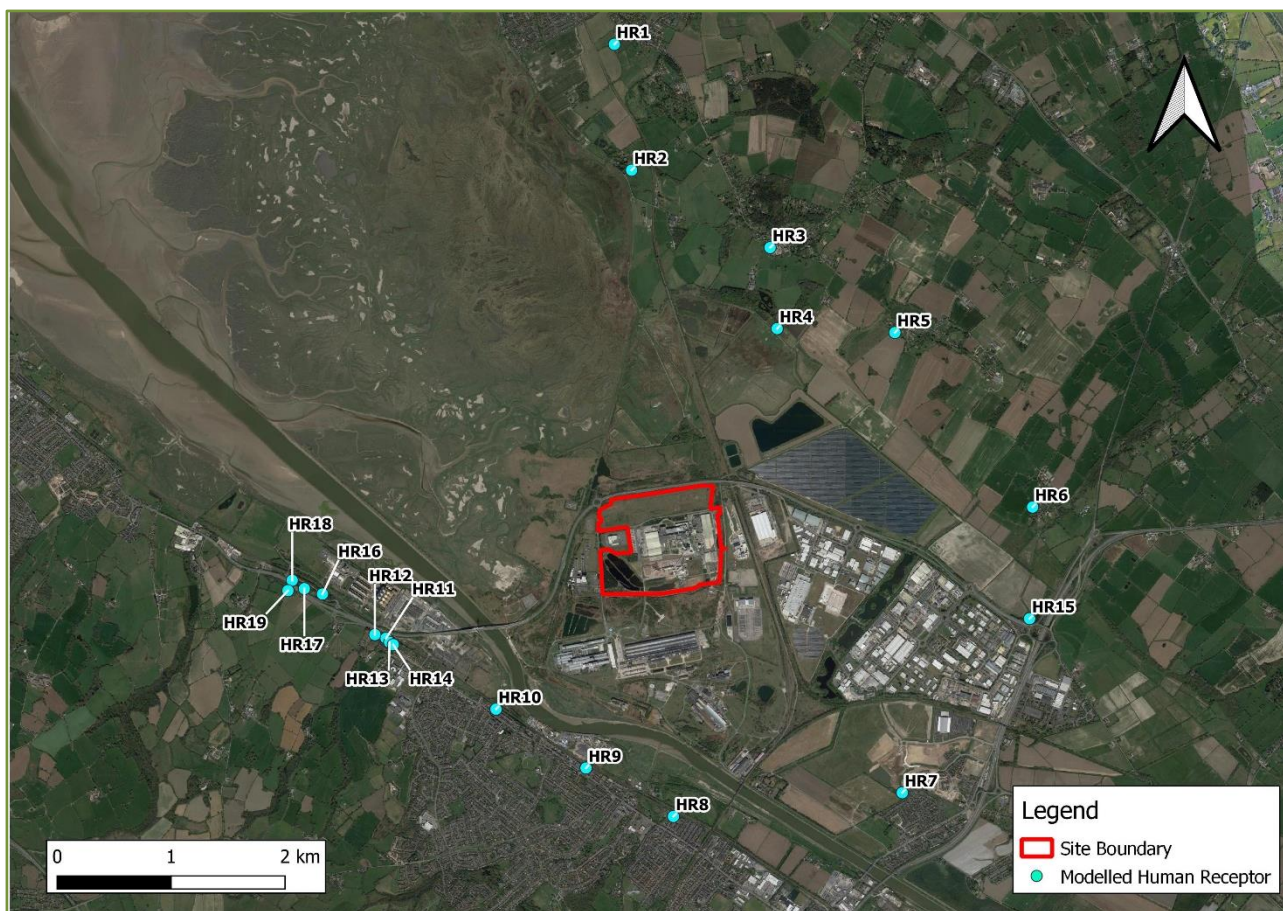


Figure 12.1
Site Setting and Assessed Human Receptor Locations

Table 12-2
Designated Ecological Sites

Ref. in report	Interest Status	Site and Designation
ER1 (SAC)	European	Dee Estuary / Aber Dyfrdwy SAC
ER1 (SPA)	European	The Dee Estuary SPA
ER2 (SAC)	European	River Dee and Bala Lake SAC
ER3 (SAC)	European	Dees and Buckley Newts SAC
ER4 (SAC)	European	Halkyn Mountain SAC
ER5 (SSSI)	National	Inner Marsh Farm SSSI
ER6 (SSSI)	National	Shotton Lagoons and Reedbeds SSSI
ER7 (SAC)	European	Alyn Valley Woods Coedwigoerr Dyffryn Alun SAC
ER8 (SPA)	European	Mersey Estuary SPA

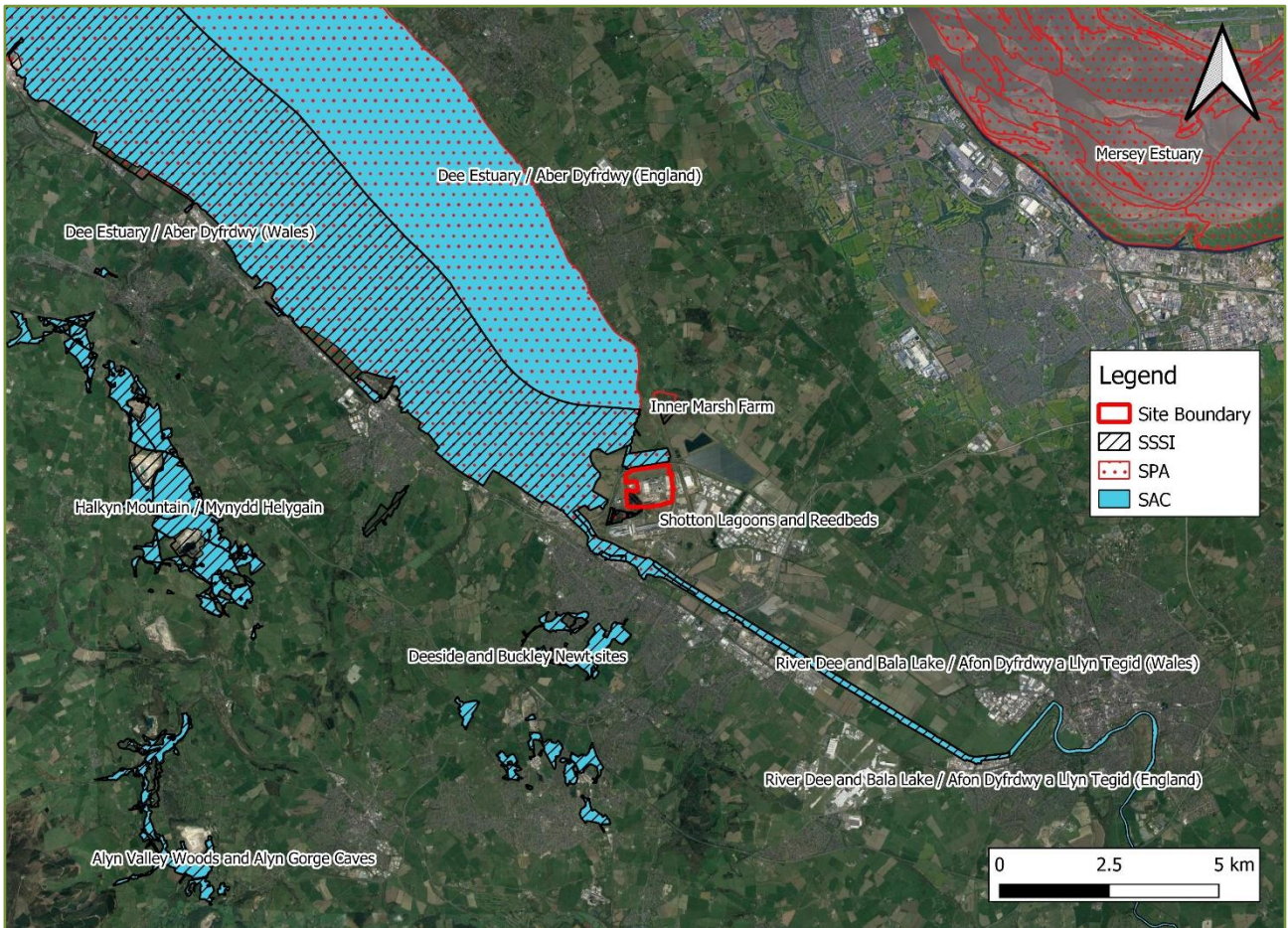


Figure 12.2
Site Setting and Assessed Ecological Receptor Locations

12.2.3 Approach and methods

12.7 The sections below present the air quality standards or guidance against which impacts are considered followed by the approach and methodology for each element of the assessment scope.

Ambient Air Quality Standards for Protection of Human Health

12.8 The standards for the protection of human health for the pollutants of interest in this assessment have been taken primarily from 'Air Quality Strategy for England, Scotland, Wales and Northern Ireland'. The ambient air quality standards collectively termed Air Quality Assessment Levels (AQALs) throughout are set out in **Table 12-3**.

Table 12-3
Air Quality Assessment Levels (AQALs)

Pollutant		Annual Standard ($\mu\text{g}/\text{m}^3$)	Short Term Standard ($\mu\text{g}/\text{m}^3$)	Source
Nitrogen dioxide	(NO ₂)	40	200 (1-hour) not to be exceeded more than 18 times per year	AQS
Particulates	(PM ₁₀)	40	50 (24-hour) not to be exceeded more than 35 times per year	AQS
Particulates	(PM _{2.5})	25	---	AQS

Standards for Protection of Ecological Sites

- 12.9 Environmental quality standards exist for nature conservation sites known as Critical Levels (for airborne concentrations) and Critical Loads (for deposition of nitrogen or acid forming compounds). Critical Levels and Critical Loads are a quantitative estimate of exposure to one or more airborne pollutants in gaseous form or deposition respectively, below which significant harmful effects on sensitive elements of the environment do not occur, according to present knowledge. The Critical Levels (C_{Le}) are set out in **Table 12-4**. The Critical Loads (C_{Lo}) are specific to each habitat and set out in **Technical Appendix 12.1** 'Detailed Air Quality Assessment'

Table 12-4
Critical Levels

Pollutant		Concentration ($\mu\text{g}/\text{m}^3$)	Habitat and Averaging Period
Nitrogen oxides (NO _x)		30	Annual mean (all ecosystems)
		75	Daily mean (all ecosystems)

General Dust and Odour Legislation

- 12.10 Part III of the Environmental Protection Act (EPA) 1990 (as amended) contains the main legislation on Statutory Nuisance and allows local authorities and individuals to take action to prevent a statutory nuisance. Section 79 of the EPA defines, amongst other things, smoke, fumes, dust and smells emitted from industrial, trade or business premises so as to be prejudicial to health or a nuisance, as a potential Statutory Nuisance. In legislation there are currently no numerical limits in terms of what level of dust or odour constitutes a nuisance.

Construction Dust Assessment

- 12.11 The assessment has been undertaken with reference to IAQM 'Guidance on the assessment of dust from construction and demolition' (IAQM, 2016). The assessment of risk is determined by considering the risk of dust effects arising from construction activities in the absence of mitigation.
- 12.12 The assessment methodology considers three separate dust impacts with account being taken of the sensitivity of the area that may experience these effects:

- annoyance due to dust soiling;
- the risk of health effects due to an increase in exposure to particulate matter (PM₁₀); and
- harm to ecological receptors.

12.13 The assessment considers:

- human receptor is located within 350m of the Site, and/or within 50m of routes used by construction vehicles, up to 500m from the Site entrance(s); and/or
- ecological receptor is located within 50m of the Site, and/or within 50m of routes used by construction vehicles, up to 500m from the Site entrance(s).

12.14 The risk of dust effects arising is based upon the relationship between the dust emission magnitude and the sensitivity of the area. The risk of impact is then used to determine the appropriate mitigation requirements, whereby through effective application, residual effects are considered to be 'not significant'.

12.15 Further detail is provided in **Technical Appendix 12.2 'Construction Dust Assessment'**.

Road Vehicular Pollutants Assessment – Human Receptors

12.16 Initially a screening assessment has been undertaken to identify 'significant changes' in traffic on roads with relevant receptors by reference to EPUK & IAQM (EPUK & IAQM, 2017) indicative criteria for a site within an AQMA, i.e.:

- a change of light duty vehicle (LDV) flows of more than 500 annual average daily traffic (AADT) (for sites not within or adjacent to an AQMA); and/or
- a change of heavy duty vehicle (HDV) flows of more than 100 AADT (for sites not within or adjacent to an AQMA).

12.17 Detailed dispersion modelling of road traffic emissions has then been undertaken using the Cambridge Environmental Research Consultants (CERC) ADMS-Roads dispersion model (v5.0.0.1), to predict annual mean concentrations of NO₂, PM₁₀ and PM_{2.5} for the following scenarios:

- 2025 Do Minimum (2025 DM) - Without development flows for the proposed opening year of the proposed development (2025), inclusive of flows associated with any relevant committed development (i.e. future baseline); and
- 2025 Do Something (2025 DS) – 2025 DS flows, plus all trips associated with the proposed development (i.e. development consent).

12.18 Human receptors considered in the assessment of emissions from road traffic are shown **Figure 12.1**. Nine receptors close to the affected road network were selected across the model domain to represent a range of exposures to air pollution: selected receptors may be representative of air quality conditions at a number of nearby properties, or selected to represent worst-case locations (e.g. façades of residential properties closest to roads), or locations close to junctions or convergence of links. All receptors were considered in relation to exposure at breathing height.

- 12.19 Further detail on the methodology and model inputs are provided in **Appendix 12.1 'Detailed Air Quality Assessment'**.

Road Vehicular Pollutants Assessment – Ecological Receptors

- 12.20 Initially a screening assessment has been undertaken to identify the affected road network' (i.e. 'significant changes') in traffic on roads by reference to the DMRB (DMRB, 2020) and IAQM nature guidance (IAQM 2020). The DMRB 'affected road network' screening criterion has been applied based upon total vehicles as confirmed within NRW's response to the Scoping Opinion Request. The following criteria has been applied as part of the road traffic emissions assessment at ecological designations:

- a change of 1,000AADT (total vehicles); and
- where there are relevant ecological designations with air quality sensitive habitats within 200m of an 'affected road'.

- 12.21 Where there are any ecological receptors which meet both of the above criteria, detailed dispersion modelling of road traffic emissions has been undertaken using the CERC ADMS-Roads dispersion model (v5.0.0.1) to predict annual mean concentrations of NO_x, and contributions to the nutrient nitrogen and acid Clo. The assessment has been undertaken following the 'detailed assessment' approach (i.e. consideration of 'project' and 'in-combination' development trips associated with other relevant committed developments) as outlined in the IAQM nature guidance (IAQM 2020). The following scenarios have been considered as part of the assessment:

- 2025 Do Minimum (2025 DM) - Without development flows for the proposed opening year of the proposed development (2025), inclusive of flows associated with any relevant committed development (i.e. future baseline); and
- 2025 Do Something (2025 DS) – 2025 DS flows, plus all trips associated with the proposed development (i.e. development consent).

- 12.22 Further detail on the methodology and model inputs are provided in **Technical Appendix 12.1 'Detailed Air Quality Assessment'**.

Assessment of Operational Phase Combustion Emissions

- 12.23 Detailed atmospheric dispersion modelling of point source combustion emissions NRW AERA guidance. For this assessment the AERMOD model has been used; this model is widely used and accepted by the NRW for undertaking such assessments. The model incorporates point source emissions, surrounding buildings, topography, and 5 years of sequential hourly meteorological data.

- 12.24 The modelling approach is based upon the following stages:

- identification of sensitive receptors;
- review of process design proposals and emission rates;
- compilation of the existing air quality baseline for the regulated emissions;
- calculation of process contribution to ground level concentrations of emissions from the process;

- evaluation against air quality standards for the protection of human health; and
- evaluation of effects on ecological receptors.

- 12.25 The dispersion modelling has been completed using a receptor grid (10km radius) to allow potential exposure to be assessed at all locations surrounding the Site. Specific locations surrounding the Site have been selected to inform the risk assessment that are broadly representative of either worst case relevant exposure locations or population centres, in addition to the roadside locations to assess the cumulative impact of emissions from both traffic and combustion sources at the Site.
- 12.26 The potential effects on human health have been assessed within the detailed dispersion modelling assessment by comparison of predicted impacts against the AQALs.
- 12.27 Further detail on the methodology and model inputs are provided in **Technical Appendices 12.1 ‘Detailed Air Quality Assessment’**.

Odour Assessment

- 12.28 Potential odour from the effluent treatment plant process using the qualitative source-pathway-receptor (S-P-R) conceptual model in accordance with ‘Guidance on the assessment of odour for planning’ (v1.1, 2018) published by the IAQM. The methodology considers the potential source magnitude in relation to the odour generation potential and designed-in mitigation, the pathway based upon the distance to receptors and prevailing meteorological conditions, and the sensitivity of receptors.

12.2.4 Assessing Significance

Significance of Effect on Human Receptors for Regulated Pollutants

- 12.29 Significance has been assessed according to the framework set out in the EPUK-IAQM guidance. Descriptors for predicted impacts applied in this assessment are taken from the EPUK-IAQM guidance. The matrix for assessment against annual mean AQALs is reproduced in **Table 12-5**.
- 12.30 For short-term AQALs the EPUK-IAQM guidance indicates that Process Contributions (PC, i.e. the change as a result of the development) of <10% of the AQAL can be classified as ‘negligible’, 10-20% ‘small’, 20-50% ‘medium’, and >50% ‘large’ and the significance of this impact can be described as ‘negligible’, ‘slight’, ‘moderate’, or ‘substantial’ respectively without considering background concentrations.

Table 12-5
Impact Descriptors

Concentration with development	Percentage Change in Air Quality Relative to AQAL (%)			
	1%*	2-5%	6-10%	>10%
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight	Moderate	Moderate

95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial
Note: *=changes less than 0.5% are considered to be 'negligible'.				

12.31 The EPUK-IAQM guidance requires a judgment on the significance of the 'effect' as 'significant' or 'not significant'. This is based upon the impact descriptors at receptors alongside other considerations that also have a bearing, including:

- the existing and future air quality in the absence of the development;
- the extent of current and future population exposure to the impacts;
- the worst case assumptions adopted when undertaking the prediction of impacts; and
- the extent to which the proposed development has adopted best practice to eliminate and minimise emissions.

Significance of Effect on Ecological Receptors

12.32 The significance of air pollution effects on ecological receptors have been informed by the IAQM guidance (May 2020) and initially assessed within this Chapter against the EA's Operational Instruction 66_12 'Simple assessment of the impact of aerial emissions from new or expanding IPPC regulated industry for impacts on nature conservation'.

12.33 This guidance provides risk-based screening criteria to determine whether impacts will have 'no likely significant effects (alone and in-combination)' for European sites, 'no likely damage' for SSSIs and 'no significant pollution' for other sites, as follows:

- Process Contribution (PC) does not exceed 1% long-term critical level and/or load or that the Predicted Environmental Contribution (PEC = PC + Background) <70% long-term critical level and/or load for European sites and SSSIs; and
- PC does not exceed 10% short-term critical level (if applicable) for European sites and SSSIs.

12.34 Following this initial assessment, the significance of air pollution effects on ecological impacts is considered in more specific detail in the **Chapter 10 Ecology**.

12.2.5 Cumulative Effects Assessment

12.35 The cumulative assessment includes consideration of traffic, i.e. trip rates associated with relevant committed developments (see Paragraph 12.17). Furthermore, the consideration of 'cumulative' impacts considers the combined the impacts of both the on-site combustion emissions and traffic related emissions.

12.3 BASELINE CONDITIONS

12.36 Baseline conditions have been established following a monitoring survey and review of:

- Site specific monitoring undertaken by SLR; and
- Defra background maps;

12.37 The background concentrations applied in the assessment are presented **Table 12-6** and discussed in **Technical Appendix 12.1 'Detailed Air Quality Assessment'**.

Table 12-6
Baseline Concentrations – Human Receptors

Pollutant	Annual Mean Background Concentration ($\mu\text{g}/\text{m}^3$)	Data Source
NO ₂	12.3 to 33.0	UK-AIR background map and SLR Monitoring data
PM ₁₀	7.7 to 13.0	UK-AIR background map
PM _{2.5}	5.2 to 8.3	UK-AIR background map

Critical Levels and Loads

12.38 Baseline data at the assessed ecological receptors has been sourced from APIS. It has been used to provide information on:

- identification of whether the habitats present are sensitive;
- critical levels and current baseline levels; and
- critical loads and current loads.

12.39 The baseline concentrations are presented in **Table 12-7** below, with further detail on habitats and critical loads presented in **Appendix 12.1 'Detailed Air Quality Assessment'**.

Table 12-7
Background Concentrations at Ecological Designations

Site	Annual Mean NO _x ($\mu\text{g}/\text{m}^3$)
ER1 (SAC)	12.94
ER1 (SPA)	12.94
ER2 (SAC)	26.07
ER3 (SAC)	15.86
ER4 (SAC)	13.71
ER5 (SSSI)	12.94
ER6 (SSSI)	16.34
ER7 (SAC)	6.96
ER8 (SPA)	35.59

12.4 ASSESSMENT OF EFFECTS

12.4.1 Potential Construction Phase Effects

- 12.40 There are both human receptors within 350m of the Site and designated habitat sites within 50m of the Site boundary. Therefore, an assessment of construction dust on human and ecological receptors was undertaken.
- 12.41 The dust emission magnitude from the different construction activities is considered to be 'large' with the exception of demolition which is considered of 'medium' magnitude. Due to the industrial estate site setting the surrounding area is considered of low sensitivity with respect to dust soiling and human health given that there are no residential (high sensitivity) receptors within 350m of the Site. A small section of the Dee Estuary lies at approximately 50m from the northern Site boundary although construction activities are expected to be setback, however to apply a precautionary consideration in the selection of mitigation measures the area has been considered of medium sensitivity. Further detailed consideration of these factors against the IAQM dust assessment criteria are presented in **Technical Appendix 12.2 'Construction Dust Assessment'**. The risk of dust impact from construction activities are summarised in **Table 12-8**.

Table 12-8
Risk of Dust Impacts (Unmitigated)

Potential Impact	Demolition	Earthworks	Construction
Dust Soiling	Low Risk	Low Risk	Low Risk
Human Health	Low Risk	Low Risk	Low Risk
Ecological	Medium Risk	Medium Risk	Medium Risk

- 12.42 Mitigation measures have been assigned following the IAQM guidance commensurate with the designation of dust risk. In accordance with IAQM guidance, provided the mitigation measures are effectively implemented, the construction dust effects can be considered not significant.
- 12.43 The proposed development is not anticipated to result in traffic movements above the EPUK-IAQM criterion of 100 HGVs AADT. Furthermore, compared to the operational phase (for which a full assessment has been undertaken) construction phase vehicle volumes are considerably lower. As such impacts from construction phase traffic movements are considered not significant.

12.4.2 Potential Operational Phase Effects

Effects on Human Receptors from Site Combustion Emissions

- 12.44 Predicted impacts for NO₂ at the assessed receptor locations are presented in **Table 12-9** to **Table 12-10**. The impacts are all considered 'negligible' against the EPUK-IAQM guidance. The NO₂ impacts at receptor HR11 to HR19, which are close to the affected road network and therefore

subject to the combined effect of NO₂ contributions from developmental traffic emissions and combustion point sources at the site are considered in the following section.

Table 12-9
NO₂ Annual Mean Impacts

Ref.	PC (µg/m ³)	PC as % AQAL	PEC (µg/m ³)	PEC as % AQAL	Impact Descriptor
HR1	0.3	0.7%	6.6	16.4%	Negligible (A)
HR2	0.4	1.0%	7.0	17.5%	Negligible (A)
HR3	0.3	0.9%	7.2	18.1%	Negligible (A)
HR4	0.4	1.1%	7.7	19.1%	Negligible (A)
HR5	0.4	0.9%	7.8	19.5%	Negligible (A)
HR6	0.4	0.9%	10.3	25.6%	Negligible (A)
HR7	0.3	0.8%	8.7	21.8%	Negligible (A)
HR8	0.1	0.3%	7.9	19.8%	Negligible (A)
HR9	0.1	0.4%	8.5	21.4%	Negligible (A)
HR10	0.2	0.4%	8.1	20.3%	Negligible (A)

Table 12-10
NO₂ 1-hour Mean (99.79%ile) Impacts

Ref.	PC (µg/m ³)	PC as % AQAL	Impact Descriptor
HR1	2.6	1.3%	Negligible (A)
HR2	3.0	1.5%	Negligible (A)
HR3	3.6	1.8%	Negligible (A)
HR4	4.3	2.1%	Negligible (A)
HR5	3.7	1.9%	Negligible (A)
HR6	3.3	1.6%	Negligible (A)
HR7	4.5	2.2%	Negligible (A)
HR8	3.4	1.7%	Negligible (A)
HR9	3.7	1.8%	Negligible (A)
HR10	3.4	1.7%	Negligible (A)

Effects on Human Receptors Close to Affected Road Network

- 12.45 Those receptors close to the affected road network are considered in this section. The impacts include the contribution from Site combustions sources on nitrogen dioxide concentrations.
- 12.46 The impacts from development-generated traffic emissions ('Do Something (DS) Scenario) on local receptors in combination with Site emissions are presented in **Table 12-11** to **Table 12-13** for NO₂, PM₁₀ and PM_{2.5} respectively. The findings of the assessment are that, according to EPUK-IAQM guidance, impacts on annual mean concentrations can be considered 'negligible' at all assessed receptors.
- 12.47 The empirical relationship given in LAQM.TG(16) states that exceedances of the 1-hour mean NO₂ AQAL are unlikely to occur where annual mean concentrations are <60µg/m³. Annual mean NO₂

concentrations predicted at all receptor locations are well below this limit. Therefore, it is unlikely that an exceedance of the 1-hour mean objective will occur. Effects associated with likely 1-hour mean NO₂ concentrations at all assessed receptor locations are therefore considered to be 'not significant'.

- 12.48 Based upon the maximum predicted annual mean PM₁₀ concentration of 12.9µg/m³ (predicted at Receptor HR15), this equates to less than 1 day where 24-hour mean PM₁₀ concentrations are predicted to be greater than 50µg/m³. Therefore, the number of maximum exceedances is in compliance with the 24-hour mean AQAL. Effects associated with likely 24-hour mean PM₁₀ concentrations at all assessed receptor locations are therefore considered to be 'not significant'.

Table 12-11
NO₂ Impacts

Ref.	2025 DM (µg/m ³)	2025 DS (µg/m ³)	% Change of AQAL	% of 2025 DS Relative to AQAL	Impact
HR11	7.8	8.0	0.5	20.0	Negligible (A)
HR12	7.6	7.8	0.5	19.5	Negligible (A)
HR13	8.8	9.0	0.5	22.5	Negligible (A)
HR14	8.7	8.9	0.5	22.3	Negligible (A)
HR15	17.1	17.7	1.5	44.3	Negligible (A)
HR16	8.7	8.9	0.6	22.3	Negligible (A)
HR17	11.1	11.4	0.7	28.5	Negligible (A)
HR18	12.1	12.4	0.8	31.0	Negligible (A)
HR19	7.4	7.6	0.4	19.0	Negligible (A)

Table 12-12
PM₁₀ Impacts

Ref.	2025 DM (µg/m ³)	2025 DS (µg/m ³)	% Change of AQAL	% of 2025 DS Relative to AQAL	Impact
HR11	10.0	10.0	<0.1	25.0	Negligible (A)
HR12	9.9	10.0	<0.1	25.0	Negligible (A)
HR13	10.3	10.3	<0.1	25.8	Negligible (A)
HR14	10.3	10.3	<0.1	25.8	Negligible (A)
HR15	12.8	12.9	0.2	32.3	Negligible (A)
HR16	9.7	9.7	<0.1	24.3	Negligible (A)
HR17	10.2	10.2	0.2	25.5	Negligible (A)
HR18	10.4	10.5	0.2	26.3	Negligible (A)
HR19	9.4	9.4	<0.1	23.5	Negligible (A)

Table 12-13
PM_{2.5} Impacts

Ref.	2025 DM (µg/m ³)	2025 DS (µg/m ³)	% Change of AQAL	% of 2025 DS Relative to AQAL	Impact
HR11	6.4	6.4	<0.1	25.6	Negligible (A)

HR12	6.4	6.4	<0.1	25.6	Negligible (A)
HR13	6.8	6.8	<0.1	27.2	Negligible (A)
HR14	6.8	6.8	<0.1	27.2	Negligible (A)
HR15	8.1	8.1	0.2	32.4	Negligible (A)
HR16	6.3	6.3	<0.1	25.2	Negligible (A)
HR17	6.6	6.7	0.2	26.8	Negligible (A)
HR18	6.8	6.8	0.2	27.2	Negligible (A)
HR19	6.2	6.2	<0.1	24.8	Negligible (A)

Effects on Human Receptors from Odour Emissions

Odour Sources

12.49 A number of potential sources of odour as a result of the proposed development have been identified:

- imported waste paper;
- production of containerboard and tissue products;
- Effluent Treatment Plant (ETP); and
- Anaerobic Digestion (AD) facility.

12.50 Waste paper is not associated with a significant potential for odour generation, due to the relatively inert nature of the material. As such, the import and storage of waste paper at the Site is not considered a significant source of odours. It is noted the operation of the CHPs proposed as part of the Site will not result in an emission source of odour.

12.51 The containerboard and tissue production process primarily involves the application of heat and pressure and is not associated with a significant potential for odour generation. Neither waste paper or the containerboard and tissue products produced are associated with a significant odour potential. Although it is acknowledged that adhesives can be utilised in the production process, the quantity utilised is relatively low and these activities are undertaken within enclosed buildings. As such, production of containerboard and tissue products at the Site is not considered a significant source of odours.

12.52 The ETP would treat wastewater and wash water from the Site operations. The primary function of the ETP is to remove suspended solids (primarily paper) from the wastewater and wash water prior to discharge offsite. In consideration of the low odour potential of the wastewater and wash water received at the ETP, it is not anticipated that the ETP would be a significant source of odours.

12.53 The AD facility would utilise paper pulp (waste product derived from the production process) as feedstock for the AD process. The primary function of the AD facility is to capture gasses arising from the paper pulp during AD for processing into biomethane. The AD process would be undertaken within digester tanks (large cylindrical heated tanks), covered by domed rooves to facilitate the containment and extraction of gasses from the feedstock. The resulting digestate product ('digestate') would be stored at the site prior to export. The digestate is not associated with a significant odour potential due to the inert nature of the material, as a result of the digestion

process, and in consideration of the low odour potential of the initial feedstock. Although it is acknowledged that the digestion process has a very high potential for odour generation, the digestion process is undertaken within a highly controlled and enclosed environment, ensuring maximum containment and capture of gasses. Therefore, it is not anticipated that the AD process would be a significant source of odours.

Pathway Effectiveness

12.54 The proposed development is located in a primarily industrial area, with industrial facilities bounding the Site to the west, south and east, and scrubland extending to the north. The nearest high sensitivity receptors (residents) are located at a distance of approximately 2km to the southwest (Connah's Quay) and northeast (Puddington) of the Site. In consideration of the extended distance between the proposed development and sensitive receptors as well as the prevailing meteorological conditions, the associated pathway effectiveness to the nearby sensitive receptors is considered ineffective.

Significance of effects

12.55 The likely odour effect is predicted to be 'negligible' at nearby sensitive receptors. Therefore, the likely significance of effects as a result of odours from the proposed development is therefore considered to be 'not significant', in accordance with the IAQM guidance.

Impacts on Ecological Receptors from Combustion and Traffic Emissions

Critical Levels

12.56 The results of the assessment of impacts on C_{Le} 's are presented in **Table 12-14** to **Table 12-15**. The findings are that:

- the NOx PC does not exceed 1% or the PEC does not exceed 70% of the long-term C_{Le} at ecological receptors ER2 to ER8, however at ER1 (Dee Estuary SAC/SPA) the PC cannot be considered insignificant and the PEC exceeds the Critical Level; and
- the NOx PC does not exceed 10% or the PEC does not exceed 70% of the daily C_{Le} at any of the designated sites.

12.57 Therefore, it is concluded that the PC will have 'no likely significant effects (alone and in-combination)' for European sites, and cause 'no damage' to the SSSI's with the exception of ER1 (Dee Estuary SAC/SPA), the significance of which is considered in **Chapter 10 Ecology**.

Table 12-14
Impact on Annual Mean NOx Critical Levels

Site	PC ($\mu\text{g}/\text{m}^3$)	PC as % of C_{Le}	PEC ($\mu\text{g}/\text{m}^3$)	PEC as % of C_{Le}
ER1 (SAC)	6.39	21.3%	34.7	115.8%
ER1 (SPA)	6.39	21.3%	34.7	115.8%
ER2 (SAC)	0.43	1.4%	15.9	53.1%

ER3 (SAC)	0.13	0.4%	n/c	n/c
ER4 (SAC)	0.08	0.3%	n/c	n/c
ER5 (SSSI)	1.28	4.3%	11.8	39.3%
ER6 (SSSI)	1.18	3.9%	17.7	59.1%
ER7 (SAC)	0.08	0.3%	n/c	n/c
ER8 (SPA)	0.12	0.4%	n/c	n/c

Table note: n/c = not calculated as PC is insignificant

Table 12-15
Impact on Daily Mean NOx Critical Levels

Site	PC ($\mu\text{g}/\text{m}^3$)	PC as % of C_{Le}	PEC ($\mu\text{g}/\text{m}^3$)	PEC as % of C_{Le}
ER1 (SAC)	23.4	31.2%	47.9	63.9%
ER1 (SPA)	23.4	31.2%	47.9	63.9%
ER2 (SAC)	9.4	12.6%	38.4	51.2%
ER3 (SAC)	7.5	10.1%	28.6	38.2%
ER4 (SAC)	5.0	6.6%	n/c	n/c
ER5 (SSSI)	11.5	15.3%	34.8	46.4%
ER6 (SSSI)	12.8	17.1%	42.5	56.6%
ER7 (SAC)	10.2	13.6%	23.6	31.5%
ER8 (SPA)	2.1	2.8%	n/c	n/c

Table note: n/c = not calculated as PC is insignificant

Critical Loads

12.58 The results of the assessment of impacts on C_{Lo} 's are presented in **Table 12-16** to **Table 12-17**. The findings are that:

- the nitrogen deposition PC does not exceed 1% of the C_{Lo} at ER3, ER4, ER7 and ER8 and can therefore be considered insignificant; and
- the acid deposition PC does not exceed 1% or the PEC does not exceed 70% of the C_{Lo} at any ecological receptor.

12.59 Therefore, it is concluded that the PC will have 'no likely significant effects (alone and in-combination)' for European sites, and cause 'no damage' to the SSSI's with the exception of ER1 (Dee Estuary SAC/SPA), ER2 (River Dee and Bala Lake SAC), and ER6 (Shotton Lagoons and Reedbeds SSSI) the significance of which is considered in **Chapter 10 Ecology**.

Table 12-16
Impact on Impact on Nitrogen Critical Loads

Site	Applied C _{Lo} (kg N/ha/yr)	PC (kg N/ha/yr)	PC as % of C _{Lo}	PEC (µg/m ³)	PEC as % of C _{Lo}
ER1 (SAC)	20	0.49	2.5%	21.5	107%
ER1 (SPA)	20	0.49	2.5%	21.5	107%
ER2 (SAC)	20	0.04	0.2%	23.7	118%
ER3 (SAC)	10	0.03	0.3%	n/c	n/c
ER4 (SAC)	10	0.01	0.1%	n/c	n/c
ER5 (SSSI)	10	0.13	1.3%	21.0	210%
ER6 (SSSI)	10	0.24	1.2%	25.7	257%
ER7 (SAC)	15	0.02	0.1%	n/c	n/c
ER8 (SPA)	5	0.01	0.2%	n/c	n/c

Table note: n/c = not calculated as PC is insignificant

Table 12-17
Impact on Impact on Acid Critical Load

Site	Applied C _{Lo} Function	Applied C _{Lo} (kg N/ha/yr)	PC (kg N/ha/yr)	PC as % of C _{Lo}	PEC (µg/m ³)	PEC as % of C _{Lo}
ER1 (SAC)	No sensitive habitat with Critical Load data					
ER1 (SPA)	CLmaxN	4.500	0.09	2.1%	1.81	40.1%
ER2 (SAC)	No sensitive habitat with Critical Load data					
ER3 (SAC)	CLmaxN	1.720	0.01	0.4%	n/c	n/c
ER4 (SAC)	CLmaxN	4.323	0.00	0.1%	n/c	n/c
ER5 (SSSI)	No sensitive habitat with Critical Load data					
ER6 (SSSI)	CLmaxN	4.548	0.04	0.8%	n/c	n/c
ER7 (SAC)	CLmaxN	1.863	0.01	0.3%	n/c	n/c
ER8 (SPA)	CLmaxN	0.498	0.00	0.7%	n/c	n/c

Table note: n/c = not calculated as PC is insignificant

12.4.3 Cumulative Effects Assessment

Road Traffic Emissions

- 12.60 In considering the likely changes in road traffic flows that may occur on the local highway network as a result of the proposed development, consideration has been given to the potential maximum traffic flows that are likely to occur in the future assessment year (i.e. 2025) should proposed development become fully operational. This has included vehicle movements associated with relevant and committed developments in the assessment area.
- 12.61 As such, the dispersion modelling results presented are inherently cumulative in nature. The cumulative operational effect of the proposed development is therefore considered to be 'not significant'.

Point Source / Combustion Emissions

- 12.62 NRW's response to the Scoping Opinion Request included reference for the requirement to consider the potential for in-combination effects even where Process Contributions are less than 1% of the applied environmental standard at the considered ecological receptors. The assessment of combustion emissions from the proposed development has included specific inclusion of Process Contributions from proposed sources in the wider locale as part of an in-combination assessment of potential impacts arising from emissions to air.
- 12.63 The PECs presented herein for the purpose of the assessment against CLe and CLo include relevant emission contributions from the identified sources.
- 12.64 Reference should be made to **Technical Appendix 12.1 'Detailed Air Quality Assessment'** for further details of which sources / sites have been made as part of this in-combination assessment.

12.4.4 Further Survey Requirements and Monitoring

- 12.65 There are no further survey or monitoring requirements. Monitoring requirements during the construction phase are detailed in the Construction Phase mitigation and would be incorporated into a Construction Environmental Management Plan (CEMP), see **Technical Appendix 5.3**. Monitoring requirements during the operational phase in respect of point source combustion emissions will be stipulated by NRW in the Site's Environmental Permit. Furthermore, the operation of the ETP and AD facility would be covered under an Odour Management Plan (OMP) and Regulated by NRW in the Site's Environmental Permit, as an overarching management system to ensure control of odour from these identified sources.

12.5 SUMMARY AND STATEMENT OF SIGNIFICANCE

- 12.66 The significance of effects are provided in **Table 12-18** and summarised below:
- the assessment of potential construction phase dust impacts using IAQM guidance concludes a low to medium risk of impacts in the absence of mitigation. With the application of industry

standard mitigation measures as identified in **Technical Appendix 12.3**, it is considered that the residual effects at all receptors will be ‘not significant’;

- operational phase impacts from Site combustion emissions combined with development road traffic emissions can be considered ‘negligible’ and therefore considered ‘not significant’ against EPUK-IAQM criteria;
- impacts on ecological receptors ER1 (Dee Estuary SAC/SPA), ER2 (River Dee and Bala Lake SAC), and ER6 (Shotton Lagoons and Reedbeds SSSI) are potentially significant and therefore the significance of effects is considered within **Chapter 10 Ecology**.

Table 12-18
Summary of Significance

Receptor	Sensitivity of Receptor	Nature of potential impact	Proposed mitigation	Residual effect	Significant / not significant
Construction phase					
Human receptors	Low	Temporary / direct	Construction dust mitigation measures (Technical Appendix 12.3)	Negligible	Not significant
Ecological receptors	Medium	Temporary / direct	Construction dust mitigation measures (Technical Appendix 12.3)	Negligible	Not significant
Operational phase					
Human receptors	High	Permanent / direct	Not required based on negligible impacts.	Negligible	Not significant
Ecological receptors	High	Permanent / direct	Considered within Chapter 10 Ecology		

12.6 REFERENCES

- 12.67 Local Air Quality Management Technical Guidance LAQM.TG(16) (Defra, April 2021)
- 12.68 Design Manual for Roads and Bridges (DMRB) LA 105 Air Quality, Welsh Government (2019)
- 12.69 Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM), 'Land-Use Planning and Development Control: Planning for Air Quality', 2017
- 12.70 Institute of Air Quality Management (IAQM) 'Guidance on the assessment of dust from demolition and construction' (v1.1, 2016)
- 12.71 Institute of Air Quality Management (IAQM) 'Guidance on the assessment of odour for planning' (v1.1, 2018)

- 12.72 Institute of Air Quality Management (IAQM) 'A guide to the assessment of air quality impacts on designated nature conservation sites' (v1.1, May 2020)
- 12.73 Local Air Quality Management (LAQM) Air Quality Annual Status Reports (ASR) for Flintshire County Council
- 12.74 The Department for Environment, Food and Rural Affairs (DEFRA), on behalf of Welsh Government, Air Information Resource (UK-AIR) <https://uk-air.defra.gov.uk/data/laqm-background-home> (accessed March 2022)
- 12.75 Air Pollution Information System (APIS) <http://www.apis.ac.uk/> (accessed March 2022)
- 12.76 Environment Agency guidance 'Simple assessment of the impact of aerial emissions from new or expanding IPPC regulated industry for impacts on nature conservation', termed 'Operational Instruction 66_12'
- 12.77 NRW Permitting Guidance 'Air emissions risk assessment for your environmental permit' (the 'AERA' guidance). <https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit> (accessed March 2022)
- 12.78 Air Quality (Wales) (Amendment) Regulations 2002

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13.1 INTRODUCTION

13.1.1. This chapter of the Environmental Statement (ES) assesses the traffic and transport effects arising from the construction and operation of the proposed development. It details the assessment methodology; the baseline conditions; the likely significant effects; the mitigation measures required to prevent, reduce or offset any significant, negative impacts; and the likely residual effect after these measures have been implemented.

13.1.2. The chapter is supported by the following appendices:

- Appendix 13.1: Transport Assessment (TA); and
- Appendix 13.2: Travel Plan (TP)

13.2 LEGISLATION, PLANNING POLICY AND GUIDANCE

13.1.3. **The Well-being of Future Generations (Wales) Act 2015 (Figure 13.1)** seeks to improve the social, economic, environmental, and cultural well-being of Wales. It contains seven well-being goals which local authorities as well as other public bodies must seek to achieve in order to improve well-being both now and in the future.



Figure 13.1. The Well-being of Future Generations (Wales) Act 2015

13.1.4. **Future Wales – The National Plan 2040** is the national development framework, setting the direction for development in Wales. Policy 1 outlines where Welsh Government will support sustainable growth and its National Growth Areas.

- 13.1.5. One such National Growth Area includes Wrexham and Deeside, and the policy notes that growth in employment should be focussed on these areas.
- 13.1.6. **The Active Travel (Wales) Act 2013** aims to make it easier for people to walk and cycle in Wales. By connecting key sites such as workplaces, hospitals, schools and shopping areas with active travel routes, the Act will encourage people to rely less on their cars when making short journeys and make implementing successful Travel Plans easier.
- 13.1.7. **Active Travel Act Guidance** was published in 2021 and includes provision for making people aware of the existing and future routes through the publication of the Integrated Network maps. The guidance further states that developments that do not adequately make provision for walking and cycling should not be approved. This may include adequate off-site improvements for pedestrians and cyclists using existing highways that are affected by the development.
- 13.1.8. **The Wales Transport Strategy** provides the framework for transport related activities and sets out the strategic priorities of a safe, integrated, sustainable, efficient and economic transport system serving Wales. It provides the context for the Welsh Government's aim to reduce the need to travel, particularly by private car, and supports a modal shift to walking, cycling and public transport. This is reflected in Planning Policy Wales and Future Wales, which puts placemaking at the heart of the planning system. This modal shift is supported by the sustainable transport hierarchy, which prioritises walking, cycling and public transport.
- 13.1.9. **Planning Policy Wales (2021)** sets out the land use planning policies of the Welsh Government. With regard to sustainable transport, PPW advises that, in the context of active and social places, developments should encourage modal shift and be easily accessible by walking, cycling and public transport, by virtue of their location, design and provision of on and off-site sustainable transport infrastructure. Furthermore, the 'active and social' theme within PPW aims to ensure development is located and designed in a way which reduces dependency on the private car and enables sustainable access to employment.
- 13.1.10. **Technical Advice Note 18 (TAN 18)** elaborates on the relationship between land use planning and transport infrastructure by outlining a range of key accessibility principles that should inform future patterns of development. Developments that are accessible to residents by modes other than the car and are afforded sufficient capacity on public transport services are favoured.
- 13.1.11. **Flintshire County Council Unitary Development Plan 2000-2015** is the latest development plan currently in use by the council. Although the adopted UDP became time expired at the end of 2015 it remains the adopted development plan for the County, and a new Local Development Plan is currently being prepared by Flintshire Council. The plan attempts to ensure a rational and consistent approach to planning decision within the council and sets out the basis to bring about sustainable development.
- 13.1.12. The plan sets out a number of strategic themes, including;
- Sustainable Development – the council will attempt to meet people's needs for jobs, while protecting the richness of Flintshire's cultural heritage and the variety of its natural environment.
 - Integrating Land Use and Transport – the council will attempt to examine and integrate the relationship between land use planning and transport. The ultimate aim is to reduce the need to travel by car.

- 13.1.13. The plan also details a number of strategic aims to be followed, including;
- Pollution - to stabilise and ultimately reduce the potential of pollution.
 - Transport and access - to integrate new land uses with the existing transport network, and to improve accessibility to varying alternative transport modes other than the car, and to promote the integration of transport modes.
- 13.1.14. A number of policies have been designed to meet these needs, including policy STR2 – Transport and Communications, in which development where possible will need to meet the following:
- Minimising the number and length of journeys especially by private car;
 - Making the best use of existing roads and addressing congestion and safety issues through traffic management and calming measures;
 - Enabling the efficient use of and improvements to public transport;
 - Enabling alternative means of travel including cycling and walking;
 - Facilitating the transfer of freight from road to rail or water; and
 - Facilitating the provision and use of telecommunications.
- 13.1.15. **North Wales Joint Local Transport Plan 2015-2020** details the Local Transport Plan by the six local authorities in North Wales and aims to provide a cohesive strategy for the region. The outcomes for the local transport plan are as follows:
- Connections to Key Destinations and Markets: Support for Economic Growth through an improvement in the efficiency, reliability, resilience, and connectivity of movement, including freight, within and between North Wales and other regions and countries (with a particular focus on accessibility to the Enterprise Zones and an improvement in the vitality and viability of towns and other key centres);
 - Access to Employment: Providing inclusive and affordable access to employment and training (with a particular focus on the most deprived communities);
 - Access to Services: Promotion of social inclusion and well-being through inclusive and affordable access to education, health services and other key services and facilities (with a focus on the most deprived communities);
 - Increasing Levels of Walking and Cycling: for both necessary travel and recreation, by residents and visitors;
 - Improved Safety and Security: of both actual and perceived safety of travel by all modes;
 - Benefits and Minimised Impacts on the Environment: the potential for transport improvements to positively affect the local and global natural and built environment will have been maximised and negative impacts minimised, including adaptation to the effects of climate change.
- 13.1.16. To achieve this, a detailed list of interventions has been created that details improvements across the region; including highway and railway improvements detailed in Section 11.7 of this report. These include the potential construction of the Red Route, providing dual-carriageway capacity to the immediate west of the site and the North East Wales Metro with the construction of Deeside Parkway railway station being promoted by Transport for Wales.

13.3 CONSULTATION

- 13.1.17. Prior to undertaking the assessment, an EIA Scoping Report was submitted to Flintshire County Council and Planning and Environment Decisions Wales (PEDW) (see Appendix 5.1). Comments were received regarding the proposed scope and approach of the assessment of transport and access effects and were considered in the preparation of the TA (see Appendix 13.1) and this chapter. The methodology proposed by the Scoping Report for the chapter was generally accepted.
- 13.1.18. **Table 13-1** sets out the main comments raised during the scoping and consultation process and how these have been addressed.

Table 13-1: Scoping Comments

Consultee (Date) and Comment	Response
Flintshire County Council	
10th September 2021 – Opinion sought on EIA Scoping Note	Proposal is unlikely to result in any significant environmental impact. No objection to the methods proposed in the report for identifying the locations and degree of impact during these phases.
3rd February 2022 - Flintshire County Council Pre-Application Scoping Meeting	<p>Agreement of the necessity of connecting the site to the wider cycle network along Weighbridge Road.</p> <p>Proximity of the site to future Deeside Parkway railway station would provide a convenient way for employees to access the site.</p> <p>Opportunities to revise existing bus services to route via the site.</p> <p>Trip generation and distribution to be undertaken using a first principles approach reflecting the site's historic operation and proposed changes as part of the development.</p> <p>Trip generation and distribution to be undertaken using a first principles approach reflecting the site's historic operation and proposed changes as part of the development.</p>
Planning & Environment Decisions Wales (on behalf of Welsh Government)	
28 th November 2021	The construction route and access to the site should be identified in the ES and construction traffic volumes and frequency should be provided as part of the description of the development. There were no additional comments.

13.4 SURVEY AREA & SCOPE

- 13.1.19. PEDW (on behalf of Welsh Government) received and reviewed a Scoping Report (SR) outlining the scope of the ES. Subsequently PEDW responded with comments noting that the construction route and access to the Site should be identified within the ES and provided as part of the description of the development. This has been included in the full ES chapter.
- 13.1.20. Welsh Government responded to the SR noting that consideration of the impact on their Strategic Highway Network should be considered, to ascertain whether further assessment would be required.

- 13.1.21. The Highway Authority considered that the proposal is unlikely to result in any significant environmental impact. “The operational phase is unlikely to impact highway usage with any significant transport impact limited to the construction phases. Otherwise, there was no objection to the methods proposed. Consideration of the Sustainable Transport Hierarchy should be considered in order to meet Welsh Government targets in achieving modal shift as detailed in Llwybr Newydd Wales Transport Strategy 2021”.
- 13.1.22. The EIA should also assess any impact these works will have on any level crossings that would be affected by the project, including Connors Quay No1 Sleeping Dog CNH3 188m 47cns and Pentre FP crossing CNH3 190m 67cns, and these should be included within the Transport Chapter of any submitted ES.
- 13.1.23. The links to be assessed within the study are shown in **Table 13-2**.

Table 13-2 Study Area Road Links

Reference	Link
1	A548 Weighbridge Road
2	A548 (East of Flintshire Bridge)
3	A548 (West of Flintshire Bridge)
4	Shotwick Road (East of Deeside Industrial Park)

13.5 METHODOLOGY

- 13.1.24. This section outlines the methodology for the assessment of the proposed development. It considers both the impact of construction and the ongoing operation of the Site.
- 13.1.25. The baseline traffic conditions have been established using traffics surveys including Automatic Traffic Counts (ATCs), and Classified Turning Counts. The surveys undertaken have been discussed with Flintshire County Council highway and transport officers.
- 13.1.26. Any growth in traffic levels has been considered across the network through a review and assignment of committed development.
- 13.1.27. The assessment will then quantify the predicted traffic generated by the proposed development both during the construction and operational phases.
- 13.1.28. For the highway network, the sensitivity to change in traffic levels of any given road link or junction is generally assessed by considering the residual capacity of the network under existing conditions. Where there is a high degree of residual capacity, the network may generally be considered less sensitive to increases in traffic, with sensitivity being low.
- 13.1.29. The significance of the predicted increase in traffic levels caused by the proposed development will be assessed against the thresholds defined in the IEMA guidelines. Broadly, where the

proposed increase in traffic is less than 30% then the effect of that increase may be considered to be not significant.

13.5.1 Assessment Scenarios

13.1.30. The assessment scenarios are as follows:

- Existing Situation – year of submission (2022) based on 2021 baseline surveys
- Construction Assessment – year of submission plus construction traffic (subject to detailed phasing)
- Future Baseline – 2026 including committed development
- Future Baseline with Development – 2026 as above plus development traffic including mitigation.

13.5.2 Construction

13.1.31. The construction traffic relates to the movement of Heavy Goods Vehicles (HGVs) transporting construction materials to and from the Site including concrete, aggregates, steels, components as well as construction plant that is likely to impact on the local highway network and any nearby receptors to the Site. Construction traffic will also comprise Light Goods Vehicles (LGVs) and cars for the construction workers and fit out contractors.

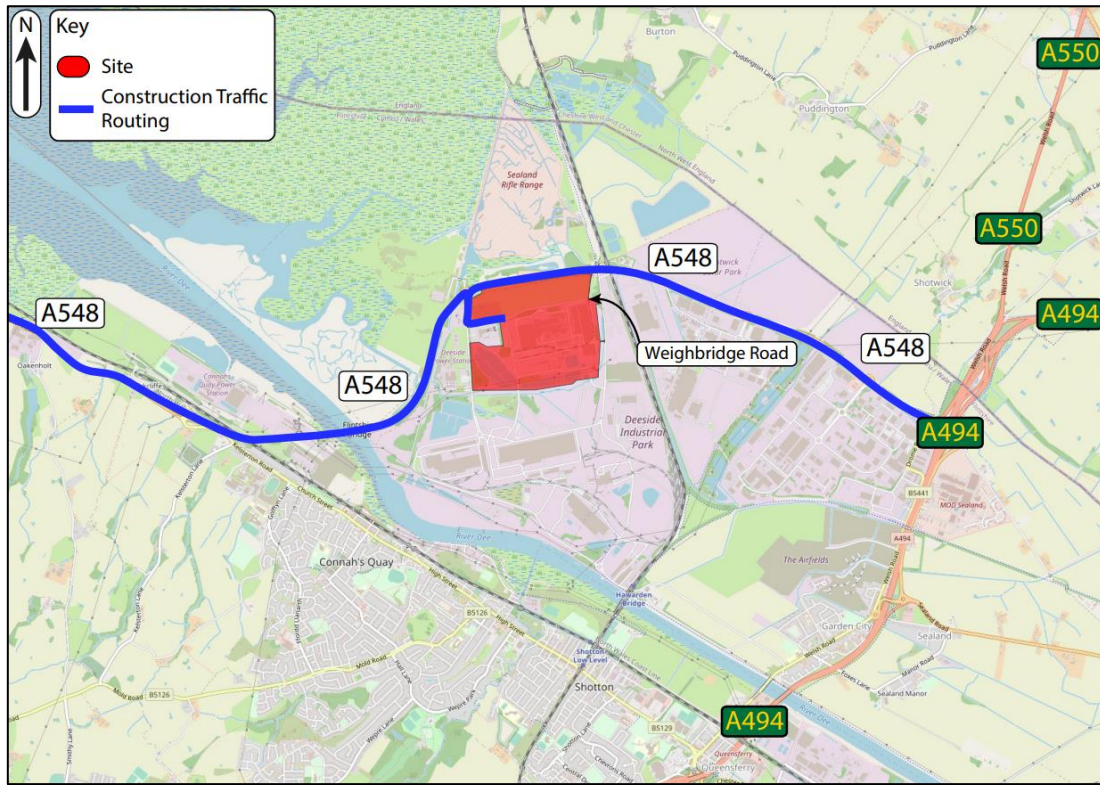
13.1.32. Increased traffic flows generated by the construction works could cause delays on the road network in the vicinity of the Site. The transportation of loads could cause delays and associated environmental impacts (such as severance, driver delay, pedestrian delay, as set out in the IEMA guidance) along the delivery route to the Site. Receptors of these effects include users of roads and residents of properties along the construction route.

13.1.33. At this stage it is expected that routes for construction traffic will mirror that of the operational routing to the Strategic Road Network unless there are any specific local origins for construction materials. Construction traffic routing is anticipated to be controlled via a Planning Condition with a Construction Traffic Management Plan.

13.1.34. From the Site access, construction traffic will route via the A548 located less than 1km away. The A548 is a dual carriageway subject to the national speed limit and links the Site with the strategic highway network. Eastbound, the A548 continues to the A494, a trunk road linking North Wales to North West England. Westbound, the A548 crosses Flintshire Bridge and continues towards Flint.

13.1.35. **Figure 13.2** shows the construction traffic routes from the site until reaching the strategic highway network at

Figure 13-2: Construction Traffic Routing



13.5.3 Operation

- 13.1.36. An assessment of trip generation has been undertaken for the operational phase of the proposed development. Trip generation has been undertaken using a ‘first principles’ approach that has been produced following detailed discussions with the Site operator reflecting historic and proposed Site operations.
- 13.1.37. Anticipated operational vehicle numbers (HGVs) provided by the Site operator have been used alongside operating hours and other operating characteristics to forecast the number and daily profile of movements compared to the existing brownfield use on the Site.
- 13.1.38. Vehicle movements will be assigned to the local highway network with routing based on access to the Strategic Road Network (SRN). Staff catchment will be based proportionally on the existing staff catchment.
- 13.1.39. The potential transport impacts of the trips arising from the proposed development during the weekday AM and PM peak periods are considered within the Transport Assessment, prepared in accordance with national guidance and submitted as part of the planning application.
- 13.1.40. Whilst the impact of traffic arising from the proposed development is considered in the Transport Assessment, it is not the same as the consideration required for the purposes of assessing the environmental impacts of traffic arising from new developments.
- 13.1.41. Guidance published by IEMA, requires that the following matters are considered in relation to road traffic:

- Severance;
- Pedestrian delay;
- Pedestrian amenity;
- Driver delay; and
- Accidents and safety.

13.5.4 Severance

- 13.1.42. Severance is defined as the perceived division that can occur within a community when it becomes separated by a major traffic artery and describes a series of factors that separate people from places and other people. Such division may result from the difficulty of crossing a heavily trafficked road or a physical barrier created by the road itself.
- 13.1.43. The measurement and prediction of severance is difficult, but relevant factors include road width, traffic flow, speed, the presence of crossing facilities and the number of movements across the affected route.
- 13.1.44. IEMA guidelines refer to the DfT 'Manual of Environmental Appraisal', which suggests that changes in traffic flow of 30%, 60% and 90% would be likely to produce 'slight' ('minor'), 'moderate' and 'substantial' changes in severance, respectively. It is advised that these broad indicators should be used with care and regard paid to specific local conditions.

13.5.5 Driver Delay

- 13.1.45. IEMA guidelines note that driver delay can occur at several points on the network, although the effects are only likely to be significant when the traffic on the highway network is predicted to be at or close to the capacity of the system.
- 13.1.46. A qualitative assessment has been undertaken to establish the impact on driver delay as a result of the Proposed Development.

13.5.6 Pedestrian Delay

- 13.1.47. The IEMA guidelines note that changes in the volume, composition and or speed of traffic may affect the ability of people to cross roads. Typically, increases in traffic levels result in increased pedestrian delay, although increased pedestrian activity itself also contributes. The IEMA guidelines do not set any thresholds, recommending instead that assessors use their judgement to determine the significance of the impact.
- 13.1.48. The IEMA guidelines refer to a report published by the Transport Research Laboratory (TRL) as providing a useful approximation for determining pedestrian delay. The TRL research concluded that mean pedestrian delay was found to be eight seconds at flows of 1 vehicles per hour and up to 20 seconds at 2,000 vehicles per hour for various types of crossing condition. This research has been reproduced in DMRB Volume 11, Section 3, Part 8. Figure 1 of this part of DMRB (Part 8) provides predictive mean pedestrian delay based on empirical data taking into account traffic flow and a range of parameters such as crossing width and vehicle speeds.

- 13.1.49. A two-way flow of 1,400 vehicles per hour has been adopted as a lower threshold for assessment (equating to a mean 10 second delay for a link with no pedestrian facilities) in the TRL report. Below this flow pedestrian delay is unlikely to be a significant factor. This provides a starting point for narrowing down the modelled routes within the study area and ensuring the routes selected exceeded the suggested threshold of analysis in DMRB Volume 11. It should be noted that for controlled forms of pedestrian crossing the pedestrian delays are less.

13.5.7 Pedestrian Amenity (including fear and intimidation)

- 13.1.50. According to the IEMA guidelines, pedestrian amenity is “broadly defined as the relative pleasantness of a journey, and is considered to be affected by traffic flow, traffic composition and pavement width / separation from traffic”. It can include fear and intimidation if they are relevant. The guidelines suggest tentative thresholds of significance would be where the traffic flow is halved or doubled.
- 13.1.51. Pedestrian fear and intimidation is related to the effects of traffic such as the volume of traffic, HGV composition, proximity to pedestrians or lack of protection.
- 13.1.52. In the absence of commonly agreed thresholds for judging the significance of likely fear and intimidation effects, the IEMA guidelines suggest thresholds summarised in **Table 13-3** which have been applied to the assessment.

Table 13-3: Criteria for Pedestrian Fear and Intimidation

Degree of Hazard	Average Flow	Total HGV	Average Speed (mph)
Extreme	1,800+ vehicles/hour	3,000+	20+
Great	1,200 – 1,800 vehicles/hour	2,000 – 3,000	15 – 20
Moderate	600 – 1,200 vehicles/hour	1,000 – 2,000	10 - 15

13.5.8 Accidents and Safety

13.1.53. The IEMA guidelines do not include any definition in relation to accidents and safety, suggesting that professional judgement will be needed to assess the implications of local circumstance, or factors which may increase or decrease the risk of accidents.

13.5.9 Overview

13.1.54. The TA (in **Appendix 13.1**) contains a detailed analysis of the transport aspects of the proposed development and in particular analysis of the traffic impacts and driver delay potentially caused (Chapters 6 of the TA contained as **Appendix 13.1**). A summary of these driver delay impacts is reported in this ES chapter.

13.1.55. The future baseline traffic conditions 'without development' are compared with future 'with-development' traffic conditions to assess the effect of the proposed development on the transport networks, using the IEMA criteria. It is important to note that future baseline conditions are included as these flows account for growth in background traffic levels as a result of committed development in the area.

13.1.56. The committed developments included within the scope of the TA have been identified following a screening process of the long list of cumulative schemes and discussions with Flintshire County Council officers. This screening process sought to identify those committed developments where transport flows overlap with the study area of the TA for the Proposed Development, or those which otherwise have the potential to interact.

13.1.57. The core assessment undertaken and reported in this chapter has assumed the design features of the scheme as the internal site layout had not been finalised. These include the new internal site layout and improved pedestrian and cycle connectivity. This is referred to as 'embedded mitigation' as it is intrinsic to the proposed development. The traffic generation estimates have assumed this level of intervention.

13.1.58. Following the assessment of effects, potential mitigation is described which leads to an assessment of those measures. An assessment of residual effects following implementation of these mitigation measures is then provided.

13.5.10 Determining Effect Significance

- 13.1.59. The significance criteria within the IEMA guidelines provide definitions of environmentally sensitive receptors, as well as affected groups and special interests. It further advises that the traffic effects from proposed development should be considered in respect of these receptors.
- 13.1.60. The sensitivity of a road or street can be defined by the vulnerability of the user groups who may use it, e.g. elderly people or children. A sensitive area may be where pedestrian activity is high, for example in the vicinity of a school or where there is already an existing safety issue. It should be noted that the sensitivity of the receptor is judged on the sensitivity of road users (primarily pedestrians). It also takes account of the existing nature of the road e.g. an existing 'A' road is likely to have a lower sensitivity than a minor residential road.
- 13.1.61. **Table 13-4** details the environmentally sensitive receptors as defined by the IEMA guidelines.

Table 13-4 Receptor Sensitivity Criteria

Receptor Type	Receptor Sensitivity
Receptors with low sensitivity to traffic flows and those sufficiently distant from affected roads and junctions	Negligible
Receptors with some sensitivity to traffic flow: places of worship, public open space, tourist attractions and residential areas with adequate footway provision	Low
Traffic flows sensitive receptors: congested junctions / links, doctor's surgeries, hospitals, shopping area with roadside frontage, roads with narrow footways, recreation facilities	Medium
Receptors of greatest sensitivity to traffic flows: schools, colleges, playgrounds, accident clusters, retirement homes, roads without footways that are used by pedestrians	High

- 13.1.62. A desktop exercise, augmented by a Site visit has been undertaken to identify the sensitivity of each receptor in the study area. All road links within the study area as detailed in **Table 13-11** have been assessed and assigned sensitivity primarily based on the criteria set out in the above table and the assessors experience and judgement. The sensitivity of each link is provided in the Baseline Section of this chapter.

13.5.11 Magnitude of Impact

- 13.1.63. Each effect is determined as the predicted deviation from the baseline conditions. The IEMA guidelines advise that changes in traffic flow can be categorised by the magnitude of change and categorised as a level of significance accordingly. This guidance sets out consideration, and in some cases thresholds, in respect of changes in the volume and composition of traffic to facilitate

a subjective judgement of traffic impact and significance. These thresholds are guidance only and provide a starting point by which a detailed analysis will inform a subjective analysis of the impact magnitude.

- 13.1.64. Within the IEMA guidance, two broad rules are suggested which can be used as a screening process to limit the scale and extent of the assessment:
- **Rule 1:** include highway links where traffic flows will increase by more than 30% (or the number of heavy goods vehicles will increase by more than 30%);
 - **Rule 2:** include any other specifically sensitive areas where traffic flows have increased by 10% or more.
- 13.1.65. Where the predicted increase in traffic flows is lower than the above thresholds, the IEMA guidelines suggest the significance of the effects can be stated to be negligible and further detailed assessments are not warranted. Furthermore, increases in traffic flows below 10% are generally considered to be insignificant in environmental terms given that daily variations in background traffic flow may vary by this amount.
- 13.1.66. To assist with the judgement of magnitude of impact, reference has been made to the IEMA guidelines. This guidance sets out consideration, and in some cases thresholds, in respect to changes in the volume and composition of traffic to facilitate a subjective judgement of traffic impact and significance. These thresholds are guidance only and provide a starting point by which a detailed analysis will inform a subjective judgement of the impact magnitude.
- 13.1.67. The standard significance criteria relates to the scale of impact: minor, moderate or major. These can be cross-classified with the type of impact: negligible, beneficial or adverse.
- 13.1.68. **Table 13-5** demonstrates the criteria used to determine magnitude of impacts. However, the absolute level of an impact is also important e.g. the total flow of traffic or HDVs on a link. This is because an increase of, say, 100% in the traffic flow on a road is likely to still lead to negligible or minor impacts if the existing flows are low.

Table 13-5 - Magnitude of Impact (Based on IEMA Guidelines)

Issue / Impact	Magnitude of Impact			
	Negligible	Minor	Moderate	Major
Severance	Change in total traffic or HDV flows of less than 30%	Change in total traffic or HDV flows of 30-60%	Change in total traffic or HDV flows of 60-90%	Change in total traffic or HDV flows over 90%
Pedestrian Delay	Two-way traffic flow < 1,400 vehicles per hour	A judgement based on the road links with two-way traffic flow exceeding 1,400 vehicles per hour in context of the individual characteristics		
Pedestrian Amenity	Change in total traffic or HDV flows < 100%	A judgement based on the routes with >100% change in context of their individual characteristics		
Driver Delay	A judgement based on the results of junction capacity assessment			
Accidents and Safety	A judgement based on quantitative analysis as set out in the Transport Assessment and summarised in this chapter			

13.5.12 Significance Criteria

The magnitude of change and the sensitivity of the receptor are considered further to determine the significance of the effect (See **Table 13-6**).

Table 13-6 - Significance Criteria

Sensitivity of Receptor	Magnitude of Impact			
	Major	Moderate	Minor	Negligible
High	Major	Major	Moderate	Negligible
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

13.1.69. In EIA terms, any effect greater than Minor is considered to be significant.

13.1.70. The temporal scope of effects is described as short, medium or long term, or permanent, as shown below. For the operational assessment the impacts are permanent, whereas for construction they are likely to be short to medium term and temporary.

- Short term: < 12 months.
- Medium term: 1 – 5 years.
- Long term: + 5 years.
- Permanent: effects that are considered to be long lasting.

13.5.13 Assumptions and Limitations

13.1.71. Traffic generation estimates for the construction of the proposed development are based on a number of assumptions on matters such as material quantities, number of workers, indicative construction programme etc. However, worst case assumptions have been applied to determine the likely peak period and highest traffic generation which has been used to determine the associated effects.

13.1.72. The main assumptions which form the basis of assessment are those used to derive the predicted trip generation of the proposed development. These assumptions have been made through iterative discussion with Shotton Mill and are considered to closely reflect historic and proposed operation.

13.6 BASELINE CONDITIONS

13.6.1 Overview

13.1.73. Baseline transport conditions have been established through a combination of traffic surveys on the local road network, desk-based audits and on-site observations undertaken in 2021. These are detailed in the Transport Assessment (**Appendix 13.1**) and summarised below.

13.6.2 Data Sources

13.1.74. The following data sources used to inform the assessment:

- OS mapping and open-source data;
- Information and data provided on the Planning Portal related to this site and other local development;
- Personal Injury Collision data from Flintshire County Council and North Wales Police;
- Adopted highway boundary mapping data acquired from Flintshire County Council;
- Site visit conducted on the 23 July 2021;
- Traffic surveys covering the local and strategic transport network;
- UPM Shotton staff travel patterns; and
- Department for Transport (DfT) Fixed Traffic Counter data and other available traffic data.

13.6.3 Walking

13.1.75. Due to the industrial nature of the Site location, current walking accessibility of the Site is considered to be poor. There are no footways present in the immediate vicinity of the Site, with roads having no footways either side of the carriageway. Additionally, there are no nearby accessible Public Rights of Way (PROWs), with a PROW located approximately 1.5km to the south being inaccessible by foot from the Site.

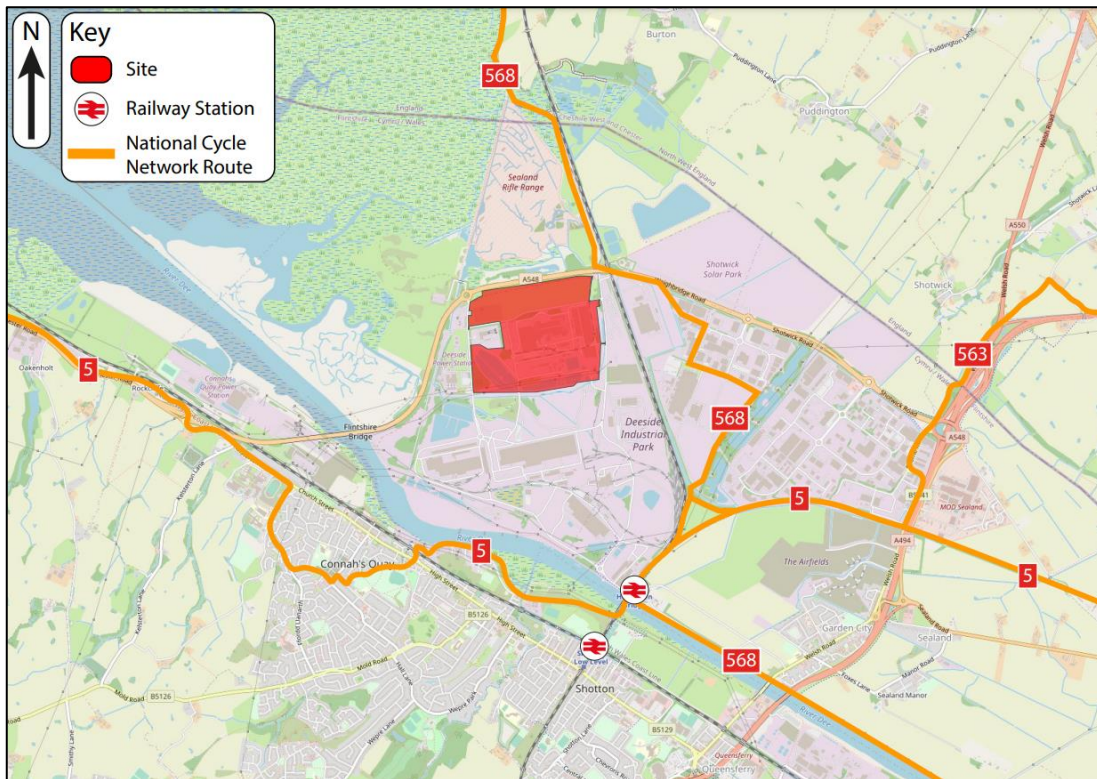
13.1.76. Internally, there exist some footways along the peripheral road that runs through the Site, but these are limited in size and quality, with the primary means of travel within the Site being vehicular.

13.6.4 Cycling

13.1.77. The Site benefits from its close proximity to a large number of National Cycle Network (NCN) cycle routes, which link the Site to a range of nearby settlements.

13.1.78. **Figure 13.3** shows the location of the cycle routes in relation to the Site.

Figure 13.3: Cycle Routes



- 13.1.79. NCN Route 568 is the nearest cycle route from the current Site access on Weighbridge Road, being located 1km away and can be accessed within a 3-minute cycle from the Site via Weighbridge Road and the unnamed link which routes close to the eastern boundary of the Site. At this point, the users can continue northbound on Route 568, which is an off-road section of route providing a direct connection to Little Neston and Neston, each of which can be accessed within 20 minutes from the Site.
- 13.1.80. Cyclists can then continue on the NCN towards the remainder of the Wirral and Liverpool. **Photograph 13.1** shows Route 568 northbound, illustrating the quality of the route.
- 13.1.81. To the north east of the Site, NCN Route 568 connects to Deeside Industrial Park to the east via a mixture of off-road cycle route and on carriageway routing. This route runs to the immediate south of the A548 at ground level.

Photograph 13.1: NCN Route 568, North of Weighbridge Road (July 2021)



- 13.1.82. Route 568 can be used by cyclists to travel towards the south. The route continues through Deeside Industrial Park on shared pedestrian/cycleways, as shown in **Photograph 13.2**.

Photograph 13.2: NCN Route 568 Deeside Industrial Estate (July 2021)



- 13.1.83. Route 568 then joins the Chester Millennium Greenway, approximately 13 minutes from the Site access which forms part of the NCN Route 5. The Millennium Greenway is a 12km flat traffic-free route that runs from Shotton Railway Station to Chester City Centre and provides the Site with a traffic-free route eastbound to Chester city centre. Additionally, the Chester Millennium Greenway connects with NCN Route 563, which runs north from the Greenway and links it with Ellesmere Port, and Route 568 that forms part of the Dee Coastal Path.
- 13.1.84. The Dee Coastal Path provides an alternative route from Shotton to Chester which runs along the River Dee. It also passes Garden City along the way and provides a traffic-free route running alongside the river.
- 13.1.85. The Chester Millennium Greenway also crosses Hawarden Bridge, providing a link to Hawarden Bridge and Shotton High and Low railway stations. While Hawarden Bridge station features very limited services and facilities, Shotton Railway Station benefits from 20 storage spaces for cycles which can be used for multi-modal journeys.
- 13.1.86. From Shotton, NCN Route 5 continues to the north-west, linking the Site with Connah’s Quay and Flint. Additional destinations can also be accessed further west.
- 13.1.87. The above demonstrates that the Site benefits from very good cycle links.
- 13.1.88. Employees at the Site are clearly using these routes and the existing cycle parking facilities within the Site. **Photograph 13.3** shows the current cycle parking available onsite, and a snapshot of utilisation.

Photograph 13.3: Parking Facilities Onsite (July 2021)

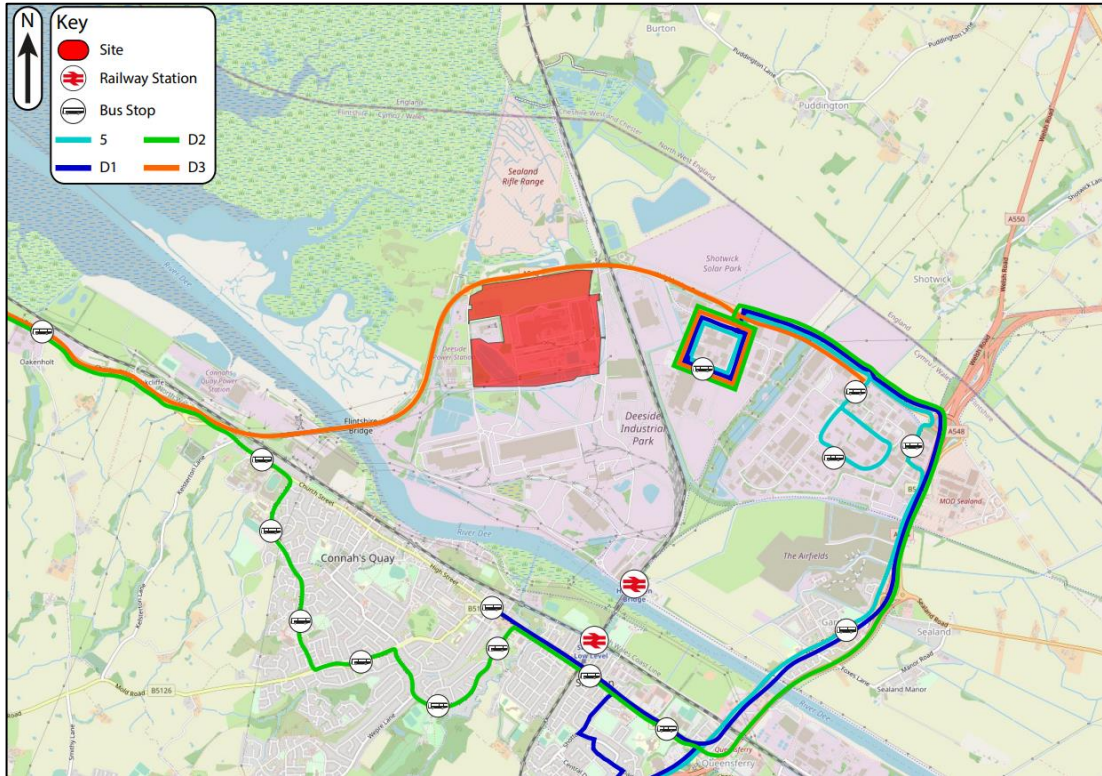


13.6.5 Public Transport

- 13.1.89. The nearest bus stop to the Site is located in Deeside Industrial Park and can only be accessed via Weighbridge Road. At present there is no footway on Weighbridge Road, meaning that pedestrians need to walk in the road to access the bus stop.

13.1.90. **Figure 13.4** details the bus routes that have an hourly frequency or better from Deeside Industrial Park. It shows that a number of services depart from the stop to many nearby towns and settlements, including Shotton, Connah’s Quay, Flint and Garden City.

Figure 13.4: Bus Routes



13.1.91. Additional services not shown on **Figure 13.4** also serve the stop during the peak hours to and from additional destinations, including Chester, Broughton, and Birkenhead via the Wirral.

13.1.92. **Table 13-7** details the services that are accessed from Tenth Avenue Bus Stop, Deeside Industrial Estate.

Table 13-7 - Bus Services from Tenth Avenue Bus Stop

No.	Operator	Route	Daytime Frequency (mins)		
			Mon-Fri	Saturday	Sunday
5	Arriva Wales	Mold – Ellesmere Port	60	60	-
		Ellesmere Port – Mold	60	60	-
D1	P & O Lloyd	Deeside Industrial Park – Flint	60	-	-

No.	Operator	Route	Daytime Frequency (mins)		
			Mon-Fri	Saturday	Sunday
D2	P & O Lloyd	Deeside Industrial Park – Connah’s Quay	60	-	-
D3	P & O Lloyd	Deeside Industrial Park – Flint	60	-	-
204	Stagecoach	Deeside Industrial Park – Chester	4 daily	-	-
		Chester – Deeside Industrial Park	4 daily	-	-
811	A2B Travel	Moreton – Deeside – Broughton	3 daily	-	-
		Broughton – Deeside – Moreton	2 daily	-	-

- 13.1.93. The Site is located in proximity to a number of railway stations, with Hawarden Bridge and Shotton railway stations both being located approximately 3 - 4km directly south from the Site. Routes to the station are available either via the internal roads within the Site and the adjacent Tata Steel site to the south. This route lacks a formal footway and rights of access need to be confirmed.
- 13.1.94. An alternative route is also available via Deeside Industrial Park, via Tenth Avenue and the Chester Millennium Greenway.
- 13.1.95. Hawarden Bridge Railway Station is located on the Borderlands Line between Wrexham and Bidston. However, at present the station lacks facilities, and only receives a limited service daily with four trains travelling to Wrexham from Bidston, with the first train at 07:54 and the last train at 18:08, and three services to Bidston, with the first and last service at 07:02 and 17:03 respectively. While some journeys may be possible using these services, it limits its practical use for many potential users, especially as Shotton railway station is located less than 10 minutes south across Hawarden Bridge which benefits from a significantly better service.
- 13.1.96. Shotton Railway Station is split into a high and low level station, although both are located a short distance between each other with a pedestrian link connecting the two. Services from both the Borderlands Line and the North Wales Coast Line serve the station, with services to Wrexham, Bidston, Holyhead, Manchester Airport, Crewe, and Chester all available from the station.

- 13.1.97. All Borderlands Line services call at the station, in contrast to Hawarden Bridge Railway Station located less than 1km to the northeast. Services continue southbound towards Wrexham Central via Deeside, and services continue northbound towards Bidston station, where users can catch Merseyrail services to Birkenhead and Liverpool. Services are generally hourly in each direction.
- 13.1.98. Shotton Railway Station also benefits from being located on the North Wales Coast Line. Services calling at the station vary, with a wide range of destinations and onward connections available from the station. Nearby destinations include Flint and Chester, but destinations such as Holyhead, Birmingham New Street, Manchester Piccadilly and Manchester Airport can all be accessed directly from the station, with these destinations providing a number of onward journeys. Its location on the North Wales Coast Line and the number of routes serving the station result in a varied timetable through the day, but an hourly service at the least is provided in each direction, with additional services supplementing this.
- 13.1.99. The location of the railway stations in proximity to the Site can be seen in **Figure 13.5**, and **Table 13-8** details the routes accessible from Shotton Railway Station.

Figure 13.5: Rail Routes

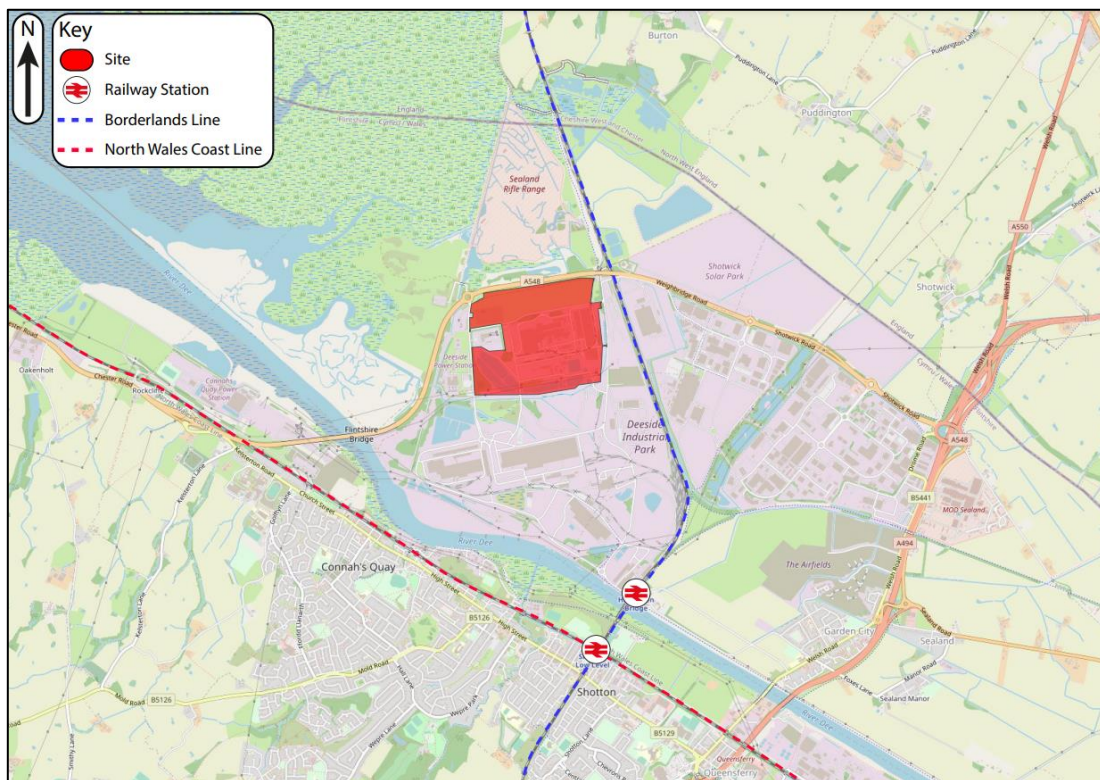


Table 13-8 - Rail Services from Shotton Railway Station

Route	First Train (Mon-Sat)	Last Train (Mon-Sat)	Daytime Frequency (Mon-Sat)	Daytime Frequency (Sun)
Wrexham General – Bidston	07:00	20:26	60	90
Bidston – Wrexham General	07:56	22:51	60	90
Llandudno/Holyhead – Manchester/Midlands via Chester	05:22	22:46	Varies – primarily every 60 minutes	Varies – primarily every 60 minutes
Manchester/Midlands – Llandudno/Holyhead via Chester	07:30	23:06	Varies – primarily every 60 minutes	Varies – primarily every 60 minutes

13.1.100. In addition to the current rail services, improvements are currently being considered by Welsh Government, Transport for Wales (TfW) and Network Rail (NR) which would improve the connectivity of the area. Primarily, there are discussions ongoing for the construction of Deeside Parkway station, which would be located to the northeast of the Site. Located on the Borderlands Line, the new station would provide excellent access from the Site, being located less than 1km away. At present, there are no firm commitments by NR for the provision of the station, but it is being considered in the wider prospect of the North East Wales Metro. In 2020, the Welsh Minister for Economy & Transport wrote to the Secretary of State for Transport to request the station be included in NR New Stations Fund 3. Should the station be included, it could be operational by 2024¹.

13.1.101. The North East Wales Metro proposes the transformation of rail and bus services within North East Wales. While still in its early phases, TfW are already planning from December 2021 to increase the number of services on the Borderlands Line between Wrexham and Bidston to two per hour, with fully rebuilt Metro trains. These trains will provide a faster service and more capacity as well as improved onboard facilities including air conditioning.

13.6.6 Highway

13.1.102. At present, there is a single priority junction vehicular access to the Site from the local highway, and this is accessed off Weighbridge Road. As shown in **Photograph 13.4**, this is a wide two-way

¹ <https://gov.wales/minister-economy-transport-and-north-wales-ken-skates-has-written-secretary-state-transport>

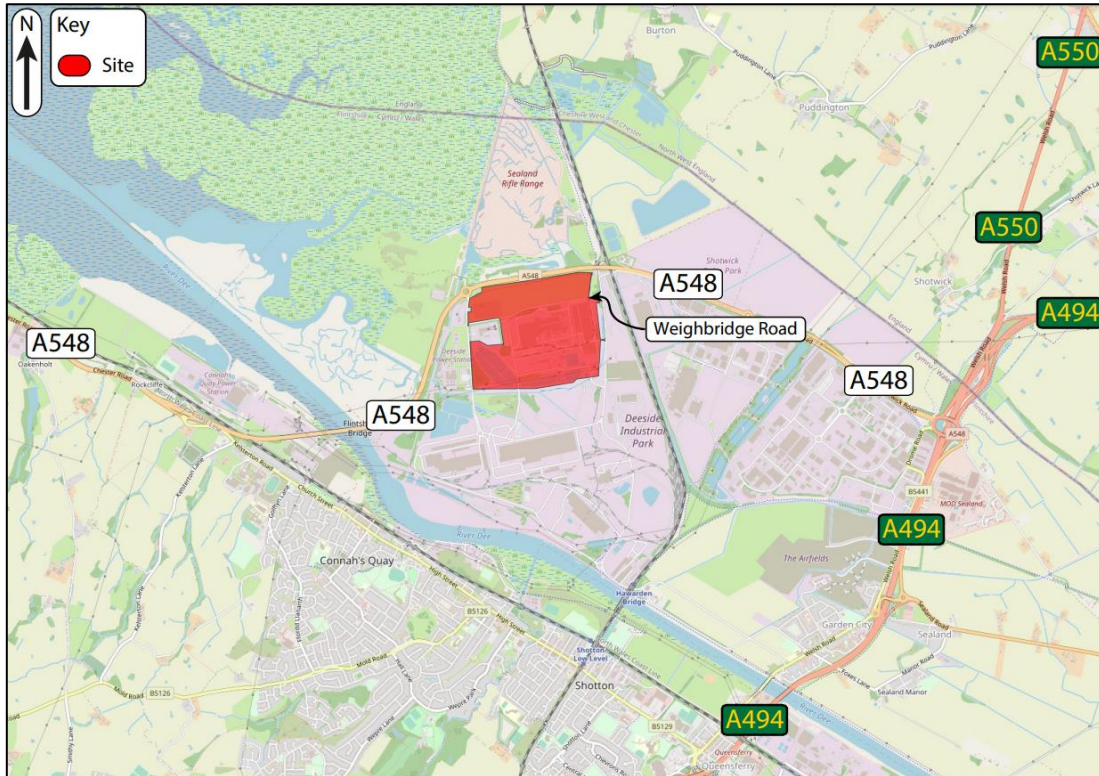
single carriageway road, which is subject to a 30mph signed speed limit, and features streetlighting. It does not currently feature a footway but does benefit from traffic calming features in part. The industrial nature of the surrounding areas results in no weight restrictions, and a carriageway of 8m. There are large verges located either side of the carriageway in most parts.

Photograph 13.4: Weighbridge Road (July 2021)



- 13.1.103. From the Site access, vehicular traffic continues to the A548 located less than 1km away. The A548 is a dual carriageway subject to the national speed limit and links the Site with the Strategic Road Network. Eastbound, the A548 continues to the A494, a trunk road linking North Wales to North West England.
- 13.1.104. Westbound, the A548 crosses the River Dee on the Flintshire Bridge and continues as a dual-carriageway past Connah's Quay. From here, it reverts to a single carriageway continuing towards Flint.
- 13.1.105. **Figure 13.6** show the nearby highways located near the Site.

Figure 13.6: Local and Strategic Highway Network



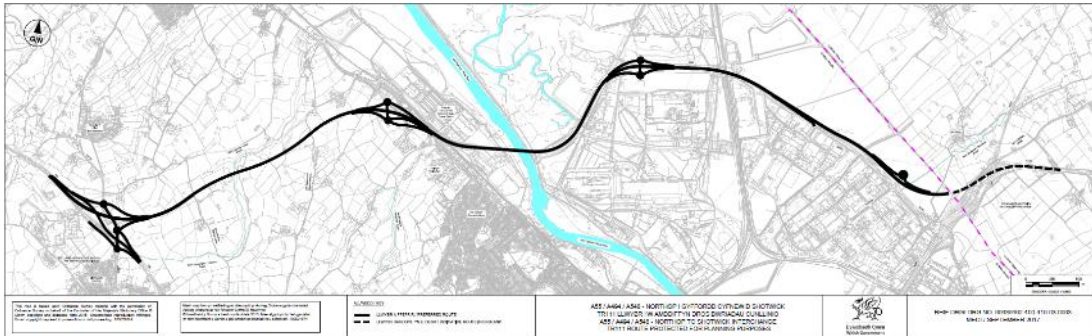
13.1.106. A selection of DfT fixed traffic counter flows and percentage HGV are shown in **Table 13.9**.

Table 13-9 - DfT Fixed Traffic Counters (Selected Links)

Link	Year	Count Method	Direction	All Vehicles	HGV	%HGV
A548	2020	Estimated	East	5,205	597	11%
	2020		West	5,274	662	13%
A550	2020	Estimated	Two Way	11,632	1397	12%
A494	2020	Counted	North	14,746	1939	13%
	2020		South	14,769	1745	12%

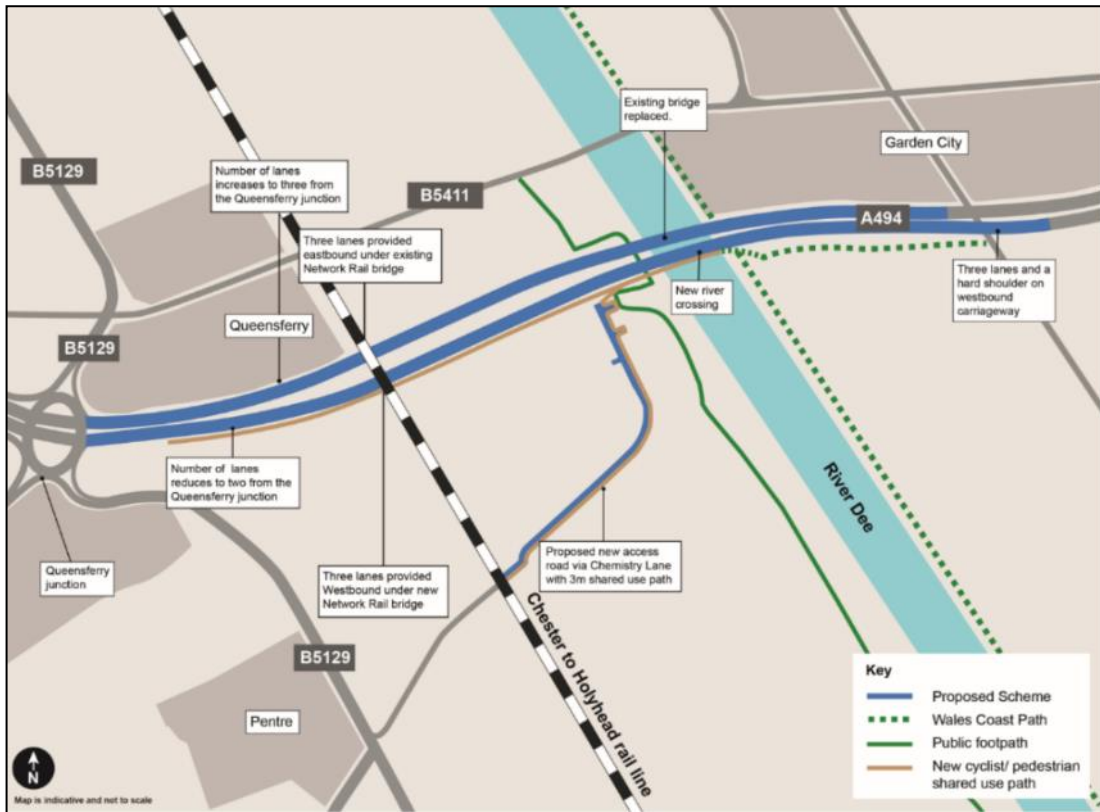
13.1.107. The Welsh Government have planned to improve journeys between the River Dee and Northop Interchange through the upgrading of the A548 to expressway standards (the Red Route), and construction of a new dual-carriageway between Kelsterton Junction and the A55. This would involve the upgrading of the present junctions of the A548, including the access roundabout to the Site, to grade separated junctions, as can be seen in **Figure 13.7**.

Figure 13.7: Potential Red Route Improvements to A548



- 13.1.108. The detailed design and construction were estimated to begin in 2023. However, in June 2021, the Deputy Minister for Climate Change announced a freeze on new road building projects, whilst a review of highway schemes across Wales is carried out. This is in reaction to the climate emergency declared by the Welsh Government, and consideration will be given on how the Government can shift spending towards maintaining existing roads, rather than building new ones.
- 13.1.109. The route improvements in the vicinity of the Site, including the upgraded grade separated junction do not impinge on the proposed development.
- 13.1.110. An additional road improvement scheme is being considered along the A494. The current River Dee Bridge crossing on the A494 is the primary route between North Wales and North West England. However, it suffers from a number of structural issues that means that it will be unable to continue in its current form in the future, and Welsh Government have held a consultation to consider removing and replacing the bridge.
- 13.1.111. Following consultation, the Welsh Government have identified a preferred option. This involves the construction of a new river crossing for traffic travelling westbound, and the partial reuse of the current crossing for eastbound traffic.
- 13.1.112. New pedestrian and cycle links are to be provided in addition to the highway improvements. This will significantly improve links between Deeside Industrial Estate and Queensferry and the remainder of Deeside.
- 13.1.113. **Figure 13.8** shows the proposed plans to upgrade the River Dee Bridge crossing.

Figure 13.8: Potential Upgrading of River Dee Bridge, A494



13.6.7 Baseline Traffic Flows

- 13.1.114. The Baseline Traffic Flows have been derived from a series of traffic counts that were undertaken on the local highway in November and December 2021 comprising a mixture of Automatic Traffic Counts (ATCs) and Classified Turning Counts (CTCs) including Queue Length Surveys.
- 13.1.115. **Table 13.10** shows the 24 hour AADT of the surveyed links for the Baseline Traffic Flows.

Table 13-10 - 24 hour Baseline Average Annual Daily Traffic

Link	Direction	24 Hour AADT				Average Speeds (mph)
		Light Vehicles (LV)	Heavy Duty Vehicles (HDV)	HDV%	Total Vehicles	
Weighbridge Road	Westbound	6,217	9,93	16%	7,209	32.3
Weighbridge Road	Eastbound	5,496	1,435	26%	6,930	37.6
A548 (East of Flintshire Bridge)	Westbound	5,579	9,30	17%	6,508	33.5
A548 (East of Flintshire Bridge)	Eastbound	5,232	1,268	24%	6,500	29.5
A548 (West of Flintshire Bridge)	Westbound	5,358	8,92	17%	6,250	60.3
A548 (West of Flintshire Bridge)	Eastbound	5,070	1,234	24%	6,304	63.8
Shotwick Road	Westbound	8,475	3,123	37%	11,597	38.4
Shotwick Road	Eastbound	9,112	2,491	27%	11,602	40.8

13.6.8 Sensitivity

13.1.116. A desktop exercise, augmented by a Site visit, has been undertaken to identify the sensitivity of each receptor in the study area. All road links within the study area have been assessed and assigned sensitivity primarily based on the criteria set out in **Table 13-6** and the assessors' experience and judgement. A summary is provided in **Table 13-11**.

Table 13-11 - Study Area Receptor Sensitivity

Reference	Link	Sensitivity
1	A548 Weighbridge Road	Negligible
2	A548 (East of Flintshire Bridge)	Negligible
3	A548 (West of Flintshire Bridge)	Negligible
4	Shotwick Road (East of Deeside Industrial Park)	Negligible

13.6.9 Future Baseline

- 13.1.117. In relation to the Future Baseline, there will be changes on the highway network in the absence of the Proposed Development. These are due to vehicle movements arising from committed developments (i.e. cumulative schemes) in the area. The Future Baseline traffic flows for 2026 take into account expected growth in the area. These flows have been derived as follows.
- 13.1.118. The assessment year for the Future Baseline traffic flows is 2026, representing the year by which the proposed development is expected to be completed and fully occupied.
- 13.1.119. The Future Baseline traffic flows are based on the following committed developments:
- **Gasification Plant** - Erection of an advanced gasification plant and associated development (Logik), Weighbridge Road, Deeside Industrial Estate, Deeside, CH5 2LL. Trip generation and distribution considered within Traffic Review report associated with application 062774, which referenced the original approved application for the site (058270).
 - **Northern Gateway** - The outline planning permission for a mixed-use development at the Northern Gateway (former Corus Garden City site), Deeside, which comprises: “Employment-led mixed-use development, incorporating Logistics and Technology Park (B1, B2, B8) with residential (C3), local retail centre (A1), hotel (C1), training and skills centre (C2, D1), new parkland; conversion of buildings, demolition of barns; and associated infrastructure comprising construction of accesses, roads, footpaths / cycle paths, earthworks and flood mitigation / drainage works at Northern Gateway, Land off Welsh Road, Deeside.
- 13.1.120. The committed developments included in the assessment are those schemes identified in (Chapter 3): EIA Scoping and Methodology that have the benefit of planning permission, i.e. are committed. For some Sites, the associated Transport Assessment or Transport Statement did not assess the network that is included in the study area for this assessment. As such, direct consideration of those sites is not required. Full details of the methodology are provided in the TA.

Future baseline conditions for the assessment year of 2026 are summarised in Table 13-12 (24 Hour AADT), Table 13-13 (AM Peak Hour) and Table 13-14 (PM Peak Hour). Table 13-12: 24 hour Baseline and Committed Development Average Annual Daily Traffic

Link	Direction	24 Hour AADT				Average Speeds (mph)
		Light Vehicles (LV)	Heavy Duty Vehicles (HDV)	HDV%	Total Vehicles	
A548 Weighbridge Road	Westbound	7,461	1086	13%	8,547	32.3
A548 Weighbridge Road	Eastbound	6,777	1530	18%	8,306	37.6
A548 (East of Flintshire Bridge)	Westbound	6,854	1017	13%	7,871	33.5
A548 (East of Flintshire Bridge)	Eastbound	6,471	1354	17%	7,825	29.5
A548 (West of Flintshire Bridge)	Westbound	6,634	980	13%	7,613	60.3
A548 (West of Flintshire Bridge)	Eastbound	6,309	1320	17%	7,629	63.8
Shotwick Road	Westbound	9,756	3217	25%	12,973	38.4
Shotwick Road	Eastbound	10,356	2584	20%	12,940	40.8

Table 13-13: AM Peak Hour Baseline and Committed Development

Link	Direction	Average AM Peak hour				Average Speeds (mph)
		Light Vehicles (LV)	Heavy Duty Vehicles (HDV)	HDV%	Total Vehicles	
A548 Weighbridge Road	Westbound	425	63	13%	489	31.0
A548 Weighbridge Road	Eastbound	517	119	19%	636	37.9
A548 (East of Flintshire Bridge)	Westbound	280	111	28%	391	33.8
A548 (East of Flintshire Bridge)	Eastbound	550	121	18%	670	29.2
A548 (West of Flintshire Bridge)	Westbound	265	91	26%	356	58.8
A548 (West of Flintshire Bridge)	Eastbound	550	117	18%	667	65.1
Shotwick Road	Westbound	1037	290	22%	1327	38.2
Shotwick Road	Eastbound	580	263	31%	843	40.7

Table 13-14: PM Peak Hour Baseline and Committed Development

Link	Direction	Average PM Peak hour				Average Speeds (mph)
		Light Vehicles (LV)	Heavy Duty Vehicles (HDV)	HDV%	Total Vehicles	
A548 Weighbridge Road	Westbound	693	80	10%	773	31.3
A548 Weighbridge Road	Eastbound	500	114	19%	614	38.1
A548 (East of Flintshire Bridge)	Westbound	731	100	12%	831	33.9
A548 (East of Flintshire Bridge)	Eastbound	386	95	20%	481	29.1
A548 (West of Flintshire Bridge)	Westbound	708	97	12%	805	60.8
A548 (West of Flintshire Bridge)	Eastbound	374	97	21%	471	62.9

Link	Direction	Average PM Peak hour				Average Speeds (mph)
		Light Vehicles (LV)	Heavy Duty Vehicles (HDV)	HDV%	Total Vehicles	
Shotwick Road	Westbound	680	198	23%	878	39.4
Shotwick Road	Eastbound	1208	172	12%	1380	39.1

13.6.10 Construction

13.1.121. The effects of construction traffic will be minimised through the implementation of a Construction Traffic Management Plan (CTMP) which can be regarded as a standard control measure for applications of this scale and which is expected to be secured by planning condition. Specific measures can be agreed with the highways authority when discharging the planning condition relating to the CTMP, however it is expected that the CTMP will include the following:

- Phasing of construction;
- Access arrangements for workers and for HGVs;
- Working hours are likely to be limited to 07.00-18.00 on weekdays, 07.00-13.00 on Saturdays, no working on Sunday or Bank Holidays without prior agreement with the highway and local planning authorities;
- Construction traffic routing which will be confined to major highways. It is anticipated that most construction materials will arrive directly via A548 Weighbridge Road / Shotwick Road and the A494;
- On-site HGV wheel wash facilities will be provided and engine idling whilst stopped will be minimised;
- Traffic management measures; and
- Parking and loading arrangements.

13.6.11 Completed Development

13.1.122. The following access arrangements are proposed in related to the proposed development;

- Upgraded access between the site and A548 Weighbridge Road;
- New pedestrian / cycle path connecting the site with the National Cycle Network to the north east of the Site.

13.6.12 Sustainable Travel Measures

- 13.1.123. A number of sustainable travel measures will be implemented to ensure the impact of the development is mitigated. The Transport Assessment explores these opportunities.
- 13.1.124. The development will include the construction of a foot/cycleway from the Site entrance to the existing National Cycle Network approximately 1km from the Site entrance. This will connect the site to the wider cycle network, and provide good routes from the Site to many nearby towns and cities.
- 13.1.125. The current on-site cycle infrastructure at the Site will also see improvement, with improved cycle parking to be provided to further build on the current parking facilities, which could potentially include e-bike charging points for users to recharge their e-bikes.
- 13.1.126. Liftshare as a car-sharing platform will be encouraged amongst members of staff, as the shift work-pattern has good scope to be incorporated into lift share, due to a large number of workers beginning and concluding work at similar times.
- 13.1.127. The above measures will be incorporated into a Workplace Travel Plan that will support the Site, ensuring that members of staff are aware of the travel options available to them.

13.7 CONSTRUCTION

13.7.1 Assessment of Effects

- 13.1.128. This section assesses the impact during the construction of the Site. It assumes that mitigation has been implemented to lessen the impact of the construction.
- 13.1.129. The proposed development will be constructed over a 4 year period between 2022 and 2026.
- 13.1.130. Construction traffic would include the movement of workers and construction vehicles associated with the construction of individual buildings and supporting infrastructure.

13.7.2 Vehicle Movements

- 13.1.131. The construction process would require a range of skills from general labourers and skilled operatives through to professionals and management. It is envisaged that works would originate from a variety of sources, with the core coming from Flintshire and the surrounding areas with others, particularly those with specialist skills originating from a wider catchment.
- 13.1.132. A summary of the main construction elements and associated vehicles is provided in **Table 13.15**.

Table 13-15: Construction Traffic Summary

Element	HGVs	Vehicle Details	Cars	Details	Total
Foundation Pouring 700 m2	88	transmixer concrete trucks	-	-	-
Precast transport to site	12	Long Vehicle (12m) / HGV	-	-	-
Steel transport to	6	Long Vehicle (12m) / HGV	-	-	-
Construction material	6	Long Vehicle (12m) / HGV	-	(LW Concrete Blocks, Cement, Rebar, plaster, Paint, Pipes, Spools, cable drums, etc)	-
Project	12	Long Vehicle (12m) / HGV	-	-	-
600 Construction	-	-	200	-	-
Catering	-	-	-	-	-
Waste Collection	-	-	-	-	-
Etc.	-	-	-	-	-
Total	124	-	200	-	324

13.1.133. It is anticipated that workers would arrive on Site during the morning from around 06:00 through to 10:00 and would leave between 14:00 and 18:00 at the end of their shift.

13.1.134. The number of workers on Site will be linked to the phasing of the development.

13.1.135. Contractors will be required to adhere to routing agreements along with measures included within the CTMP. Therefore HDVs will only affect the main road network and the final connections into the Site.

13.7.3 Impact on Car Drivers

13.1.136. As a result of the construction phase of the proposed development, there would be increased volumes on the local highway network associated with workers travelling to and from the Site and

from the movement of materials using HGVs. A summary of these movements can be found in **Table 13-15**.

- 13.1.137. A peak construction demand is expected to comprise up to 324 vehicles per day of which 214 are expected to be HGVs including concrete mixer trucks. Around 200 vehicles are expected to be light vehicles such as cars and vans transporting construction workers each day. An assumption has been made that each light vehicle will have an average occupancy of three people which is reasonably typical for developments of this size and nature.
- 13.1.138. Worker movements to and from the Site will be coordinated as part of the CTMP with measures put in place to encourage vehicle sharing. It is usual for workers to travel in groups using a single vehicle (i.e. car / van share, minibus). As such the total number of vehicle movements is typically much less than the total number of workers.
- 13.1.139. The magnitude of the impact on road users from construction traffic would be minor and the sensitivity of the affected links is negligible.
- 13.1.140. The significance of the effect would be a temporary (medium term: 1 – 5 years) impact.
- 13.1.141. The impact of construction on road users, given the negligible sensitivity of the local links, is considered to be **Negligible**.

13.7.4 Impact on Pedestrians and cyclists

- 13.1.142. The construction phase of the proposed development will result in an increase in the volume of traffic on the local highway network, associated both with workers travelling to / from the Site and from the movement of materials using HGVs.
- 13.1.143. HGVs will be required to adhere to specific routing agreements via the A548 Weighbridge Road and the A494 which will be included within the CTMP. The route for construction vehicles will avoid any local routing through Shotton and Connah's Quay unless there is a specific logistical requirement.
- 13.1.144. Due to the nature of these routes, they are not used by a large number of pedestrians and cyclists and this was confirmed through on-site observations.
- 13.1.145. It is therefore considered that the impact of construction traffic on pedestrians and cyclists will be a temporary (medium term: 1 – 5 years) **Negligible** impact.

13.7.5 Mitigation, monitoring and Residual Effects

- 13.1.146. The Site will be supported by a CTMP which would include standard control measures for minimising and managing construction.
- 13.1.147. Effective implementation of the CTMP, including restrictions on vehicle routing, working times and delivery times, would minimise potential adverse effects associated with construction activity, although residual effects would remain.
- 13.1.148. For vehicular road users in the vicinity of the Site, primarily those using the A548 Weighbridge Road and the A494, the residual effect would be temporary (medium term), **Negligible** impact associated with the construction activity. For pedestrians and cyclists, the residual effect would also remain as a temporary (medium term) **Negligible** impact. Routing restrictions would ensure

that construction traffic would have no residual effects on users of local roads, for example those through Shotton and Connah’s Quay unless there is a specific logistical requirement.

13.1.149. On-going monitoring of construction traffic would form part of the CTMP.

13.8 COMPLETED DEVELOPMENT

13.8.1 Assessment of Effects

13.1.150. The future year traffic flows have previously been set out in **Table 13-13** and **Table 13-14**.

13.1.151. **Table 13-16** and **Table 13-17** present a comparison of the total vehicle flows by link with and without development in the future year for the AM and PM peak hours.

Table 13-16 – AM Peak Hour (07:00 – 08:00) Development Impact

Link	Direction	2021 + Committed		2021 + Committed + Development		Percentage Change	
		Light Vehicles (LV)	Heavy Duty Vehicles (HDV)	Light Vehicles (LV)	Heavy Duty Vehicles (HDV)	Light Vehicles (LV)	Heavy Duty Vehicles (HDV)
1	Westbound	425	63	690	104	+62%	+64%
1	Eastbound	517	119	517	160	0%	+34%
2	Westbound	280	111	280	121	0%	+9%
2	Eastbound	550	121	638	131	+16%	+8%
3	Westbound	265	91	265	102	0%	+11%
3	Eastbound	550	117	638	128	+16%	+9%
4	Westbound	1037	290	1302	331	+26%	+14%
4	Eastbound	580	263	580	303	0%	+15%

13.1.152. **Table 13-16** shows that during the peak hour of 07:00 – 08:00, the increase in light vehicles is limited to selected links with there being a 62% increase on Link 1 in a westbound direction.

13.1.153. For HDVs, the impact is more widespread, with the majority of links seeing a percentage increase of between 9% - 15%. Link 1 sees a 64% increase in HGVs in a westbound direction and a 34% increase in an eastbound direction.

Table 13-17 – PM Peak Hour (16:00 – 17:00) Development Impact

Link	Direction	2021 + Committed		2021 + Committed + Development		Percentage Change	
		Light Vehicles (LV)	Heavy Duty Vehicles (HDV)	Light Vehicles (LV)	Heavy Duty Vehicles (HDV)	Light Vehicles (LV)	Heavy Duty Vehicles (HDV)
1	Westbound	693	80	693	120	0%	+51%
1	Eastbound	500	114	764	155	+53%	+35%
2	Westbound	731	100	819	110	+12%	+10%
2	Eastbound	386	95	386	105	0%	+11%
3	Westbound	708	97	796	107	+12%	+10%
3	Eastbound	374	97	374	107	0%	+10%
4	Westbound	680	198	680	238	0%	+21%
4	Eastbound	1208	172	1472	213	+22%	+24%

13.1.154. **Table 13-17** shows a similar pattern to the AM peak, with the greatest impact occurring on Link 1.

13.8.2 Severance

13.1.155. The measurement and prediction of severance is based on professional judgement which takes into account relevant factors in addition to traffic flow, including road width, speed, the presence of crossing facilities and the number of movements across the affected route.

13.1.156. Changes in traffic flow of 30%, 60% and 90% would be likely to produce 'slight' ('minor'), 'moderate' and 'substantial' changes in severance, respectively. It is advised that these broad indicators should be used with care and regard paid to specific local conditions.

13.1.157. The highway links considered in the assessment have limited pedestrian interaction and as such have a receptor sensitivity of Negligible.

- 13.1.158. Reviewing the change in HDV flows shown in **Table 13-16** and **Table 13-17** demonstrates that for the majority of links, the change in HDV flows are less than 30% and therefore the magnitude of impact is Negligible.
- 13.1.159. In the AM peak hour, the HDV flows on Link 1 (A548 Weighbridge Road) equate to a 64% increase in the westbound direction and a 34% increase in the eastbound direction both which corresponds to a 'Moderate' Impact.
- 13.1.160. In the PM peak hour, the HDV flows on Link 1 (A548 Weighbridge Road) equate to a 51% increase in the westbound direction and a 35% increase in the eastbound direction both which also corresponds to a 'Moderate' Impact.
- 13.1.161. The sensitivity of A548 Weighbridge Road is classed as Negligible and therefore the magnitude of impact is **Negligible** for Severance.

13.8.3 Pedestrian Delay

- 13.1.162. Pedestrian (and cyclist) delay is in some ways similar to severance and is a measure of the increase in delay to pedestrians crossing a road subject to the increased traffic flows. Pedestrian delay only becomes an issue where vehicle flows in any peak hour are greater than 1,400 vehicles per hour.
- 13.1.163. As the Site is located in an industrial area with very limited residential and commercial uses, there are very limited number of footways accessible from the site, which limits the number of pedestrians the site will impact. There are no footways or crossings near the links assessed, and as such there is expected to be no increase in pedestrian delay.
- 13.1.164. The impact on Pedestrian Delay is therefore considered to be **Negligible**.

13.8.4 Pedestrian Amenity

- 13.1.165. Based on the IEMA Guidelines, the change in flows at which pedestrian amenity changes should be considered in detail are a 100% increase or a 50% decrease in the flow of all traffic or HDVs. However, it also states that links should be assessed in the context of their individual characteristics.
- 13.1.166. The maximal increase in HDV flows during peak hours is 64% and therefore this is well below the above criteria.
- 13.1.167. The impact on Pedestrian Amenity is therefore considered to be **Negligible**.

13.8.5 Driver Delay

- 13.1.168. The traffic associated with the Proposed Development will result in increased traffic flows on the access roads to the site.
- 13.1.169. The extent of the study area for assessment is listed below:
- Junction 1: A458/Weighbridge Road
 - Junction 2: A458/Tenth Avenue
 - Junction 3: A458/Parkway

13.1.170. The highest increase in traffic volumes is predicted to occur at Junction 1 during the PM peak hour, with the highest increase occurring on the Weighbridge Road Arm (leading to and from the site). The additional vehicles are anticipated to result in an additional 5 vehicles per minute which is considered to have a **Negligible** impact on driver delay.

13.8.6 Accidents and Safety

13.1.171. An analysis of the collisions has been undertaken to determine whether the proposed development may have an adverse impact on the highway safety of the area.

13.1.172. Records have been obtained based on available STATS19 data, which is the police recorded Personal Injury Collision dataset and is held by the Welsh Government. The data is for the latest 5-year period available, which is 2016-2020.

13.1.173. There are a total of four accidents that have occurred at the Weighbridge Road Roundabout Junction, which is where all vehicular traffic to and from the site will access.

13.1.174. Over the period of 5 years, the number of collisions to have occurred at the junction is relatively low, with seemingly no connection between the various collisions. It should also be noted that at the Weighbridge Road Roundabout Junction there were no collisions involving HGVs.

13.1.175. Across the wider search area, there were a total of seven collisions involving HGVs. Of these, six were slight and the seventh collision was the severe collision.

13.1.176. There were 17 total collisions involving cyclists across the network over the search period, with a total of four of these collisions being severe. Each of the severe accidents occurred in different locations across the network, and in differing circumstances. These include a vehicle colliding with a cycle as they both entered a roundabout, a vehicle striking a cyclist from behind, and a bus colliding with a cyclist on a restricted road.

13.1.177. In summary, the review has not identified highway safety trends which could be exacerbated by the proposed development and therefore the impact of the development on Accidents and Safety is considered **Negligible**.

13.8.7 Mitigation, monitoring, and Residual Effects

13.1.178. The Proposed Development would seek to maximise the number of trips undertaken by sustainable modes as far as practicable. The Proposed Development will seek to build upon existing sustainable transport links by:

- Promoting an occupier Travel Plan
- Committing to review sustainable travel measures across the site;

13.1.179. Implementing a Delivery & Servicing Management Plan.

Table 13-18 -Summary of Effects of the Proposed Development

Effect	Receptor (Sensitivity)	Geographic Scale	Temporal Scale	Magnitude	Mitigation and Monitoring	Residual Effect
Construction						
Impact on road users	Negligible	Local	Temporary (long term) minor negative	Negligible	Implementation of a CTMP	Temporary (long term) minor negative
Completed Development						
Severance	Negligible	Local	Permanent	Negligible	Travel Plan	Negligible
Driver Delay	Negligible	District	Permanent	Negligible	Travel Plan	Negligible
Pedestrian Delay	Negligible	Local	Permanent	Negligible	Travel Plan	Negligible
Pedestrian Amenity	Negligible	Local	Permanent	Negligible	Travel Plan	Negligible
Accidents and Safety	Negligible	Local	Permanent	Negligible	Travel Plan	Negligible

13.9 REFERENCES AND STANDARD GUIDANCE

- 13.1.180. **AADT** - Annual Average Daily Traffic Flow: 24 hour traffic count data averaged for all the days in the year: i.e. the total traffic flow on a road for a year divided by 365.
- 13.1.181. **AAWT** - Annual Average Weekday Traffic Flow: 24 hour traffic count data averaged for just the weekdays (Monday to Friday).
- 13.1.182. **ARCADY** - Assessment of Roundabout Capacity and Delay – software tool for assessing the capacity, traffic movement, accident risk and delay around traffic roundabouts.
- 13.1.183. **ANPR** - Automatic Number Plate Recognition, a computerised system which records vehicle number plates and can be used for counting and monitoring routing of vehicles.
- 13.1.184. **Automatic Traffic Count (ATC)** - These can be conducted by placing pneumatic tubes across the road, often for periods of one week or more, to record the number of vehicles travelling in each direction. Permanent monitoring sites are also in place around the UK recording traffic passing over induction loops cut into the road surface. In addition to the total traffic flow, it is possible for an ATC to record more specific data, including individual vehicle speeds and vehicle classification.
- 13.1.185. **Calibration** - The process used to build a traffic model so that it reflects local circumstances.
- 13.1.186. **Cycle Time** - At a signalised junction the cycle time is the period required for all approaches at the signals to run. This is measured as the time which elapses between the start of an approach and the point at which that particular approach starts again. Typically a cycle time may be up to a maximum of 120 seconds.
- 13.1.187. **DCO** - Applicants promoting nationally significant infrastructure projects in the fields of energy, transport, water and waste will apply for a 'Development Consent Order' rather than for planning permission under the Planning Act 2008. A development consent order, when issued, combines the grant of planning permission with a range of other consents that in other circumstances have to be applied for separately, such as listed building consent. All applications for development consent orders will be made to the Infrastructure Planning Commission (IPC).
- 13.1.188. **Degree of Saturation (DoS)** - is the ratio of the actual traffic flow to the maximum flow, and indicates how much demand a lane/or lanes can take or approach is experiencing compared to its total capacity. A DoS of 90% on an approach to signals indicates that it is approaching its theoretical capacity and a value of above 100% indicates that it has exceeded its absolute capacity. See also RFC.
- 13.1.189. **Design Manual for Roads and Bridges (DMRB)** - is a Stationery Office publication containing current Standards, Advice Notes and other guidance documents relating to the maintenance, operation and improvement of motorways and trunk roads. It is often applied by highway authorities to non-trunk roads, however, greater flexibility may be appropriate in these cases.
- 13.1.190. **HGV - Heavy Goods Vehicle (>3.5 tonnes gross vehicle weight)**
- 13.1.191. **Killed & Seriously Injured (KSI)** - Number of people killed or seriously injured in road traffic accidents
- 13.1.192. **LGVs - Light Goods Vehicles (<3.5 tonnes gross vehicle weight)**

- 13.1.193. **Link Capacity** - The flow of traffic that can be accommodated on a particular stretch of road/road type. The capacity of a link is expressed in terms of a Congestion Reference Flow (CRF) and can be illustrated graphically using a speed flow curve.
- 13.1.194. **LinSig** - is a helpful tool to aid the traffic engineer in designing new traffic signal junctions as well as assessing the effects of modifying existing designs. It is a computer program used to predict Practical Reserve Capacity (PRC), delays, and queuing. It can be used to model individual junctions as well as small networks.
- 13.1.195. **LMVR** - Local Model Validation Report
- 13.1.196. **Mean Max Queue** - the mean maximum queue measured in PCUs is an approximate average of the maximum queues likely to be encountered at a junction in a modelled network, and it will therefore be exceeded 50% of the time. The queue represents the average distance of the vehicle furthest from the stop line in each cycle.
- 13.1.197. **MOVA (Microprocessor Optimised Vehicle Actuation)** - Technology involving a series of loops cut into the road surface which feed vehicle data back to the automatic traffic signal controller. MOVA signal timings respond to traffic conditions and generate its own signal timings cycle-by-cycle, varying continuously with traffic conditions, both in the short term (hour to hour, day to day) and in the long term following annual trends and longer term traffic growth. This innovative method of signal control is found to be effective in reducing delays and reducing accident levels at a particular signalised junction.
- 13.1.198. **NTEM** - National Trip End Model
- 13.1.199. **NTS** - National Travel Survey
- 13.1.200. **OGV1** - HGVs with 2 or 3 axles
- 13.1.201. **OGV2** - HGVs with 4 or more axles
- 13.1.202. **PCU** - Passenger Car Unit, is a term used to represent the traffic flow on a road for various vehicle types. It is acknowledged that different types of vehicles will have different effects on traffic flow, and the PCU provides a consistent dimension. Individual vehicle classes are given different PCU values, with a car having the base PCU value of 1 and an HGV a PCU value of 2.3 (a HGV has the potential to cause an impact more than two times greater than a car).
- 13.1.203. **Pedestrian Crossings - Puffin Crossing** - A puffin crossing differs from a pelican crossing in that the lights controlling the pedestrians are on the near side of the road in such a position that makes the pedestrian face towards the closest lane of oncoming traffic. The system also utilises detectors which sense the presence of pedestrians waiting at the crossing, and as they cross the road, such that the lights will not stop traffic if the pedestrian has already crossed.
- 13.1.204. **Pedestrian Crossings - Toucan Crossing** - A toucan crossing is a combined pedestrian/cycle crossing that allows bicycles to be ridden across. The pedestrian/cyclist signal lights may be on the near side of the crossing (like a puffin crossing), or on the opposite side of the road (like a pelican crossing).
- 13.1.205. **Pedestrian Crossings - Zebra Pedestrian Crossing** - A zebra pedestrian crossing is characterised by alternating longitudinal black and white stripes (hence the term, named after the zebra) on the road, parallel to the flow of the traffic.

- 13.1.206. **PIC** - Personal Injury Collision. These are accidents which involve personal injury to a driver or other road users.
- 13.1.207. **Queue Length** - The length of a stationary queue of traffic usually expressed in PCU units.
- 13.1.208. **RFC (Ratio of Flow Capacity)** - An RFC is a measure used in traffic engineering to indicate how much demand a junction or road is experiencing compared to its total theoretical capacity. The design threshold value for capacity is usually 0.85. An RFC value in excess of 0.85 indicates that the entry arm is performing at a level beyond its ideal operational capacity. A value of 1.00 represents the junction being at capacity. See also Degree of Saturation.
- 13.1.209. **Section 38** - A common way of creating new highways is by an agreement between developers and the local Highway Authority under Section 38 of the Highways Act 1980. These agreements are most often made with housing developers who agree to build the roads to standards laid down by the Highway Authority, which then adopt and maintain the road.
- 13.1.210. **Section 116 - Highways Stopping Up Order (Highways Act)** - This enables the magistrates' court to authorise the stopping up or diversion of a highway if it is deemed that the highway is either:
- a) unnecessary
 - b) able to be diverted so as to make it nearer or more commodious to the public.
- 13.1.211. The key differences in comparison to the Section 247 (Planning Act) process are that the stopping up process under the Highways Act is generally more exposed to objection whereas the Section 116 process does not require proof that the highway closure is necessary to enable development.
- 13.1.212. **Section 278 Agreement** - Where a development requires works to be carried out on the existing adopted highway an Agreement will need to be completed between the developer and the highway authority under Section 278 of the Highways Act 1980. Examples of such works could be the construction of new access junction or improvement of an existing junction. Similarly, works such as traffic calming or improved facilities for pedestrians and cyclists could fall within a Section 278. Under the Section 278 Agreement, the highway authority may provide the works at the developer's expense, or may allow the developer to provide the works directly, subject to an approval and inspection process.
- 13.1.213. **SRN** - Strategic Road Network
- 13.1.214. **TEMPRO** - DfT National Trip End program, used to adjust NRTF to locality. The programme presents growth forecasts in local planning data and car ownership in order to forecast trip-making growth for different forms of transport
- 13.1.215. **TRICS** (Trip Rate Information Computer System) - a database for land use types and new developments allowing trip rate information to be calculated. It is the only national trip generation and analysis database and contains trip generation and site information for over 2,800 sites and numerous land uses.
- 13.1.216. **TRO** (Traffic Regulation Order) is the statutory legal document necessary to support any enforceable traffic or highway measure within the public highway. TROs are required for a range of restrictions including: waiting and loading, oneway streets, speed limits, weight and width restrictions, access and turning restrictions, road and footway closures, cycle and bus lanes and high-occupancy vehicle (HOV) lanes.
- 13.1.217. **Trunk Road** - A highway for through traffic forming part of the national system of routes.

- 13.1.218. **85th Percentile Speed** - This is the speed up to which 85% of the traffic is measured as travelling on a particular road in a particular direction using a speed gun or pneumatic tubes. It is a parameter used to consider the geometry of a road, like the safe level of forward visibility along a road and the appropriate visibility splays either side of a junction. It is accepted that 15% of the traffic will be travelling faster than this speed.



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14.1 INTRODUCTION

- 14.1 This chapter of the Environmental Statement (ES) assesses the waste and resources for the proposed development. The proposed development would generate waste and require material resources as part of its decommissioning, construction and operational phases.
- 14.2 With regard to resources, this chapter considers the use of materials within the construction of the proposed development. It also considers the raw material feedstock used in the operation of the new plant. With regard to card production the process would solely utilise recovered paper, card and other materials that are collected for recycling by local authorities and businesses across the UK as its raw material feedstock. The tissue manufacturing process would use a proportion of office (white) paper and wood pulp. The existing biomass plant would contribute to the paper mill's energy requirements through the use of recycled wood and wood products.
- 14.3 The chapter also considers use of water resources, as water is an important element of the paper making process.
- 14.4 This chapter therefore considers the likely significant effects on waste and resources during the construction and operation phases of the proposed development. Decommissioning effects are considered to be similar to construction effects, which includes for demolition of existing buildings.

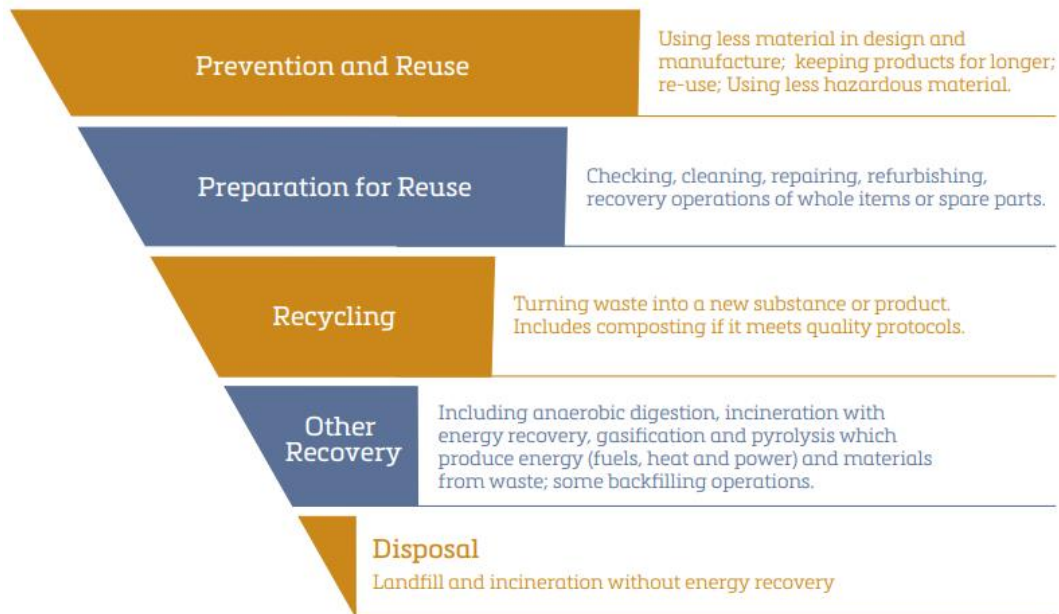
14.2 APPROACH AND METHODOLOGY

- 14.5 There is no specific guidance as to how the environmental effects of waste and resource generation and usage should be addressed for the purposes of Environmental Impact Assessment. This chapter draws on professional experience and published policy and guidance.

14.2.1 Data sources and guidance

- 14.6 There is extensive international (EU), national and local policy and guidance in respect of waste management. The driver for waste policy is to ensure that waste generation is minimised through recovery of materials and energy, to ensure that where possible materials enter the circular economy and to minimise loss of resources from the system such as can occur if waste is disposed of to landfill. Planning Policy Wales Edition 11 (PPW) describes the circular economy as *“one which aims to keep materials, products and components in use for as long as possible. There are environmental, social and economic benefits of taking 100 101 such an approach, most notably the increased value and productivity of materials, financial savings for the construction sector and the prevention of waste”*.
- 14.7 The key principle of waste management in the UK including Wales is the waste hierarchy, as summarised in **Figure 14.1** below.

Figure 14.1 Waste Hierarchy (extract from PPW Edition 11)



- 14.8 In relation to construction and demolition waste, the Welsh Government has introduced a requirement to produce Site Waste Management Plans. Amongst other things, Site Waste Management Plans should set out how waste will be prevented, managed and disposed as part of taking forward construction projects¹.
- 14.9 A full list of relevant Welsh policy and guidance is provided in **Technical Appendix 14.1**.

14.2.2 Study Area

- 14.10 The study area focuses on the management of waste and materials within the Site itself, but also considers the impact of the proposed development on a wider study area extending to the whole of England and Wales, which represents the likely extent of feedstock sourcing and waste management activity for the proposed development.

14.2.3 Scoping and Consultation

- 14.11 A Scoping Request was issued to both Flintshire County Council and to PINS (Wales) now Planning and Environment Decisions Wales (PEDW) on behalf of Welsh Government. Although the County Council did not make any request for separate consideration of waste, PEDW requested that production and disposal of waste (including sludge) during operations should be assessed as part of the ES, and that a dedicated chapter is required.

¹ The Clean Neighbourhoods and Environment Act 2005, c.16

- 14.12 PEDW also requested that the ES should include details of the volumes of materials required during construction. The production of waste during construction should be considered.
- 14.13 It should be noted that other chapters within this ES also consider the potential impacts of materials and waste, and the requirements for management. In particular there is consideration of materials and waste management within Chapter 8: Land Quality, Chapter 9: Hydrology and Flood Risk and Chapter 13: Traffic and Transport. To avoid 'double counting' likely significant effects, this chapter has scoped out the impact of resources and waste on land quality, hydrology and flood risk and on traffic and transport.
- 14.14 Construction management would take place in accordance with the Outline Construction Environmental Management Plan (CEMP), see **Technical Appendix 5.3**, which would ensure that contractors are aware of the potential environmental impacts of the construction activities, and that management measures are in place to mitigate these potential impacts.

14.2.4 Approach and methods

Receptors

- 14.15 There are no published standards that define receptor sensitivity in relation to waste and materials assessment. As a general rule, the sensitivity of each receptor or receptor group is based on its importance or scale and the ability of the baseline to absorb or be influenced by the identified effects. For example, a receptor is considered less sensitive if there are alternatives with capacity within the study area. In assigning receptor sensitivity, consideration has been given to the following:
- the importance of the receptor e.g. local, regional, national, international;
 - the availability of comparable alternatives;
 - the ease at which the resource could be replaced and
 - the capacity of the resource to accommodate the identified impacts over a period of time.
- 14.16 The receptors considered in respect of materials and waste are as follows:
- the circular economy within England and Wales with regard to recycling of paper and other recovered materials;
 - water resources (quantity); and
 - third party waste management facilities.
- 14.17 Due to the scale of the proposed development and the wide geographic spread of the potential effects, receptors are considered to be of national / regional importance and therefore of high/medium sensitivity.

Magnitude of Impact

- 14.18 The magnitude of impact is a function of the change relative to baseline conditions. Baseline conditions are described in section 14.3 of this chapter.
- 14.19 In order to aid clear and robust identification of significant effects, specific and targeted criteria for defining the magnitude of impacts have been developed for this assessment based on experience on other similar projects. The following four levels of magnitude have been adopted using professional judgement: high; medium; low and negligible. These impacts can be beneficial, adverse or neutral. Criteria for each of these levels of magnitude are set out in **Table 14-1**.

Table 14-1:
Magnitude of Impact

High	Medium	Low	Negligible
An impact that would dominate over baseline conditions.	An impact that would be expected to result in a moderate change to baseline conditions.	An impact that would be expected to result in a perceptible difference from baseline conditions.	An impact that would not be expected to result in a measurable variation from baseline conditions.

14.2.5 Assessing Significance

- 14.20 The level of effect of an impact waste and resources receptors is initially assessed by combining the magnitude of the impact and the sensitivity of the receptor. The level of effects presented in **Table 14-2** provides a guide to the decision-making process.

Table 14-2: Level of effects matrix

Sensitivity or Value of Resource or Receptor	Magnitude of Impact			
	High	Medium	Low	Negligible
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

- 14.21 Effects may be positive (beneficial) or negative (adverse). Where an effect is classified as major, this is considered to represent a 'significant effect' in terms of the EIA Regulations. Where an effect is classified as moderate, this may be considered to represent a 'significant effect' but should always be subject to professional judgement and interpretation, particularly where the sensitivity or impact magnitude levels are not clear or are borderline between categories or the impact is intermittent.

- 14.22 The level of effects matrix shown in **Table 14-2** therefore provides a guide to decision making but is not a substitute for professional judgement. Impacts and effects can be beneficial, neutral or adverse and these would be specified where applicable. It should be noted that significant effects need not be unacceptable or irreversible

14.2.6 Residual Effects

- 14.23 The assessment takes account of any environmental principles that are incorporated into the design of the proposed development. These include good practice measures with regard to traffic; management of surface water and site remediation, details of which are set out in **Technical Appendix 5.3: Outline CEMP**. Any additional mitigation measures that would reduce the level of any significant effects are set out and considered prior to assessing residual effects.

14.2.7 Residual Effects

- 14.24 A statement of residual effects, following consideration of any specific mitigation measures, is provided.

14.2.8 Cumulative Effects Assessment

- 14.25 In relation to waste and resources effects, cumulative effects would generally be widespread and dispersed with regard to the circular economy. Cumulative effects on water resources and waste management facilities and key suppliers may be felt more locally.

14.2.9 Statement of Significance

- 14.26 The assessment approach is to describe the baseline conditions, to identify likely effects from construction and operation of the proposed development, consider the sensitivity of receptors, and then to assess the likely significance of any effects. Any adverse effects considered to be 'significant' are further considered with regard to bespoke mitigation measures and residual effects following mitigation are then identified.
- 14.27 Any significant effects that would be direct, indirect, secondary, cumulative, short, medium and long term, permanent or temporary are examined and their significance assessed. These effects are identified as being positive or negative.

14.3 BASELINE CONDITIONS

- 14.28 The baseline situation is set out in **Chapter 3: Project Description**. Paper production ceased on 30 September 2021, and sales of newsprint product from stock ceased around 31 December 2021. However, the following facilities have continued in operation and contribute to the operational baseline of the Site:
- Materials Recovery Facility (MRF) – recycling facility for mixed recyclables;
 - Biomass Plant – uses recycled wood and wood products and paper sludge to recover energy in the form of Combined Heat and Power (CHP); and

- Process water – reduced requirement due to closure of paper production, but retained for the remaining continuing site operations.

OCC

- 14.29 The former operator UPM Shotton was one of the largest reproducers of recycled paper in the UK. Recycled paper was used as the raw material for newsprint production, but this has currently been suspended.

MRF

- 14.30 The position with the MRF is different to the OCC in that comingled recyclables have continued to be processed in the MRF since newsprint production ceased. The MRF continues in full operation during the redevelopment period and recovered recyclables are sold offsite. Throughput amounts to 120,000 tonnes a year.

Biomass Plant

- 14.31 The biomass plant normally produces 18.5 Megawatts (MW) of electricity plus steam for paper production. When the paper mill was operational the Biomass plant therefore operated in CHP mode. Since the closure of paper production it currently supplies electricity to the grid and the steam is released unused.

Process water

- 14.32 Paper mills require vast amounts of process water for paper production. Shotton Mill benefits from its own private water supply, which is drawn from a location on the River Dee above Chester and transported by underground pipeline to the Site. There is no limit on abstraction volumes.

14.4 ASSESSMENT OF EFFECTS

- 14.33 The assessment of effects considers the likely significant effects, whether adverse or beneficial, arising from the proposed development.

14.4.1 Potential Construction Phase Effects

- 14.34 The potential impact of the construction activities on waste and resources can be summarised as follows:
- use of construction materials in particular steel and concrete;
 - generation of demolition waste and spoil from groundworks; and
 - generation of packaging waste and other waste arising from temporary use such as timber for form work.

Construction materials

- 14.35 The selection of building materials for the proposed development is based on sustainability criteria involving a ‘whole life’ approach. One of the key components is therefore the use of concrete for internal support structures, roofs and walls for those buildings that are subject to a high humidity environment. This is particularly relevant to the paper mills. Evidence from the previous newsprint production on Site shows that the main paper machine building, which was constructed of steel, had to have three replacement roofs over the course of its lifetime, which represents an unsustainable use of materials and disrupts production.
- 14.36 Nevertheless, where high humidity factors do not apply, the proposed standard fabrication material would be steel. Subject to commercial considerations, opportunities exist to source this locally.

Demolition and groundworks waste

- 14.37 Demolition of redundant buildings has already commenced in accordance with notification provided to Flintshire County Council², but will also be ongoing for several months during the determination period of the planning applications. A Demolition Management & Transport Consideration Plan was submitted with the notification to Flintshire County Council and is provided in **Technical Appendix 14.2a**.
- 14.38 In high level terms the following principles will apply:
- retention of materials on Site where feasible and safe to do so, such as use of recovered concrete for engineering fill;
 - recycling of materials offsite such as steel, concrete, office and canteen fittings;
 - safe disposal of wastes that cannot be reused or recycled in accordance with the waste hierarchy and Duty of Care for transportation; this means that waste would be disposed of to energy recovery in preference to landfill; and
 - special arrangements for management of hazardous waste including asbestos.
- 14.39 The Demolition Contractor is required to operate under a comprehensive Site Waste Management Plan (SWMP) and comply with all current waste management and disposal legislation and guidance including the Hazardous Waste (England and Wales) Regulations (2005). The Contractor will be expected to segregate all wastes on Site into inert, non-inert, hazardous and non-hazardous to maximise reuse and recycling in accordance with the Waste Hierarchy, whilst minimising exposure and disposal. Following segregation, materials will be stored in separate areas designated for the purpose and demarcated accordingly, prior to removal offsite. All materials will be removed from the Site in accordance with section 34(7) of the Environmental Protection Act 1990 (Duty of Care)

² In accordance with Schedule 2, Part 31 of the Town & Country Planning (General Permitted Development Order) 1995 (as amended)

and any waste requiring disposal will be taken to a suitable permitted facility. Where feasible, materials recovered from demolition will be stored for re-use within the Site during redevelopment.

- 14.40 Existing Site surveys undertaken by site management relating to asbestos inspection and management have identified that asbestos is only present within the Site as pipe flanges. Management procedures for removal of the asbestos have been developed and involve moistening the area prior to cutting and removing. The relevant reports including a methodology for removal of asbestos has been provided to the Demolition Contractor prior to work commencing, and removal of all asbestos will take place in accordance with the approval methodology.
- 14.41 The Demolition Contractor will dispose of asbestos at a suitably licensed facility and waste transfer tickets will be included within the Site Waste Management Plan and the Health and Safety File.

Packaging and other construction waste

- 14.42 During construction, materials would be brought to Site either as packaging or for temporary use.
- 14.43 It is proposed that any such materials would be managed in accordance with the waste hierarchy, starting with avoidance of use. Materials that cannot be re-used may be recycled or recovered on-site within the MRF or the biomass plant, thereby avoiding additional road journeys to third party processors.
- 14.44 There would be a certain proportion of residual waste that cannot be recycled or used for energy recovery due to its innate characteristics and would therefore have to be disposed of to landfill. All reasonable steps would be taken to make use of local landfill facilities, of which there are several in Flintshire.

Assessment of effects

- 14.45 It is intended that, prior to submission of the planning applications, an estimate of materials demand and waste arising will be made in order to provide an indication of likely significance. For the purposes of this ES, it is considered that the embedded good practice design principles and mitigation, including the provision of an Outline CEMP, would ensure that environmental effects are unlikely to be significant.

14.4.2 Potential Operational Phase Effects

- 14.46 The potential impact of operational activities on waste and resources can be summarised as follows:
- use of recycled materials as a raw material feedstock for card and tissue production;
 - use of reclaimed wood and wood products for energy generation in the biomass plant;
 - recycling of process water through the proposed Effluent Treatment facility;
 - process waste (primarily paper sludge); and

- optimising use of existing infrastructure.

14.47 The principles resources required for the proposed development can be summarised as follows:

Table 14-3: Resource usage

Product line	% recycled input	Raw material	Proposed tonnage tpa	Existing tonnage tpa
Card	100%	MRF (mixed recyclables)	175,000	
		Card / mixed paper	804,000	
Tissue	15%	Office paper	37,500	
Biomass	100%	Recycled wood	260,000	260,000

14.48 Water usage is expected to amount to 1,386 m³/hour.

Feedstock for paper manufacturing

14.49 The OCC and Mixed Paper grade raw materials would be sourced direct from local authorities, and commercial businesses including national retailers such as supermarkets, distribution centres, waste management companies and waste paper merchants. The sources are similar to those that were utilised by UPM Shotton when producing 100% recycled newsprint on the site. Many of the suppliers are expected to be the same but the grade sourced will be different. For the proposed development, the applicant would look for sources that are nearest to the Site; for example, there is already discussion with WRAP Wales to look at sourcing suitable fibre from Wales. However, due to the scale of the operation there would still be a requirement to source material UK wide.

Reclaimed wood for energy generation

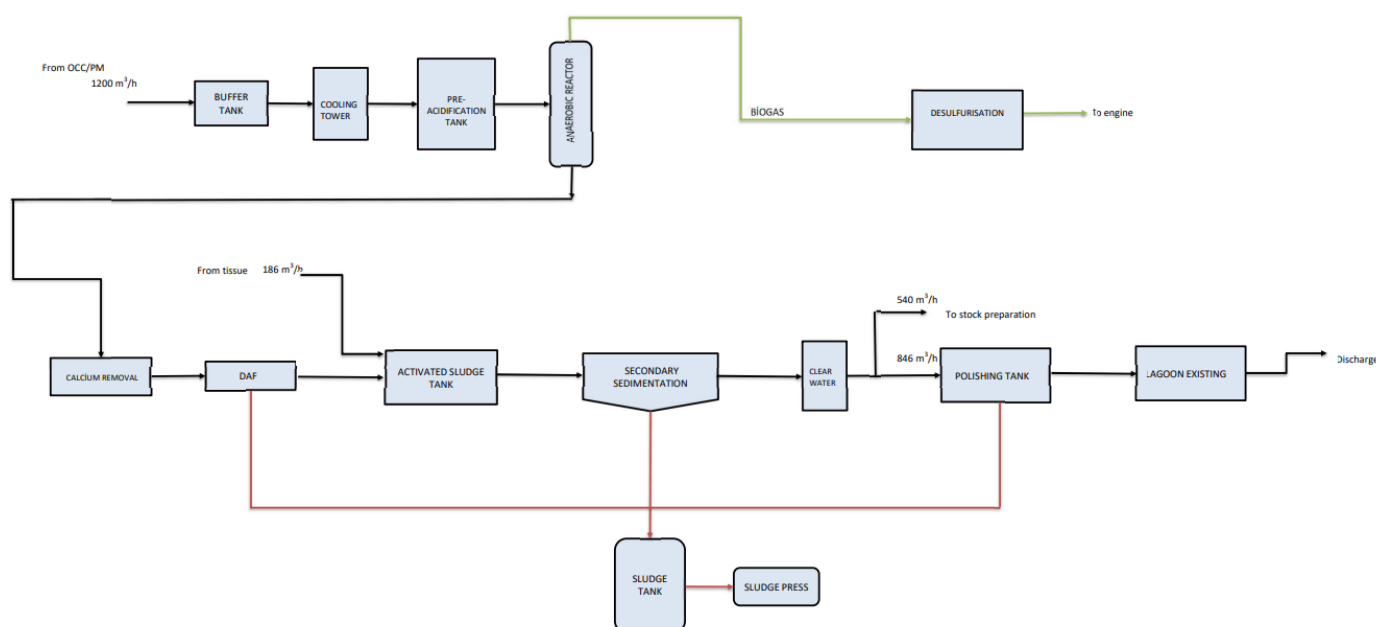
14.50 Waste wood supply to Shotton is managed through Tilhill Forestry Ltd. The material comes from a variety of sources consisting of commercial, industrial, and residential arisings. Supply is aggregated through a number of both local and national suppliers, who deliver the unprocessed / minimally processed waste wood to Site, prior to processing on site (size reduction) and metal (ferrous and non-ferrous) removal.

14.51 The material is predominantly non-recyclable waste wood suitable only for energy recovery. The waste wood is classed as Grade C (Wood Recyclers' Association July 2022); Grade D Hazardous Waste Wood is not accepted. Fuel quality is monitored through both on site load inspection and off-site supplier visits. Each delivered load is recorded and traceable. A specification is issued to all supplier's sub-standard loads are rejected.

Process water

- 14.52 Process water from the OCC / paper mill process and from the tissue manufacturing process would be directed to the Effluent Treatment Facility for cleaning, with the objective of recycling as much water as possible.
- 14.53 The Effluent Treatment Facility would use a state-of-the-art multi-stage treatment process to reduce the temperature of the incoming water, followed by anaerobic digestion and calcium removal by precipitation. Following a further step of sedimentation to separate paper sludge and clean water, the water is either recirculated into the process or passed through a polishing tank prior to discharge to the lagoon, **Figure 14.2** below illustrates this.

Figure 14.2: Effluent Treatment Process Flow Diagram



- 14.54 Of the total water usage of 1,386 m³/hour, approximately 45% would be recycled, resulting in a significant reduction in water demand. This is substantially higher than the recycling rate of 10% achieved for the newsprint plant. The balance of approximately 55% would be discharged via the existing consented Discharge Point to the River Dee, thereby returning into the same river from which it was extracted.
- 14.55 The proposed Effluent Treatment Facility would produce biogas as a by-product of the process. This would be fed directly (following desulphurisation) into the proposed Combined Heat and Power (CHP) facility to supplement natural gas supplied from the grid.

Process waste

- 14.56 Process waste comprises primarily sludge from the Effluent Treatment Facility. The sludge would be passed through a sludge press prior to leaving the Effluent Treatment Facility, at which stage it would contain only 40% moisture. The sludge, comprising approximately 30,000 tpa, would then

be transferred to the biomass plant where it would be used as feedstock in association with reclaimed wood and wood products.

- 14.57 Other wastes arise from normal operational activities including repair and maintenance. **Table 14-4** characterises the wastes that are expected to require management including transfer offsite to third party recycling and waste disposal operators.

Table 14-4 – Waste Generation and Management

Waste stream	Source of waste	Quantity generated per annum (tonnes)	Onwards recovery / disposal method
Hazardous waste			
Waste paints and varnishes containing organic solvents or other hazardous substances	Maintenance and Repair	0.05	R13-Storage until recycling
Hydraulic oils	Maintenance and Repair	70	R9- Re-refining of oils
Packaging containing residues of dangerous substances	Process additives	259	R12- Physical processes in preparation for recycling
Absorbents and clothing contaminated with hazardous substances	Production, Maintenance and Repair	35	R12- Physical processes in preparation for recycling
Oil filters	Production, Maintenance and Repair	0.4	R13-Storage until recycling
Electronic wastes	Maintenance and Repair	3	R12- Physical processes in preparation for recycling
Chemical wastes	Process additives	60	R13-Storage until recycling
Lead batteries and accumulators	Maintenance and Repair	7	R13-Storage until recycling
Medical waste	First Aid	0.007	D9- Disposal
Fluorescent lamps and other mercury-containing waste	Maintenance and Repair	0.17	R13-Storage until recycling
Printer/Toner cartridge	Offices		R13-Storage until recycling
Engine oil	Maintenance and Repair		R9- Re-refining of oils

Non-hazardous Waste			
Rubber tyres	Maintenance and Repair	2	R1-Use as fuel for power generation
Cables	Maintenance and Repair	2	R12- Physical processes in preparation for recycling
Glass	General	1	R12- Physical processes in preparation for recycling
Plastics	General	54	R12- Physical processes in preparation for recycling
Metals	General	527	R12- Physical processes in preparation for recycling
Wood	Maintenance and Repair		R1-Use as fuel for power generation
Sludge from on-site wastewater treatment	Effluent Treatment Plant	29,968	R1-Use as fuel for power generation

14.58 It should be noted that, with the exception of clinical wastes, a recycling or recovery route has been identified for all materials.

Use of existing infrastructure

14.59 The Site is in a transition phase, in which paper manufacturing has temporarily ceased but considerable ancillary infrastructure remains in place and operational. This includes the biomass plant, the MRF, the OCC facility and the water supply and discharge system.

14.60 In the absence of new paper production the existing infrastructure would continue in operation, but with the following constraints:

- Biomass plant – operating only in electrical generation mode, which is substantially less efficient (approximately 40% less efficient) than CHP mode;
- MRF – the materials sorting operation would continue but all product would need to be transferred offsite to third party processors resulting in an increase in miles travelled; and
- OCC – the processing of recycled paper could continue but all product would need to be transferred offsite to third party processors resulting in an increase in miles travelled. The increased density of product following addition of water may make such an outcome unviable.

14.61 The proposed development is designed to make best use of the existing infrastructure whilst at the same time seeking improvements where this impacts on use of resources, such as water usage within the process.

Assessment of effects

- 14.62 The proposed development has been designed to optimise the use of recycled materials and minimise waste generated on-site, thereby making a substantial contribution to national and local objectives in moving the management of waste up the waste hierarchy.
- 14.63 The proposed development would make efficient and effective use of existing recycling and energy recovery infrastructure in particular the biomass plant, MRF and OCC to complement the new paper processing plant.
- 14.64 It is intended that, prior to submission of the planning applications, a qualitative assessment will be made of likely significance. For the purposes of this draft ES, it is considered that the embedded good practice design principles and mitigation are unlikely to be significant (adverse) and have the potential to be significant (beneficial).

14.4.3 Further Survey Requirements and Monitoring

- 14.65 As part of the requirements of the Outline CEMP and Site Waste Management Plan, it is proposed that all waste generated on Site would be recorded and reviewed regularly with a view to optimising performance in accordance with the waste hierarchy and travel distance.
- 14.66 Water usage will be recorded in accordance with the Environmental Permit.

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15.1 INTRODUCTION

- 15.1 This Chapter of the Environmental Statement (ES) explores and assesses the impacts of the proposed development on land use and socio-economics on the local area, as defined by **Figure 15.1**. Effects are also considered within the rest of Wales and the UK where relevant.
- 15.2 The impacts that the proposed development could have on socio-economics may occur as a result of a direct or indirect interaction: directly providing jobs, contributing to the local economy through purchasing of goods and services, and impact on local recreational receptors, amongst others.
- 15.3 The majority of the socio-economic impacts during the construction phase relate to the creation of employment opportunities, and any potential temporary restriction or severance of the road and sustainable travel network.
- 15.4 Once operational, impacts on the local labour market arising from direct job creation arising from a significant increase of full time equivalent (FTE) jobs and supply chain effects locally. This could result in a long-term socio-economic benefit to the community, whereby they would be in receipt of the security of retaining staff, as well as an additional further new FTE roles and training as a result of facilitate the transition to the Client's new technologies and processes.
- 15.5 The assessment will also take into account the impact of the proposed development on land use and community assets, including recreational receptors such as long-distance walking and cycling routes.

15.2 APPROACH AND METHODOLOGY

- 15.6 The approach to the Socio-Economic Chapter will take an appropriate and topic-specific approach to assessment of the proposed development. It provides a qualitative assessment of the contribution of the proposed development to the local economy, and how that is likely to impact baseline conditions in terms of employment and skills.

15.2.1 Data sources and guidance

- 15.7 The assessment uses information provided by the Applicant in respect of job provision and desk-based information sources to assess the likely effects, supplemented by consultation with relevant stakeholders where necessary, and professional judgement based on previous experience. A complete schedule of sources referred to in undertaking this assessment is contained in the reference list at the end of this Chapter.
- 15.8 Guidance will be offered in terms of Welsh and local planning policy, which make specifications to the impact that the economic benefits and/or job creation will have in regard to a potential development in the area. Planning policies of relevance to this project are provided in **Chapter 6: Policy and Guidance**.

Future Wales – The National Plan 2040

15.9 Future Wales is the national development framework for Wales, extending to year 2040, whereby it sets out the spatial plan for development within Wales, to benefit the country and communities environmentally, culturally, socially and economically.

15.10 Future Wales sets out 11 Outcomes that they aim to achieve with the framework, the 3rd is directly relatable to the purpose of this Chapter:

“A Wales where people live ... in distinctive regions that tackle health and socio-economic inequality through sustainable growth”

15.11 The following Policies are of relevance to the proposed development:

- Policy 2 – Shaping Urban Growth and Regeneration – Strategic Placemaking
- Policy 3 – Supporting Urban Growth and Regeneration – Public Sector Leadership
- Policy 20 – National Growth Area – Wrexham and Deeside.

Planning Policy Wales 2021

15.12 Planning Policy Wales (PPW) aims to achieve sustainable development in Wales by ensuring that the planning system promotes and maximises the contribution to the wellbeing of Wales and its communities. The PPW has the stated primary objective of:

“The primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales, as required by the Planning (Wales) Act 2015, the Well-being of Future Generations (Wales) Act 2015 and other key legislation and resultant duties such as the Socio-economic Duty. A well functioning planning system is fundamental for sustainable development and achieving sustainable places.”

15.13 Further describing the concept of the ‘Socio-Economic Duty’ in paragraph 1.17:

“The Socio-economic Duty also requires relevant public bodies when taking strategic decisions, for example associated with strategic policy development and development plans, to have due regard to the need to reduce the inequalities of outcome that result from socio-economic disadvantage.”

15.14 And describing the role planning should take regarding economic development in page 17:

“The planning system should enable development which contributes to long term economic well-being...”

15.15 The PPG also states that developments should be considered by their economic benefits and:

“whether, and how far, the development will help redress economic disadvantage or support regeneration priorities, for example by enhancing local employment opportunities or upgrading the environment”

Flintshire County Council Unitary Development Plan 2000-2015

15.16 The Unitary Development Plan (UDP) sets out the vision for the physical state of Flintshire until 2015, in terms of its environment, economy and society. It is currently the Development Plan for Flintshire until the adoption of the Flintshire Local Development Plan, which will run until 2030.

15.17 The UDP has a set of common of principles, designed to complement their various Strategies and Action Plans, of particular note is their second principle:

“Promoting Economic Diversity and Prosperity - The promotion of economic diversity and competitiveness and the creation of good quality job opportunities within a framework of sustainability, are common goals for both the UDP and the Economic Development Strategy.”

15.18 With their first Strategic Aim also being:

“economy - to create a thriving and sustainable economy providing a wide range of quality employment opportunities for local people.”

15.19 And the following Policy deemed of relevance to the proposed development:

- Policy STR3: Employment.

The Flintshire Local Development Plan

15.20 The Flintshire Local Development Plan (LDP) was initially aimed for adoption in November 2021, however this has been delayed. The LDP has been included for review as the adoption is thought to be imminent and of relevance to the proposed development, due to the LDP being statutory until at least 2030. The currently available version is the deposit LDP, as such, the text may change.

15.21 Similarly to the UDP, the LDP aims to deliver sustainable development in such a way that it balances the ‘Well-Being’ of the County and community in a ‘sensible and proportionate’ way. Regarding economic development, the LDP takes the following stance in its Strategic Growth STR1 objectives:

*“8. Facilitate growth and diversification of the local economy and an increase in skilled high value employment in key sectors
9. Support development that positions Flintshire as an economically competitive place and an economic driver for the sub-region”*

15.22 With the following Policies of relevance to the proposed development:

- Creating Sustainable Places and Communities
 - Policy STR1: Strategic Growth
 - Policy STR6: Services, Facilities and Infrastructure

- Policy STR7: Economic Development, Enterprise and Employment
- Supporting a Prosperous Economy
- Policy STR7: Economic Development, Enterprise and Employment

15.2.2 Study Area

15.23 A two-tiered study area has been used for the assessment; the study areas are defined as follows:

Wider Study Area (WSA)

15.24 The proposed Wider Study Area (WSA) for the assessment is intended to encompass the area within which significant effects on employment and the local economy, including the effects on employment and skills, will be experienced. The boundary is set as encompassing the 'host' local authority Flintshire County Council together with the neighbouring authority of Cheshire West and Chester Council. Impacts on the wider Welsh economy will be considered where appropriate.

Local Area of Influence (LAI)

15.25 A Local Area of Influence (LAI) forms the focus for the assessment of both direct and indirect effects those receptors that are likely to experience impacts at a more local level. The LAI has been identified at a radius extending to 2km from the Site, shown in **Figure 15.1**, within which potential impacts on land use and community assets such as recreational receptors will be assessed. These include a number of long-distance walking and cycling routes, also shown in **Figure 15.1**.

15.2.3 Approach and methods

15.26 **Chapter 5: Scoping and EIA Methodology** provides an overview of the approach to assessment and explains the parameters being assessed in the EIA. The effects of the cumulative impacts of the development, and others, are described in **Section 15.4.3: Cumulative Effects Assessment**.

15.27 There are no published standards or technical guidelines that set out a preferred methodology for assessing the likely socio-economic effects of a proposal of the like of the proposed development. However, there is a series of commonly used methodologies for such assessment, including recognised approaches to quantifying economic effects both during the construction of a development and following its completion, that have been widely used in other major projects. These have been adopted here and are described below.

15.28 The approach to the socio-economic assessment is presented in two parts, addressing both the construction phase aspects of the proposed development and the longer-term economic effects once the proposed development is built and operational.

15.2.4 Assessing Significance

15.29 As there are no published standards that define receptor sensitivity in relation to socio-economic assessment, the sensitivity of each receptor or receptor group is based on its importance or scale

and the ability of the baseline to absorb or be influenced by the identified effects. For example, a receptor (such as a public footpath or a supply chain business) is considered less sensitive if there are alternatives with capacity within the study area. In assigning receptor sensitivity, consideration has been given to the following:

- the importance of the receptor e.g. local, regional, national, international;
- the availability of comparable alternatives;
- the ease at which the resource could be replaced;
- the capacity of the resource to accommodate the identified impacts over a period of time; and
- the level of usage and nature of users (e.g. sensitive groups such as people with disabilities).

15.30 Based upon professional judgement and experience on other large-scale projects, four levels of sensitivity have been used: high; medium; low; and negligible. These are defined in **Table 15.1**.

Table 15.1 - Sensitivity Criteria

Sensitivity	Description
High	<p>The receptor:</p> <ul style="list-style-type: none"> • has little or no capacity to absorb change without fundamentally altering its present character; or • is of high socio-economic, recreational, or tourism value¹; or • is of national or international importance; or • is accorded priority in national policy; or • has no alternatives with available capacity within its catchment area; or • is a destination in its own right (as regards tourism and visitor attractions).
Medium	<p>The receptor:</p> <ul style="list-style-type: none"> • has moderate capacity to absorb change without fundamentally altering its present character; or • has a moderate socio-economic, recreational or tourism value; or • is of regional importance; or • is accorded priority in local policy; or • has some alternatives with available capacity within its catchment area; or • is a destination for people already visiting the area (as regards tourism and visitor attractions); or • forms a cluster of low sensitivity receptors.

¹ Which may include being of high value to a user group of high sensitivity (e.g. mobility impaired users)

Low	<p>The receptor:</p> <ul style="list-style-type: none"> • is tolerant of change without detriment to its character; or • is of low socio-economic, recreational or tourism value; or • is of local importance; or • is accorded low priority in policy; or • has a choice of alternatives with available capacity within its catchment area; or • is an incidental destination for people already visiting the area (as regards tourism and visitor attractions).
Negligible	<p>The receptor is resistant to change and is of low socio-economic, recreational or tourism value or there is a wide choice of alternatives with available capacity within its catchment area.</p>

15.31 In considering the sensitivity of a receptor it is important to remember that, in the case of socio-economic assessment, the sensitivity is often subjective and different receptors will have differing sensitivities depending on matters such as the economic profile of the local area, perception of the type of development and attitude to the potential benefits of a development. This assessment is based on the assumption of a worst-case, which assumes that there is a negative perception of the proposed development, although this may not be the case for all receptors.

Magnitude of Impact

15.32 There are also no published standards that define thresholds of magnitude for socio-economic or recreational impacts. In order to aid clear and robust identification of significant effects, specific and targeted criteria for defining the magnitude of impacts have been developed for this assessment based on experience on other similar projects. The following four levels of magnitude have been adopted using professional judgement: high; medium; low and negligible. These impacts can be beneficial, adverse or neutral. Criteria for each of these levels of magnitude for each receptor group are set out in **Table 15.2**.

Table 15.2 - Magnitude of Impact

Receptor Group	High	Medium	Low	Negligible
WSA economy	An impact that would dominate over baseline economic conditions by >10 %.	An impact that would be expected to result in a moderate change to baseline economic conditions by >5 %.	An impact that would be expected to result in a perceptible difference from baseline economic conditions by >0.5 %.	An impact that would not be expected to result in a measurable variation from baseline economic conditions.
WSA labour market	An impact that would dominate over baseline labour market	An impact that would be expected to result in a moderate change	An impact that would be expected to result in a perceptible	An impact that would not be expected to result in a measurable

	conditions and/or would affect a large proportion (>10 %) of the existing resident workforce.	to baseline labour market conditions and/or would affect a moderate proportion (>5 %) of the existing resident workforce.	difference from baseline labour market conditions and/or would affect a small proportion (>0.5 %) of the existing resident workforce.	variation from baseline labour market conditions.
Long distance routes	An impact that would be expected to cause a major restriction of access to or availability of long-distance routes in the LAI or would result in a major change to existing patterns of use.	An impact that would be expected to have a moderate restriction of access to or availability of long-distance routes in the LAI or would result in a moderate change to existing patterns of use.	An impact that would be expected to have a small restriction of access to or availability of long-distance routes in the LAI or would result in a small change to existing patterns of use.	An impact that would be unlikely to result in a noticeable difference to long-distance routes in the LAI.
Land use	An impact that would lead to a major restriction on the operation of a receptor, e.g. forestry business, or complete closure of receptor.	An impact that would lead to a moderate to major restriction on the operation of the receptor.	An impact that would lead to a minor restriction on the operation of the receptor.	An impact that would lead to a negligible restriction on the use of the receptor.

15.33 The level of effect of an impact on socio-economic and recreational receptors is initially assessed by combining the magnitude of the impact and the sensitivity of the receptor. The level of effects presented in **Table 15.3** provides a guide to the decision-making process.

Table 15.3 - Level of effects matrix

Sensitivity or Value of Resource or Receptor	Magnitude of Impact			
	High	Medium	Low	Negligible
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

- 15.34 Effects may be positive (beneficial) or negative (adverse). Where an effect is classified as major, this is considered to represent a 'significant effect' in terms of the EIA Regulations. Where an effect is classified as moderate, this may be considered to represent a 'significant effect' but should always be subject to professional judgement and interpretation, particularly where the sensitivity or impact magnitude levels are not clear or are borderline between categories or the impact is intermittent.
- 15.35 The level of effects matrix shown in **Table 15.3** therefore provides a guide to decision making but is not a substitute for professional judgement. Impacts and effects can be beneficial, neutral or adverse and these would be specified where applicable. It should be noted that significant effects need not be unacceptable or irreversible.

15.2.5 Residual Effects

- 15.36 A statement of residual effects, following consideration of any specific mitigation measures, is provided.

15.2.6 Cumulative Effects Assessment

- 15.37 In relation to economic effects, cumulative effects depend on the extent to which the supply chain and labour market within the WSA have the capacity to meet demand for construction services for a number of similar projects. An assessment has been made as to whether it is considered likely that the cumulative effect indicates a loss of benefit as a result of cumulative projects, or an enhancement of opportunity which would help to develop expertise and capacity in the market.
- 15.38 Other cumulative effects may arise if the construction and/or operation of a number of other major development projects were to affect receptors in the LAI or WSA.

15.2.7 Statement of Significance

- 15.39 The assessment approach is to describe the baseline conditions, to identify likely effects from construction and operation of the proposed development, consider the sensitivity of receptors, and then to assess the likely significance of any effects. Any adverse effects considered to be 'significant' are further considered with regard to bespoke mitigation measures and residual effects following mitigation are then identified.
- 15.40 Any significant effects that would be direct, indirect, secondary, cumulative, short, medium and long term, permanent or temporary are examined and their significance assessed. These effects are identified as being positive or negative.

15.3 BASELINE CONDITIONS

- 15.41 The proposed development is situated on land (the 'Site') that comprises the operational Shotton Mill paper manufacturing facility (the 'Main Site'), formerly owned and operated by UPM, plus adjoining vacant land (the 'Expansion Site'). The Site is situated within the Deeside Industrial Park close to the Dee Estuary in Flintshire, North Wales, which is within the jurisdiction of the Flintshire County Council. The Site is within 1.3 km of the boundary with Cheshire West and Chester Council.

- 15.42 The Expansion Site is a brownfield site which has become revegetated, however, this was previously in industrial use as part of Shotton steelworks. This is reminiscent of the Site's surroundings, which are predominately of industrial usages to the east, south and west, although the area is undeveloped to the north and comprise the Dee Estuary and RSPB Burton Mere Wetlands. Previously, planning permission was granted for the construction of a ceramic tile factory on this Site. After his project was suspended Shotton Mill acquired the Site.

15.3.1 Wider Study Area

- 15.43 The baseline review of the Wider Study Area (WSA) focuses primarily on the 'host' local authority, Flintshire County Council (FCC), as well as the neighbouring authority of Cheshire West and Chester Council as the majority of the labour market and local supply chains impacts which could occur would be experienced there. The WSA baseline review details the population and employment characteristics of the WSA, and data for Wales and the UK/Great Britain are provided for comparison as appropriate.

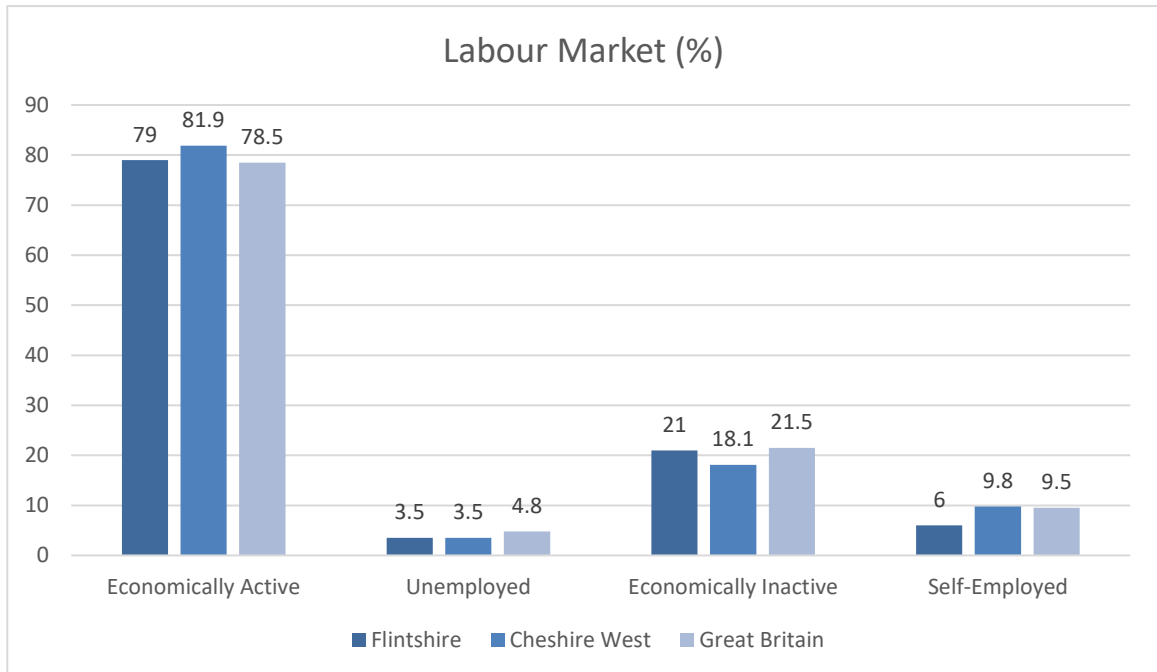
Population

- 15.44 The latest data for the population for Flintshire (NOMIS, 2020a) shows that there are currently 156,800 residents, 49.2% are males (77,200) and 50.8% are females (79,700). In the context of Wales, Flintshire accounts for approximately 4.9% of the total Welsh population.
- 15.45 For Cheshire West and Chester, the current data from NOMIS (2020b) shows a resident population of 343,800, split into 167,600 males (48.7%) and 176,200 females (51.3%). In the context of the North West of England, Cheshire West and Cheshire accounts for 4.7% of the total population.

Labour Market and Supply Chain

- 15.46 The Office of National Statistics (ONS) Annual Population Survey (2021) reports that there were 77,200 economically active residents of working age in Flintshire between October 2020 and September 2021, implying an economic activity rate of 79.0%. This is higher than the activity rate for Wales as a whole (76.0%) and slightly higher than that of Great Britain (78.5%).
- 15.47 From the same Annual Population Survey reports that there were 171,900 economically active residents of working age in Cheshire West and Chester between October 2020 and September 2021, implying an economic activity rate of 81.9%. This is higher than the activity rate for Flintshire, the North West (76.9%) Great Britain (78.5%), illustrated on **Figure 15.2**.

Figure 15.2 - Labour Market



- 15.48 The unemployment rate² in the two local authorities were the same at 3.5%, both were lower than the average for Great Britain, which was 4.8%.
- 15.49 Economic inactivity (those of working age who are not employed nor seeking work; students, sick, retired, for example) is lowest in Cheshire West and Chester, at 18.1%, whilst Flintshire has 21.0% but both were lower than in Great Britain (21.5%).
- 15.50 The level of self-employment is highest in Cheshire West and Chester was 9.8% which was slightly higher than the average for Great Britain (9.5%), both were significantly higher than Flintshire, at 6.0%.
- 15.51 Useful insights into the dynamics of the labour market are often revealed by consideration of the occupational structure of those in employment, as shown in **Table 15.4**. The proportion of 'Managers, directors and senior officials' is highest in Cheshire West and Chester 13.0%, followed by the national average for Great Britain (10.7%), both being higher than that of Flintshire (8.6%). This trend occurs in the 'Professional', where Cheshire is highest again, with over a quarter of their population in this occupation (25.6%), which is also slightly higher than average for both Great Britain (23.4%), and both are significantly higher than Flintshire (16.4%). Conversely, the proportion

² As unemployed form a small percentage of the population, the APS unemployed estimates within local authorities are based on very small samples so for many areas would be unreliable. To overcome this ONS has developed a statistical model that provides better estimates of total unemployed for unitary authorities and local authority districts.

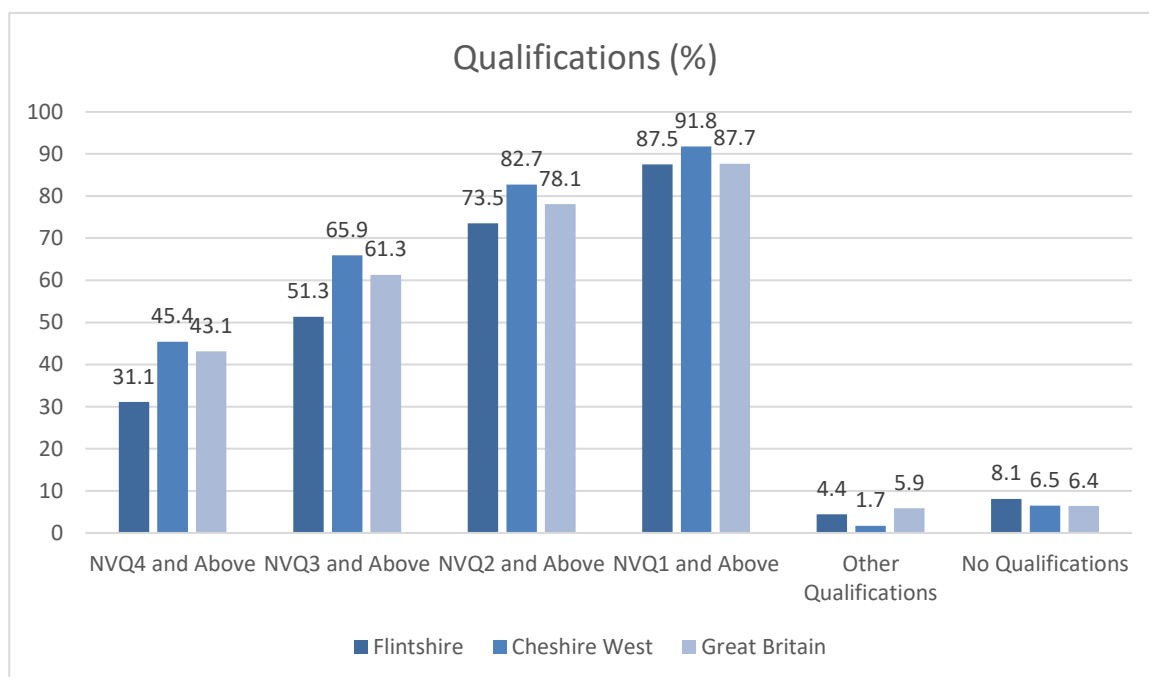
of ‘Associate professional & technical’ is higher in Flintshire (18.4%) than in Cheshire West (13.7%) and the average for Great Britain (15.5%). The spread for Flintshire is more even and less top-heavy than that of Cheshire West and Great Britain. The full figures are shown in **Table 15.4**.

Table 15.4 - Employment by Occupation

	Flintshire (numbers)	Flintshire (%)	Cheshire West	Cheshire West (%)	Great Britain (%)
1 Managers, directors and senior officials	6,400	8.6	21,800	13.0	10.7
2 Professional	12,300	16.4	43,000	25.6	23.4
3 Associate professional & technical	13,700	18.4	22,900	13.7	15.5
4 Administrative & secretarial	9,400	12.5	14,900	8.9	10.2
5 Skilled trades	7,500	10.1	16,000	9.5	8.9
6 Caring, leisure and other service	6,600	8.8	15,600	9.3	9.1
7 Sales and customer service	7,600	10.1	12,500	7.4	7.0
8 Process plant & machine operatives	5,600	7.5	9,400	5.6	5.6
9 Elementary	5,100	6.9	11,600	6.9	9.4

- 15.52 Regarding the proposed development, the ‘Skilled trades’ and ‘Process plant & machine operatives’ occupations would be desirable for the construction and operation of the paper mill. In Flintshire, ‘Skilled trades’ currently account for 10.1% of all occupations, this is a greater proportion than Cheshire West and Chester, which has 9.5%, however, both are greater than national mean of 8.9%. This is indicative of a large pool of these types of employees, particularly in Flintshire, which would be of use to the proposed development.
- 15.53 ‘Process plant & machine operatives’ are also greater than the national average in Flintshire, where 7.5% of the employees work in this sector. In Cheshire West and Chester, 5.6% of employees work in the sector, which is equal to the national mean. These figures show a good labour market pool for the potential jobs available during the construction and operation of the proposed development within the WSA, particularly Flintshire.
- 15.54 Degree-qualified (or equivalent) residents of working age account for 31.1% of the population of the Flintshire, which is significantly lower than the average for Cheshire West (45.1%) and the average for Great Britain (43.1%). The proportion of the working age population with no qualifications in Flintshire is 8.1%, this is slightly higher than the average for West Cheshire (6.5%) and for Great Britain (6.4%), shown in **Figure 15.3**.

Figure 15.3 - Qualifications



- 15.55 According to the ONS Annual Survey of Hours and Earnings (ASHE) for 2020 (NOMIS, 2020c), average weekly gross earnings levels for residents of Flintshire were £576.90, £42.80 lower than the Cheshire West average of £619.70, and £36.20 lower than the average for Great Britain of £613.10.
- 15.56 Data on an area’s business population can be obtained from the ONS UK Business Counts data series (which is sourced from the Interdepartmental Business Register) (NOMIS, 2020d). This data source can be used to identify the structure of the local business base by sector: this is potentially useful in assessing the capacity of the local area to host supply chain activity for infrastructure and other large-scale construction projects such as the proposed development. **Table 15.5** provides the latest (2019) data on the structure of the local business base, both in absolute and relative terms.

Table 15.5 - Employees

Industry	Flintshire	Flintshire (%)	Cheshire West	Cheshire West (%)	Great Britain (%)
B: Mining and quarrying	300	0.4	225	0.1	0.2
C: Manufacturing	20,000	28.2	13,000	8.0	7.9
D: Electricity, gas, steam and air conditioning supply	300	0.4	500	0.3	0.5
E: Water supply; sewerage, waste management and remediation activities	500	0.7	1,250	0.8	0.7

F: Construction	4,500	6.3	6,000	3.7	4.8
G: Wholesale and retail trade; repair of motor vehicles and motorcycles	9,000	12.7	31,000	19.0	14.9
H: Transportation and storage	3,000	4.2	7,000	4.3	5.1
I: Accommodation and food service activities	4,500	6.3	13,000	8.0	7.2
J: Information and communication	1,250	1.8	4,500	2.8	4.5
K: Financial and insurance activities	600	0.8	11,000	6.7	3.5
L: Real estate activities	500	0.7	2,500	1.5	1.8
M: Professional, scientific and technical activities	5,000	7.0	16,000	9.8	8.7
N: Administrative and support service activities	6,000	8.5	13,000	8.0	8.8
O: Public administration and defence; compulsory social security	3,500	4.9	6,000	3.7	4.6
P: Education	4,500	6.3	14,000	8.6	9.0
Q: Human health and social work activities	5,000	7.0	18,000	11.0	13.6
R: Arts, entertainment and recreation	1,250	1.8	5,000	3.1	2.2
S: Other service activities	700	1.0	3,000	1.8	1.9

- 15.57 The data in **Table 15-5** shows that over a quarter of Flintshire employees are employed in manufacturing (28.2%), substantially higher than Cheshire West (8.0%) and Great Britain (7.9%), indicating potential capacity and skills in the 'home' local authority for the manufacturing industry. In Cheshire West, 19.0% are employed in the wholesale and retail trade; repair of motor vehicles and motorcycles sector which is above that of Flintshire (12.7%) and the national average (14.9%).
- 15.58 The construction industry in Flintshire has a greater proportion of total employees (6.3%) than that of the national mean for Great Britain (4.8%), however, Cheshire West and Chester has a lower proportion than both (3.7%). This is evident of potential labour market of pool of construction workers in the 'home' WSA of Flintshire; Cheshire West and Chester, albeit with a lower proportion of construction workers than the national average, has twice as many residents and therefore, has 33.3% more construction workers in their respective local authority.
- 15.59 Note, persons in agriculture and the self-employed are not included in the NOMIS data set out in **Table 15.5**.

15.3.2 Local Area of Influence

- 15.60 The Site is located in North East Wales, close to the Wales-England border, on the northern edge of Connaught's Quay, Flintshire. To the north of the Site is the Dee Estuary, to the east are other parts of the Deeside Industrial Park, which is home to a number of industrial and commercial units, to

the south lies further industrial units and a steel manufacturer, followed by the River Dee and to the west is Deeside Power station, further areas of the Dee Estuary and the River Dee.

- 15.61 As previously mentioned, the Main Site comprises the operational paper mill, with the Expansion Site located on adjoining land, which is currently vacant, shown in **Figure 15.1**. The proposed Expansion Site is a revegetated brownfield site, previously having served as Shotton steelworks.
- 15.62 The Local Area of Influence (LAI) is a 2km radius from the Site boundaries, shown in **Figure 15.1**, stretching into the Dee Estuary to the north, encapsulating much of the neighbouring industrial to the east, extending into Connah's Quay town in the south west and crosses into England, and the neighbouring Cheshire West and Chester, to Burton Mere Wetlands in the north-east, an RSPB site.
- 15.63 Within the Site's immediate surroundings, it is primarily characterised by its industrial usage, with the extensive aforementioned Deeside Industrial Park to its east. This is also true for the land immediately to the south, which houses a large steel works, surrounded by brownfield areas of grassland, and also the land immediately to the west, where further brownfield grassland and a power station is located. The immediate boundary to the north differs from the others, beyond the A548 – Weighbridge Road several areas of recreational usages are located, including a shooting range and model aircraft club, and the Dee Estuary.
- 15.64 Beyond the immediate surroundings to the north-east, the land is predominately used for arable farming with a sailing club located at Shotwick Lake and a large solar farm. The RSPB site Burton Mere Wetlands is also located near the northern edge of the LAI.
- 15.65 Throughout the north and north-west, the land is largely part of the Dee Estuary, with several ecological designations which are assessed in **Chapter 10: Ecology and Ornithology**.
- 15.66 The River Dee runs from the Dee Estuary in the north-east of the Site in a south-westerly direction, separating the Site and its surroundings from the large Connah's Quay Power Station in the west, and the residential areas of Connah's Quay itself in the south-west of the LAI.
- 15.67 The final area of land use is located south of the Site and on the southern bank of the River Dee, within the town of Connah's Quay, which is predominately residential, and includes an area used for commercial and hospitality purposes on the banks of the River Dee.

Recreation

- 15.68 There are two recreational assets that are promoted nationally and therefore likely to draw in visitors from outside the LAI. These are the Wales Coastal Path and the Burton Mere Wetlands RSPB site. As for sites that are promoted regionally, the LAI is home to the Dee Way, a footpath following the River Dee, and lengths of National Cycle Network (NCN).

Formal Recreation Facilities

- 15.69 'Formal' recreation facilities are considered to be those with paid or controlled entry. There are several within the LAI:
- Sealand Ranges – a shooting club;

- Shotwick Lake Sailing – a sailing club;
- Deeside Model Aircraft Club;
- Connah’s Quay Cricket Club; and
- RSPB Burton Mere Wetlands.

- 15.70 The first 3 facilities listed above are to the north of the Site, with Sealand Ranges and Deeside Model Aircraft Club being either within or surrounded by the Dee Estuary – both of these clubs require training and/or qualifications to partake in the activities, as well as membership and/or prior booking. Shotwick Sailing Club is located to the north-west of the proposed Site and is closest to the Site. The sailing club also caters exclusively to members, however, they do not require prior qualifications as they allow for training of new enthusiast.
- 15.71 Connah’s Quay Cricket Club is located in the far south-western corner of the LAI, on the opposite side of the River Dee and within the town of Connah’s Quay. The club currently play in the second tier of the amateur North Wales Cricket League, which will be of local importance.
- 15.72 Due to these conditions, the niche nature of each activity and their relative status nationally, regionally and locally, these recreational facilities have been deemed to be of local importance.
- 15.73 The final ‘formal’ recreational asset is the RSPB Burton Mere Wetlands, which is straddles the Welsh-English border to the north-east of the Site. Although free for RSPB members, the site charges an entrance fee for others and includes a visitor centre and shop, accompanying the wider RSPB site.
- 15.74 Due to being to the national promotion of the site and its relative ecology sensitivity, Burton Meres is considered to be highly sensitive, however, it lies a relative distance from the proposed development, beyond the industrial area, the raised A548 and Dee Estuary with its natural landscape.
- 15.75 The Site is already within an industrial area, with a large section of it already existing and operational and the rest of the Expansion Site located on adjacent brownfield land, and its relative separation from the formal recreational assets, they are considered to be of low sensitivity.

Informal Recreation Facilities

- 15.76 ‘Informal’ recreation facilities are considered to be those which do not require paying, such as public beaches or footpaths. Pathways, both cycling and footpaths, have been identified in **Figure 15.1**.
- 15.77 There is a long Public Right of Way which enters the LAI on its western border through the neighbouring industrial estate and travels south to the River Dee, running along either side of the bank and entering Connah’s Quay, in total is it 1644m long (Flintshire County Council, 2022). The Public Rights of Way in the LAI are considered to be of local importance and low sensitivity.

- 15.78 Part of the 1,400km Wales Coastal Path and the 24km Dee Way both follow the same route in the south-west to south of the LAI, before briefly splitting as they leave the LAI. The Wales Coastal Path in its entirety is considered to be of national importance, and high sensitivity. The Dee Way is considered to be of regional importance.
- 15.79 National Cycle Network (NCN) Route 5 enters the southern end of the LAI, where it diverges north and joins NCN 568. The NCN 568 passes the north-western boundary of the proposed development, where it then travels north, outside of the LAI. The NCN Route is considered to be of national importance and high sensitivity.
- 15.80 No other Public Rights of Way, horse riding facilities or beaches have been identified in the LAI.

15.4 ASSESSMENT OF EFFECTS

- 15.81 This section is concerned with the assessment of effects for both construction and operational activities within the relevant study areas.

15.4.1 Potential Construction Phase Effects

- 15.82 Construction effects are addressed in turn with regard to the WSA and the LAI.

Wider Study Area

- 15.83 During the construction phase of the proposed development there would be economic effects resulting from expenditure on items such as Site preparation, purchase and delivery of materials, plant, equipment, and components, etc. The construction period for the proposed development is assumed to be approximately 42 months.
- 15.84 Although construction phase impacts are by their very nature temporary, for large-scale development schemes these effects can be both sizeable and extend over an extended period. During the construction phase the proposed development would affect the local economy through the provision of jobs (direct employment) and through supply chain services and expenditure in the local area.

Employment

- 15.85 Over the course of the 42 months construction period, the proposed development would require an array of different employees; sub-contractors, delivery drivers, supply chain and further skills and expertise to meet the requirements. The construction would, generally, take place over four zones, shown on **Table 15.6**.

Table 15.6 - Construction Timetable

Zone	Area / Buildings	Construction Timescale
------	------------------	------------------------

1	Piling for Paper Machine Building	June 2022 – October 2022
2	Paper Machine and CHP, warehouse and dispatch, new OCC, EFT, chemical building, ancillary plant	September 2022 – December 2024
3	Tissue Mills, pulp storage, reel storage, converting building, finished goods (Area 4)	September 2022 – December 2024
4	Corrugator plant	January 2025 – December 2025

- 15.86 The current baseline shows that the combined WSA has a total of 10,500 construction workers, this number is split to 4,500 or 6.3% of jobs in Flintshire and 6,000 or 3.7% of jobs in West Cheshire and Chester. The baseline data shows that construction workers in Flintshire comprise a higher proportion of the workforce than the average for Great Britain, whereas in Cheshire West and Chester, the proportion of construction workers is lower than the national average.
- 15.87 The peak construction period is likely to bring an estimated 400 direct jobs in total, excluding further jobs needed for the delivery and supply chain. Whilst much of the work requires specialist skills relating to paper manufacturing and energy generation, the Applicant has advised that approximately 45% of construction expenditure is likely to relate to civil engineering and general services that could be provided by employees within the WSA. Such work is also likely to draw in workers from further afield, especially in view of the excellent transport links to the Site, and allowance must also be made for specific contractors bringing their own teams of workers with them. Allowing for commuting by workers from outside the WSA, a conservative assumption is that approximately 20% of the total construction jobs would be acquired from the WSA, owing to the large pool of construction sector workers available in the area. There is potential for the percentage of WSA employment in construction to exceed 20%, dependent on the particular skills and expertise that would be needed.
- 15.88 The increase in construction jobs within the WSA over the 42-month construction period would amount to approximately 80, which is a proportional increase of 0.76% in the construction workforce of the two local authorities, this number is not thought to be greatly significant and would result in a minor positive impact.
- 15.89 The value of the construction spend, from data obtained from the Applicant, is approximately £600m, this can be broken down to roughly 45% spend on civil engineering, which amounts to a total of £270m spent on construction. The proportional spend on civil engineering for the proposed development is higher than that of other manufacturing plants, due to the sizeable proportion of materials, such as concrete, and the erection of steel needed for the construction of the buildings.

- 15.90 Using the previous conservative assumption for the WSA spend of 20%, the spend of civil engineering would amount to £54m over the 3.5-year period. The latest figures for GVA per sector for each local authority in 2019 (ONS, 2021), show that the combined GVA for construction of buildings, civil engineering and specialised construction activities had a total GVA of £235m.
- 15.91 The same data source shows that Cheshire West and Chester had a GVA in their combined construction sector of £337m. Combining these two figures, for the purposes of forming a total WSA combined construction GVA, totals £572m.
- 15.92 The increase of £54m would amount to 9.44% increase in GVA for the combined industries for the WSA local authorities. This is considered to be a Medium - High level impact to the relative industries and their local authorities and excludes further sizeable proportions of expenditure that could result in the WSA, including supply chains, hospitality and the transport industry.
- 15.93 Due to the Medium - High sensitivity of the construction industry economy in respect of the WSA and the Medium – High to high level of impact that the additional spending would have on this economy, it is considered to have a Moderate – Major (beneficial) level of significance.
- 15.94 The construction of the proposed development also has direct benefits on employment through the retention of the existing paper mill employees. The current employees number approximately 190, and the Applicant has pledged to secure and retain the jobs of this highly skilled and experienced work force, who would benefit from job security throughout the construction period.

Local Area of Impact

- 15.95 The potential impact on the current land of the proposed development, as a result of the construction, is thought to be low. The land of the Main Site already has an operational paper mill and is within an industrial compound with palisade fencing acting as the boundary. The Expansion Site would still be within these confines and, although the land would change from its current state, it is brownfield land which would be re-developed. There is not expected to be any spill over as a result of the construction and construction related activities, meaning that the potential impact to land use of the Site is negligible.
- 15.96 The ‘formal’ recreational facilities in the LAI, those which require paid entry for their use, are of local importance in respect of north-east Wales. This is due to many needing prior membership, experience and/or qualifications for their usage. It is not expected that the construction stage of the proposed development would result in an unacceptable impact on the usage of these assets or result in a detriment in terms of their visitor numbers. The Site is separated from these assets by several large areas of industrial premises, infrastructure and natural environment, including the River Dee in respect of the cricket club. The current large industrial sites and estate are already in operation in the area, without any known detriment to these assets, it is not thought that the proposed developments construction, within the already-defined boundaries and operational paper mill, would result in a deterrence of potential recreational users, as many of these users would already be members of these organisations. As such, the impact on recreational assets is considered to be negligible.
- 15.97 The impact of the proposed development on the Welsh Coastal Path and Dee Way path are deemed to be negligible due to these routes’ relative distance from the Site and the volume of

intervening infrastructure, buildings and the River Dee all offering various forms of screening; the visual element of the construction phase deterring potential visitors is considered to be low. **Chapter 7: Landscape and Visual** explores the potential impact of construction on Visual amenity.

- 15.98 The length of Welsh Coastal Path, over 1,400km, offers further mitigation, allowing potential users a vast amount of land to use. However, the distance and location of both paths means that neither would need closures or alternative routes to allow for the movement of construction vehicles. The impact of the construction of the proposed development is thus considered to be negligible.
- 15.99 Cycle routes NCN Routes 5 and 568 pass the Site closely on its north-eastern boundary, as NCN Route 568. This route would not need to be closed, temporary or otherwise, due to the confined nature of the proposed development, which is encompassed within metal palisade fencing. Construction mitigation measures would be put in place in accordance with the Outline Construction Environmental Management Plan (CEMP) (see **Appendix 5.3**) to ensure that local routes including NCN Route 568 remain open and safe for all users during the construction period.
- 15.100 Subject to the implementation of the CEMP, the potential for adverse impacts on Route 568 are considered to be low. As the receptor is of high sensitivity, the level of effect is adjudged to be moderate. Moderate levels of effect can be significant, but as the potential disruption would be for limited periods of time through the 42-month construction period, it is not considered that there would be a significant adverse effect.

Residual Effects

- 15.101 The residual impact on the WSA labour market is considered to be a Minor-Medium beneficial impact, due to the Minor benefit on a Medium-Highly sensitive receptor. Whilst the impact on the Medium-Highly Sensitive WSA economy is deemed to be a Medium-Major benefit due to the Medium-Major benefit that the substantial funds from the construction of the proposed development would provide.
- 15.102 The impacts on land use are considered to be negligible due to the current operation mill on the Main Site, the brownfield land on the Expansion Site and the defined palisade fencing providing a rigid boundary.
- 15.103 The impact on the recreational receptors, specifically the NCN route, is considered to be low, despite a highly sensitive receptor and moderate impact. This is due to professional judgement considering the actual impact on this receptor to low, with any potential closure or detour being restricted and very temporary.
- 15.104 No significant negative effects have been identified in respect of socio-economic receptors arising from construction of the proposed development and, therefore, no mitigation measures are required to reduce or remedy any adverse effect.
- 15.105 No residual adverse construction effects are expected on the LAI.

15.4.2 Potential Operational Phase Effects

- 15.106 Operational impacts are addressed in turn with regard to the WSA and the LAI.

Wider Study Area

- 15.107 The proposed development would secure approximately existing 190 jobs as a result of current staff being retained throughout the redevelopment of the Site. This is owing to the current level of skills and expertise of the employees.
- 15.108 The proposed development would create an additional 660 new jobs, bringing the total number of jobs during the operational phase to 850. The new jobs would be primarily manufacturing roles including process plant and machine operatives, skilled trades and professional workers, together with office support staff.
- 15.109 **Table 15.4** shows that there is currently 7,500 people employed in a Skilled trade profession in Flintshire and 16,000 employed in West Cheshire and Chester, totalling 23,500. The same table from the baseline shows that 5,600 residents in Flintshire are employed in a Process plant & machine operative occupation, whilst in West Cheshire and Chester, there are 9,400, totalling 15,000.
- 15.110 It is expected that these occupations would be the highly sought-after roles for the operation of the proposed development and are the roles that a significant number of the 660 new employees would be employed in. The number of the above roles within the WSA combined are 38,500, when the additional number of 660 new jobs is added, it results in an increase of 1.71%. When including the 190 roles that the proposed development would retain, it results in an increase of 2.2%. Although a substantial increase of FTE jobs in relative terms of a single new development, this would amount to a low impact on a highly sensitive receptor, as per **Tables 15-1 and 15-2** and is considered a moderate beneficial impact.
- 15.111 As well as the direct impacts on employment during the operational phase, there would also be indirect effects. Indirect effects arise from the placing of contracts with other businesses; in the local area, elsewhere in the region and nationally, supplying services and materials to the proposed project during its operational phase.
- 15.112 Examples of such supply chain activity would include the procurement of:
- logistics – delivery of feedstock and export of products;
 - maintenance and repair of equipment, infrastructure and/or buildings;
 - waste management and recycling;
 - maintenance of fencing and landscaping; and
 - supply of consumable items (e.g., resources, lubricants and oils, spare parts, office supplies, etc.).
- 15.113 In terms of quantifying indirect and induced effects, the scale of income and supply linkage multiplier effects vary according to the mix of economic activity that exists in an area and the size of the study area; a larger study area means it is more likely that relevant skills, goods and services can be procured from within the area. The UK Government provides an Additionality Guide (2014)

which draws from experience throughout the UK, to create a formula to account for the multiplier effect of a certain type of development; the number of indirect jobs created.

- 15.114 This is done through assessing the indirect option, the number of jobs created by the proposed development, and the reference case, the number of existing jobs from the baseline which be a ‘no change’. **Table 15.7** details this formula on the proposed development.

Table 15.7 - WSA Multiplier Effects

Formulae	Description	Intervention Option	Reference Case
A	Gross direct jobs	660	190
B=A*25%	Estimated leakage – 25%	165	48
C=A-B	Gross local direct effects	495	142
D=C*15%	Displacement – 15%	75	22
E=C-D	Net local direct effects	420	120
F=E*(1.1 -1)	Multiplier – 1.1	42	12
G=E+F	Total net local effects	378	108
H=G (Intervention option) - G (Reference case)	Total net additional local effects	270	-

- 15.115 Consequently, as a result of multiplier effects, in addition to the securing of the current 190 jobs and the direct increase of 660 jobs, the proposed development would secure or create a further 270 jobs within the WSA as a result of its operation.
- 15.116 The addition of direct and potential in-direct roles within the WSA is considered to be a significant beneficial impact.

Skills and Training

- 15.117 The proposed development would be a state-of-the-art facility. In bringing the new production facility online, the Applicant would make the necessary efforts to invest in the training of the existing and additional workforce. ensuring that the employees have the necessary skills to work effectively with the new technology, equipment and technologies. This will be especially necessary as the output changes and the addition new processing equipment.
- 15.118 The Client has an existing track record of developing and retaining good quality staff, now employing over 8,000 people globally, with annual turnovers exceeding £1.8 billion. As high-quality engineering and mechanical skills would become even more important once the new paper mill becomes operational, it is expected that skilled employees and in-house training would become more necessary.

Local Area of Impact

- 15.119 Visual effects on the recreational receptors are assessed in **Chapter 7: Landscape and Visual**, and the findings have been considered in the assessment below, although it is important to note that a

significant landscape and visual effect does not necessarily result in a significant socio-economic effect.

- 15.120 The Landscape and Visual Impact Assessment found that the proposed development would result in no significant landscape effects on any of the receptors identified. Further stating:

“The Site is generally well screened within the Study Area, with only the upper parts of the existing Shotton paper mill being appreciated by receptors using the network of PRoW and National Cycle Routes. The Site is screened from users of the Wales Coastal Path (National Trail) by intervening development (Tata Steel Works) along large parts of its route, with only glimpsed views possible.”

- 15.121 Overall, the visual effects of the proposed development on the recreational assets, such as sporting clubs and long-distance routes, are considered to be relatively limited. This is because of screening provided by the surrounding A568, industrial areas and buildings, infrastructure and natural features such as the River Dee.
- 15.122 The impact on the ‘formal’ recreational facilities are thought to be negligible, this is due to the current paper mill already being in operation. The operation of the proposed development would result in no significant change beyond the potential of increased patronage of the membership clubs through increased footfall in the area as a result of the significant increase in jobs that the proposed development would bring, however, this is also thought to be insignificant.
- 15.123 The Public Right of Way and long-distance footpaths do not connect directly with the Site, and so unlikely to be used by employees of the proposed development. There is not expected to be any impact on levels of use of these receptors.
- 15.124 The NCN Route 568 may experience increased levels of use through the potential for the increased numbers of employees using the route as a means of sustainable, free, active travel to the work place. Such increase is likely to be neutral in terms of its impact on the route, unless increased numbers lead to increased levels of maintenance and investment in the future.
- 15.125 The current land use of the LAI would remain unchanged during the operation of the proposed development, which would be in keeping with the industrial nature of the surroundings. The impact of the operation of the proposed development on the land use of the LAI is, therefore, considered negligible.

Residual Effects

- 15.126 The securing of jobs as a result of the proposed development with the additional increase of 660 jobs post-construction is likely to have a moderate beneficial impact on the WSA. This is due to the WSA job market being considered a Moderate-Highly sensitive receptor, with the additional jobs considered a low impact due to the large labour pool in a relatively large WSA; if the WSA and labour to come directly from one local authority/area, this would likely result in a moderate beneficial impact.
- 15.127 The further increase in indirect jobs through the multiplier effect, both individually and combined with the direct increase of jobs, are also considered a low impact on a highly sensitive receptor, which would, again, result in a moderate beneficial impact to the WSA’s relevant labour pool.

- 15.128 This is coupled with a further beneficial impact to the labour market through the increase in training, skills, and expertise, which is considered a low beneficial impact. These effects combine to give a beneficial impact on the WSA labour market which will continue throughout the lifespan of the proposed development.
- 15.129 No significant effects have been identified in respect of socio-economic receptors within the LAI arising from operation of the proposed development and therefore no mitigation measures are required to reduce or remedy any adverse effect.
- 15.130 No residual adverse operational effects are expected.

15.4.3 Cumulative Effects Assessment

- 15.131 Cumulative effects occur in combination with other development projects in the area. Cumulative effects may result from impacts arising at various stages of a project, as follows:
- the interaction or proximity of two or more construction projects (not necessarily for the same type of development);
 - the interaction or proximity of two or more developments of a similar nature; and
 - a combination of the above scenarios.
- 15.132 Route 568 presents a potential for disruption due to cumulative impacts of the construction of other developments within the vicinity of the proposed development, however, the implementation of a Construction Traffic Management Plan (CTMP) and Construction Environment Management Plan (CEMP) would offer mitigation and provide the necessary planning to mitigate, minimise and/or avoid potential disruptions or closures of the route.
- 15.133 Whilst there is potential for both construction phase and operational phase effects arising within the WSA as a result of the construction of other major manufacturing facilities, this is not considered to be of a scale that would lead to a shortage of labour or a disruption to the labour market. It is possible that the cumulative effects of other similar development would lead to the local labour market benefitting for improved training opportunities.
- 15.134 The proposed development is thought to have minimal, if any, impacts on further socio-economic receptors, therefore, it is unlikely that the cumulative experience of other developments would present greater impacts.
- 15.135 The cumulative impact on the WSA and LAI socio-economic receptors is considered to be not significant.

15.5 SUMMARY AND STATEMENT OF SIGNIFICANCE

- 15.136 The predicted socio-economic effects associated with the construction of the proposed development are summarised in **Table 15.8**.

Table 15.8 - Summary of Predicted Construction Effects

Type	Duration	Sensitivity	Effect	Mitigation Measures	Residual Effect
WSA Labour Market	Temporary	Medium - High	Minor (beneficial)	None required	Minor - Medium (beneficial)
WSA Economy	Long-term	Medium - High	Medium - Major (beneficial)	None required	Medium - Major (beneficial)
Land Use	Temporary	Low	Negligible	None required	Negligible
Recreational Receptors	Temporary	High	Moderate	None required	Low (little change)

15.137 The predicted socio-economic effects associated with the construction of the proposed development are summarised in **Table 15.9**.

Table 15.9 - Summary of Predicted Operational Effects

Type	Duration	Sensitivity	Effect	Mitigation Measures	Residual Effect
WSA Labour Market	Long term	Medium-High	Low (beneficial)	None required	Moderate (beneficial)
Land Use	Long term	Low	Negligible	None required	Negligible
Recreational Receptors	Long term	High	Negligible	None required	Negligible

15.138 This assessment has considered data from the extensive baseline review to determine the likely effects of the proposed development on the local economy, together with local effects on land use and recreation assets. The potential effects on the economy and identified assets take account of good practice measures to be adopted. No specific mitigation has been identified to be required and therefore residual effects of the proposed development are effectively the same as the

predicted effects. Predicted adverse effects have been assessed as not significant; predicted beneficial effects have been assessed as significant with regard to effects on the local construction sector during the construction phase and the WSA employment with regard to the operational phase.

- 15.139 With regard to local land use, no significant adverse construction phase effects have been identified. Operational phase impacts are thought to be insignificant, often with little to no significant change from the current baseline.
- 15.140 There has been a moderate impact assessed on a highly sensitive recreational receptor due to the NCN route, however, with professional judgement and a contextual understanding of the proposed development, the residual impact is considered to be Low, with little actual impacts during the construction phase. As with land use, operational impacts are considered to be negligible, with little change from the current baseline.

15.6 REFERENCES

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- 15.142 Natural Resource Wales, *Map of Places to Visit*, 2021. Available at: [Natural Resources Wales / Map of places to visit](https://www.naturalresources.wales/map-of-places-to-visit)
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- 15.144 NOMIS - *Labour Market Profile – Flintshire*, 2020a. Available at: [Labour Market Profile - Nomis - Official Labour Market Statistics \(nomisweb.co.uk\)](https://www.nomisweb.co.uk/labour-market-profile)
- 15.145 NOMIS *ONS Annual Population Survey*, 2021
- 15.146 NOMIS, *ONS Annual Survey of Hours and Earnings*, 2020c
- 15.147 NOMIS - *ONS UK Business Counts*, 2020d
- 15.148 ONS, *Regional gross value added (balanced) by industry: local authorities by ITL1 region*, 2021
- 15.149 UK Government, *Additionality Guide Fourth Edition*, 2014

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16.1 INTRODUCTION

16.1 This chapter of the Environment Statement (ES) considers the effects of the proposed development for those topics that do not require full assessment. The statutory basis for EIA has been set out in Chapter 5, Scoping and EIA Methodology. From this, it is noted that the purpose of an EIA is to assess the significant environmental effects of a development. In this respect Planning Circular 1/2017 indicates that:

“It is emphasised that the requirement is to include the information that may reasonably be required for reaching a reasoned conclusion on the significant effects of the project on the environment, taking into account current knowledge and methods of assessment. Other impacts may be of little or no significance for the particular development in question and, if included in the EIA report, will need only very brief treatment to indicate that their possible relevance has been considered.”

16.2 In view of this certain potential effects are not considered to require a detailed assessment. This is due to the nature of the potential operations and the context of the application site relative to including remoteness from sensitive receptors.

16.1 The scoping report (see **Appendix 5.1**) identified Cultural Heritage could be scoped out from further assessment due to a low likelihood on the potential adverse effects on cultural heritage. However, following the scoping direction from PEDW it was identified that Cultural Heritage should remain in the scope of the ES.

16.2 In response to the consultation feedback, therefore, limited assessment of effects in relation to the following issues is provided in this chapter of the EIA Report:

- Cultural Heritage; and
- Major Accidents and Disasters.

16.3

16.2 CULTURAL HERITAGE

16.4 This section considers the effects of the proposed development upon the existing cultural heritage receptors.

16.5 Three Historic Environment Desk-based Assessments (DBAs) were completed in February 2022 to support three separate planning applications for the Shotton Paper Mill redevelopment, comprising the main site and expansion land, the piling site and the CHP site. These three aspects of the proposed development are hereafter collectively referred to as ‘the Site’.

16.6 The DBAs identified whether there were any known or anticipated historic assets within the Site and provided an assessment to allow a full understanding of the impact of the proposals on the significance of known or potential historic assets, in accordance with the Planning Policy Wales (PPW) (2021), paragraph 6.1.26 and Technical Advice Note (TAN) 24 (2017), paragraphs 4.7 and 4.8. The DBAs also discussed the possible effect of the proposals upon the significance of surrounding historic assets, both as a result of physical truncation and as a result of change to setting.

16.2.1 Direct Impacts

- 16.7 The DBAs confirmed that there were no known historic assets within the Site. The only record to pre-date the post-medieval period within 1km of the Site was a findspot of the haft end of a Bronze Age (2500-800 BC) halberd located c.780m to the north. Considering the location of this single findspot, within what historically would have been the tidal estuary of the River Dee, it is highly unlikely that this findspot is evidence of localised settlement activity in the area. The Site would have been an unattractive (and likely completely unfeasible) location for settlement prior to the later post-medieval period. Until the construction of the new cut of the river channel for the Dee in the early 18th century, the Site would have been underwater at high tide and, at best, continuously waterlogged as part of the salt marshes at low tide. Within this context, the presence of a single prehistoric findspot to the north is more likely to be the result of loss or washing from further upstream.
- 16.8 All other recorded historic assets within 1km of the Site are dated after AD 1800 and largely relate to historic land reclamation, such as the tidal embankments to the west. The historic mapping sequence from 1835 onwards depicts the phased reclamation of the salt marshes over time, and the increased industrial development in this area from 1899. The photographic and documentary evidence demonstrates that the land within the Site underwent considerable changes over the 20th century that would likely have been highly destructive to any archaeological remains, if present. These changes include:
- the dredging and sand-pumping activities to drain and raise the area during the 1940s;
 - the activities associated with the expansion of the steelworks during the 1960s, including the construction of ponds, tramways and buildings; and
 - the construction of Shotton Paper Mill during the 1980s, as well as any demolition of the prior steelworks structures.
- 16.9 If extant within the Site, more recent remains relating to the construction of the 19th century embankments and flood defences would retain some low historic, communal and evidential interest, which would contribute to their heritage significance. The examination of such remains under archaeological conditions may also contribute to the understanding of their construction and development, such as the types of material used for the banks and where it was imported from. However, due to the reasons identified within paragraph 16.8, it is unlikely that such remains would have survived the industrial development of the 20th century.
- 16.10 Within the above context, the archaeological potential of the Site is considered to be very low. In the unlikely event that there were surviving archaeological remains within the Site prior to the 20th century, it is probable that the industrial activities since that time would have severely impacted the significance of such remains through truncation or total removal.
- 16.11 Further, in reference to the recorded borehole data within and surrounding the Site, the very thick layers of underlying made-ground could have the potential to protect surviving archaeological remains (in the unlikely event there are any) from the physical impacts of the proposed development and preserve them *in situ*.
- 16.12 Due to the location and former environmental conditions however, it may be possible to retrieve some paleoenvironmental deposit data from within the Site through geoarchaeological test pitting or core sampling. Such samples would have the potential to inform about past conditions within the estuary and contribute towards the development of a deposit model.

16.2.2 Indirect Impacts

- 16.13 The DBAs identified no historic assets that were at risk of harm to their significance as a result of changes to setting due to the proposed development.
- 16.14 In all cases, the intervening distances and lack of any material intervisibility between the historic assets within 2 km of the Site negated the potential for the proposed development to adversely affect their significance.
- 16.15 Aside from this lack of intervisibility, the historic assets within proximity to the Site are either directly connected to the industrial heritage of Connah's Quay or have been present within its development as an industrial town for much of the modern historical period. The presence of factories and distribution centres within the modern setting of the historic assets is entirely in keeping with their historical settings. It is not anticipated that the proposals would equate to a material change to the current character of the Site, which is currently a paper mill, therefore this redevelopment would not amount to a change to the settings of the historic assets.
- 16.16 In all cases, the contributing heritage values to the significance of these historic assets, the ability to appreciate their significance, and all key views towards, from and including them, would be preserved.

16.2.3 Summary

- 16.17 The Cultural Heritage Assessment has concluded that:
- no known historic assets (designated or non-designated) are located within the Site;
 - the potential for unknown archaeological remains is very low due to the historical environmental conditions, the land reclamation processes during the 19th and 20th centuries, and the subsequent construction and demolition of industrial infrastructure within the Site;
 - in the unlikely event that there are surviving archaeological remains, these may be preserved *in situ* beneath the substantial layers of made ground, which have been identified within existing borehole data as being least 2m in depth across the Site; and
 - there is no anticipated harm to any historic assets as a result of changes to setting. In all cases, the key contributing interests to the significance of those historic assets, the key views towards and from them (including from 'third points') and the *ability to appreciate* their significance would be preserved under the proposals.
- 16.18 Overall, the Cultural Heritage Assessment has identified no significant adverse impacts to archaeological remains or built heritage as a result of the proposed development.

16.3 MAJOR ACCIDENTS AND DISASTERS

Introduction

- 16.19 Major Accidents and Disasters was introduced as a technical requirement for EIA as part of the EU Directive 2014/52/EU (the EIA Directive).

- 16.20 The assessment requires identification of “*potentially significant adverse effects on the environment deriving from its vulnerability to risks of relevant major accidents and/or disasters.*”¹.
- 16.21 Paragraph 4(4) of the EIA Regulations indicates that an EIA should include the expected effects deriving from the vulnerability of the development to risks, so far as relevant to the development, of major accidents and disasters. Paragraph 8 to Schedule 4 of the EIA Regulations requires EIA Reports to include the following:
“A description of 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 which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to legislation of the European Union such as Directive 2012/18/EU of the European Parliament and of the Council or Council Directive 2009/71/Euratom or relevant assessments may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies”.
- 16.22 This section of the EIA Report outlines the vulnerability of the proposed development to risks of major accidents and/or disasters. This is a new requirement of the 2017 version of the EIA Regulations. Its inclusion in this EIA Report does not indicate that the proposed development is considered especially susceptible to such risks but is to demonstrate why such risks can be scoped out of the EIA.

Scope of Assessment

- 16.23 Consideration of the effects deriving from major accident or disaster must be considered in relation to the likelihood of such incidents occurring. This chapter sets out the basis for determining whether certain types of major accident or disaster are considered likely in relation to the nature and scale of the proposed development, and its location. Events that are considered to have a low probability of occurring, or to which the proposed development has low vulnerability, are identified and scoped out of further assessment.

Terminology

Accident

- 16.24 The following definition follows advice given by the Health and Safety Executive (HSE)² with regard to major accidents:

“An incident will be a major accident if it results in serious danger, whether realised or potential, to the natural or built environment. The effect may be immediate or delayed and may sometimes be relatively long-lasting but not necessarily irreversible. Operators should consider the potential for

¹ Major Accidents and Disaster in EIA, IEMA, September 2020.

² The Control of Major Accident Hazards Regulations 2015

widespread loss or damage to the general environment as well as the risk of adverse effects on a rare, unique or otherwise valued component of our natural or built environment.”

16.25 The advice goes on to state: *“Serious danger to the environment includes accidents with the potential to result in:*

(a) the death or adverse effects on local populations of species or organisms, with lower thresholds for high-value or protected species;

(b) contamination of drinking water supplies, ground or groundwater;

(c) damage to designated areas, habitats or populations of species within the areas;

(d) damage to listed buildings;

(e) damage to widespread habitats;

(f) damage to the marine or aquatic environment”.

Disaster

16.26 The definition of disaster is normally considered to involve a calamitous event, especially one occurring suddenly and causing great loss of life, damage, or hardship. The International Federation of Red Cross and Red Crescent Societies (IFRC) considers a disaster to be *“a sudden, calamitous event that seriously disrupts the functioning of a community or society and causes human, material, and economic or environmental losses that exceed the community’s or society’s ability to cope using its own resources. Though often caused by nature, disasters can have human origins”*. A disaster can therefore include major accidents, but also encompasses natural events, and other incidents including malicious intent.

Probability of Occurrence

16.27 The proposed development comprises a redevelopment of an established paper mill that has an established track record of managing safety risk for its employees, contractors, visitors and neighbours. The Eren Group similarly has an established track record of managing safety risks in respect of its operations in Turkey.

16.28 The Applicant intends to retain existing employees from the previous paper mill operations, and undertake the relevant training to upgrade skills for the operation of the new plant and machinery. Health and safety management systems will be reviewed and updated to take account of new plant and working practices. Safety management will continue to be a prime focus of Site management and employees.

16.29 Based on the proposed continuation of existing practices, which will be subject to review and updating to account for the proposed development, it is expected that the probability of occurrence of accidents and disasters resulting from Site -based human error will be low.

- 16.30 There is always the possibility of external sources of accident and disaster for any location, including both natural and man-made occurrences. Examples would comprise earthquake, road traffic accident affecting the Site access, and cyber-attack. The proposed development and the Site are not considered to have any particular susceptibility to such events, and it is expected that the probability of occurrence of accidents and disasters resulting from external forces will be low.

Vulnerability to Accident or Disaster

- 16.31 As noted above, the likelihood of occurrence of major accidents and/or disasters from whatever source is considered to be low. Similarly, the vulnerability of the Site and the proposed development to such events is also adjudged to be low. All businesses these days are susceptible to some extent to cyber-attack, but the paper mill manufacturing process is of relatively low sensitivity being to a large extent dependent on manual operations. The most likely outcome of a cyber-attack would be to disrupt logistics systems and bring a temporary halt to operations and distribution.
- 16.32 The proposed development would not be storing excessive quantities of hazardous materials on Site. All such storage would be securely contained and managed as part of the ongoing health and safety management system. It is therefore considered that the vulnerability of the proposed development to accidents and disasters will be low.

Summary

- 16.33 The proposed development is considered to be of low risk with regard to major accidents and disasters from internal and external sources, whether man-made or natural. The proposed development will be managed in accordance with established safety management systems and training will be provided to take account of new plant and working practices.

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17.1 INTRODUCTION

- 17.1. This chapter assesses the Cumulative Effects of the proposed scheme. The assessment of Cumulative Effects Assessment (CEA) must take a systematic and methodical approach allowing for the identification and evaluation of significant effects from multiple activities and developments.
- 17.2. There are two types of cumulative effects, these are:
- Type 1: Cumulative effects arising from a single project, for example, this type of effect is where there are combined effects from differing environmental impacts (such as from landscape and ecology) on a single receptor/resource that may, in combination, be significant.
 - Type 2: Cumulative effects from other projects which in combination with the proposed development have an effect that may, in combination, be significant.
- 17.3. There are several definitions of cumulative effects and there is not one agreed methodology. For the purpose of this assessment, cumulative effects are defined as: *“impacts that result from the incremental changes caused by other past, present and reasonably foreseeable future actions together with the project”* (Hyder 1999, Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions).
- 17.4. The Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions also define impact interactions as: *“The reactions between impacts whether between the impacts of just one project or between projects in the area.”* These impacts would be Type 2.

17.2 TYPE 2 EFFECTS

- 17.5. As required by the EIA Regulations, the EIA includes an assessment of any direct and indirect cumulative effects arising from the proposed development when considered alongside any other developments in the area surrounding the Site (Type 2).
- 17.6. The aim of a Type 2 CEA is to identify any combined effects from the proposed development or effects from several developments. It should be noted that whilst an effect may not be significant on its own, when considered with other effects identified in other ESs they could cause a further significant direct or indirect effect requiring mitigation.
- 17.7. In relation to Type 2 CEA and other developments, best practice requires that cumulative assessments of this nature should have regard to those schemes which are ‘reasonably foreseeable’ (i.e. usually those that are referred to as committed development). The assessment is only capable of being carried out based on the information available at the time of assessment.
- 17.8. For Type 2 CEA the technical assessments presented within this ES have all considered and assessed CEA type 2 effects. To avoid ‘double counting’ the Type 2 CEA are not considered further within this assessment and the respective technical assessments should be consulted for further information.
- 17.9. This chapter of the ES therefore considers only Type 1 Cumulative Effects and this is discussed further in section 17.3 below.

17.3 REGULATORY/POLICY FRAMEWORK

- 17.10. The assessment of Cumulative Effects is required at project level in EIAs by the European Community Directive: 'The assessment of the Effects of Certain Public and Private Projects on the Environment' (85/337/EEC) as amended by the Council Directive 97/11/EC.
- 17.11. Schedule 4, Part 1 of the EIA Regulations 2017 states that an ES should include, '*the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resource.*'

17.4 METHODOLOGY

17.4.1 Study Area

- 17.12. The Study Areas presented within the technical chapters, (chapters 7-16) of this ES have informed the Study Area, and thus receptors, for the CEA.

17.4.2 Baseline Conditions

- 17.13. The technical assessments (chapters 7-16) within this ES have clearly identified the baseline environment and sensitive receptors applicable to the assessments. This CEA is informed by those technical assessments and no further baseline conditions have been identified.
- 17.14. The methodologies for determining the potential effects of the proposed development on the receiving environment and the mitigation required are identified within the technical assessments of this report. The CEA has focused on effects that were significant, therefore only receptors experiencing moderate or large/major adverse effects and are included in the assessment.

17.4.3 Value (sensitivity) of Receptor

- 17.15. The value and / or sensitivity of the receptors are described in detail in Chapters 7 to 16 of this ES.

17.4.4 Design, Mitigation and Enhancement Measures

- 17.16. Where mitigation measures are required to address a potential adverse impact, these are proposed in the technical assessments of this ES. No additional mitigation is proposed for the Cumulative Effects of the project.

17.5 TYPE 1 CUMULATIVE ASSESSMENT

- 17.17. Individual receptors affected by different environmental impacts, as a result of the proposed development have been identified in **Table 17-1** and **Table 17-2**.

17.18. For the purpose of the CEA, only those effects which have been identified as being Moderate Adverse (and identified in the assessment as being significant) and Major Adverse after mitigation are included.

Table 17-1 Cumulative Effects (Construction), Type 1

	Receptor/ Environmental Resource	Significance of Effect (Residual)	Commentary of Significance	Comments and Significance of in-combination effects following mitigation
Landscape and Visual Effects	Viewpoint K (views from A548 Weighbridge Road)	Major Adverse	Construction activities would be seen in the near distance and form the focus of the view, changing its nature and composition and resulting in a Major adverse effect.	The technical assessments have not identified a major adverse effect on the A548 Weighbridge Road (viewpoint K) therefore there are no cumulative effects associated with this receptor.

Table 17-2 Cumulative Effects (Operation) Type 1

	Receptor/ Environmental Resource	Significance of Effect (Residual)	Commentary of Significance	Comments and Significance of in-combination effects following mitigation
Landscape and Visual Effects	Viewpoint K (views from A548 Weighbridge Road)	Major Adverse	The proposed development would be seen in the near distance and form the focus of the view, changing its nature and composition and resulting in a Major adverse effect.	The other technical assessments have not identified a major adverse effect on the A548 Weighbridge Road (viewpoint K) therefore there are no cumulative effects associated with this receptor.
Landscape and Visual Effects	Viewpoint B (views from RSPB Burton Mere Wetlands)	Moderate Adverse	The proposed development would be seen in the far distance as a small part of the wide view but forming a new and prominent feature. It would result in a	The other technical assessments have not identified a major adverse effect RSPB Burton Mere Wetlands (viewpoint B) therefore there are no cumulative effects associated with this receptor.

			Moderate adverse and significant adverse effect on visual amenity.	
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17.6 SUMMARY

- 17.19. As identified in **Table 17-2** and **Table 17-3** there will be a major adverse residual effect on receptor K ((views from A548 Weighbridge Road) during both construction and operation. In addition to this there will be a moderate adverse residual effect during operation on receptor B (RSPB Burton Mere Wetlands).
- 17.20. There are no other adverse effects on these two receptors from the assessments therefore there are no cumulative effects.

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18.1 INTRODUCTION

- 18.1. This chapter of the Environmental Statement (ES) provides a summary of the technical assessments that the ES has reported on for the proposed development. This ES has provided detail on the proposed development, the consultation undertaken, the EIA process and, has presented the assessments undertaken to determine whether the proposed development will have a significant effect on the environment after mitigation has been incorporated.
- 18.2. The assessments undertaken have detailed relevant legislation, policy and best practice; detailed the assessment methodology; presented the baseline to which the proposed development is assessed against and then sought to identify adverse and beneficial impacts during demolition; construction and operation and what mitigation can be utilised to reduce the effect of these impacts. Each technical assessment has identified the residual effects of the proposed scheme on the receiving environment and the capacity of the receiving environment to accommodate these effects. In addition to this, the assessments have assessed the Cumulative Effects of the proposed development and those other significant developments which are 'committed' within the immediate area.

18.1.1 Landscape and Visual Impact Assessment

- 18.3. **Chapter 7: Landscape and Visual Impact Assessment (LVIA)** reported that the existing landscape within the Study Area is dominated by the large scale industrial and infrastructure-based development close to the River Dee. Predominately: Parc Adfer EfW; Deeside Power Station; Flintshire Bridge; and Connah's Quay power station, along with numerous OHL and their adjacent pylons. These existing detracting features were taken into account for the assessment.
- 18.4. The assessment identified that there were potential for 'perceived' effects of the proposed development associated with a change in the aesthetics, but within the context of existing landscape, it was considered that these effects were minimal.
- 18.5. The Sites immediate landscape includes earthworks, such as the A548 embankments, and mature vegetation which would provide some lower-level screening. The main potential visual impacts would therefore be caused by the proposed developments CHP stacks.
- 18.6. Within the LVIA a number of view points were identified, some would have partial but clear views of the proposed development against the sky (Viewpoints B, F, J and K). It is predicted that other than Viewpoints B and K, there would be no significant effects on the visual amenity of the receptors. Due to the prominence of the new CHP stacks against the sky Viewpoint B would experience a Moderate adverse effect on visual amenity during operation, whereas Viewpoint K, due to its close proximity, would experience a Major adverse effect on its visual amenity during construction and operation.

18.1.2 Land Quality

- 18.7. **Chapter 8: Land Quality** reported that when mitigation measures and best practice techniques are adopted, the effects during the construction phase of the development would result in ‘negligible’ land quality effects.
- 18.8. Identified areas of contamination will be dealt with through risk management and mitigation measures, all of which will be controlled under regulatory permitting requirements. It is therefore considered likely that the magnitude of effects due to contamination during the operational phase of the development will be ‘negligible-minor’.
- 18.9. Within **Chapter 8: Land Quality** a number of mitigation measures were identified and are outlined in **Table 8-8** of the chapter. Once these are adopted, the overall significance of effects during the construction phase of the proposed development with respect to land quality are considered ‘negligible-minor’.
- 18.10. Whilst the proposed development will improve the existing ground conditions, there remains a residual risk for contamination to potentially impact on surface waters. However, the overall significance of the environmental effects of the proposed development with respect to land quality during the operational phase is considered ‘negligible-minor’.

18.1.3 Hydrology and Flood Consequence

- 18.11. **Chapter 9: Hydrology and Flood Consequence** demonstrates that provided the appropriate mitigation is incorporated into the design scheme, then this significantly limits the adverse effects to surface water and groundwater identified within the assessment from the proposed Site activities to acceptable levels.
- 18.12. The proposed development Site is likely to result in improvements to the water environment through improved treatment of storm and effluent flows and this will assist in contributing towards achieving the local WFD objectives. The chapter concludes that the proposed changes will not have the potential to result in a negative change in the WFD status of any of the local water bodies. The chapter concludes that there is a low or negligible risk to the Dee Estuary Site of Special Scientific Interest (SSSI) and the Shotton Reedbeds SSSI which can be managed through the construction and operation of the Site.

18.1.4 Ecology and Ornithology

- 18.13. **Chapter 10: Ecology and Ornithology** provides the assessment describes the baseline ecological conditions at Shotton Paper Mill and provides an evaluation of the ecological resources that occur within the site or have potential to be affected by operations within it. The chapter describes in detail the potential ecological impacts resulting from the proposed scheme and describes the mitigation and avoidance measures that are required to reduce the magnitude of these effects.
- 18.14. The ecological assessment assesses the potential impacts of the proposed development upon biodiversity receptors, including designated sites, habitats and protected wildlife, and details

appropriate mitigation measures required to avoid, reduce or compensate for these impacts. Any residual impacts are identified and their significance assessed.

- 18.15. Desktop studies and field surveys have been completed by SLR Consulting Ltd in 2021 and 2022. Desk study data has been collected from Cofnod Environmental Records Centre (CERC), RECORD (Local Environmental Records Centre for Cheshire, Halton, Warrington and Wirral), Local Wildlife Site citation records from Cheshire Wildlife Trust, British Trust for Ornithology WeBs and Merseyside ringing group's bird data, The Woodland Trusts' Ancient Tree Inventory and HM Government's web-based spatial data resources from the Multi-Agency Geographic Information for the Countryside (MAGIC).
- 18.16. The ecological receptors that have been identified include designated sites (Dee Estuary SPA/SAC/SSSI, Shotton Lagoons SSSI and locally designated sites such as Shotton Steelworks LWS), habitats of principal importance (open mosaic habitat and reedbeds), freshwater biodiversity, the capacity for a reptiles and terrestrial invertebrate assemblages to exist onsite, commuting and foraging bats, and birds.
- 18.17. The ecological assessment has identified residual impacts of habitat loss and fragmentation upon open mosaic habitat and reedbeds of up to county value that cannot be ameliorated in the short-term. Mitigation measures are required to reduce risks to populations of bird species, including those associated with the Dee Estuary European Sites. These can be delivered through a Construction Environment Management Plan for construction phase and through best practice environmental management within the operational site.

18.1.5 Noise and Vibration

- 18.18. **Chapter 11: Noise and Vibration** has assessed the potential for noise and vibration effects during construction and operational activities and has reported on it's likely significance.
- 18.19. During construction of the Main Site and Expansion Site including construction road traffic using, the magnitude of impact arising from construction noise and vibration would be None, with an associated effect of None, which is not significant. Therefore no mitigation measures are required, however Best Practicable Means measures to minimise noise and vibration during construction are recommended and are included within the **Outline CEMP (Appendix 5.3)**.
- 18.20. During operation of the Main Site and Expansion Site, the magnitude of impact arising from operational noise would be None or Negligible at the majority of sensitive receptors assessed. The greatest impact is expected to result at NSR R2, with an impact magnitude of Minor and a permanent associated effect of Minor, which is not significant. During operation the magnitude of impact arising from operational road traffic using the local road network would be Negligible, with an associated permanent effect of Negligible, which is not significant.
- 18.21. Piling will be required for the proposed development within distinct area of the Site. The noise assessment has considered the impact the piling may have on the receiving environment and determined that at the sensitive receptors identified there would be not be a significant effect, details can be found in **Table 11-25** of the chapter.

- 18.22. In combination with construction activities at nearby cumulative developments, noise and vibration from construction activities and road traffic would result in a magnitude of impact of None, with an associated effect of None, which is not significant. The magnitude of impact arising from operational road traffic using the local road network during operation would also be Negligible, with an associated effect of Negligible, which is not significant.
- 18.23. In combination with operational activities at nearby cumulative developments, noise from operation of the Main Site and Expansion Site would result in a magnitude of impact of Minor, with an associated effect of None, which is not significant.
- 18.24. The assessment has shown that specific mitigation measures will not be required, therefore residual effects remain as anticipated during construction and operation, above.

18.1.6 Air Quality

- 18.25. **Chapter 11: Air Quality** presented the potential effects of the proposed development during both the construction and operation phases, upon the receiving area including the ecological designations such as the Dee Estuary and Shotton Lagoons and Reedbeds.
- 18.26. The assessment details the methodology, baseline environment, potential effects and mitigation required to address these effects. The assessment then considers what the residual effects of the proposed development would be and provides a cumulative effects assessment.
- 18.27. The Air Quality assessment has found that:
- the assessment of potential construction phase dust impacts using IAQM guidance concludes a low to medium risk of impacts in the absence of mitigation. With the application of industry standard mitigation measures as identified in **Technical Appendix 12.3**, it is considered that the residual effects at all receptors will be ‘not significant’;
 - operational phase impacts from Site combustion emissions combined with development road traffic emissions can be considered ‘negligible’ and therefore considered ‘not significant’ against EPUK-IAQM criteria; and
 - impacts on ecological receptors ER1 (Dee Estuary SAC/SPA), ER2 (River Dee and Bala Lake SAC), and ER6 (Shotton Lagoons and Reedbeds SSSI) are potentially significant and therefore the significance of effects is considered within Chapter 10 Ecology.

18.1.7 Traffic and Transport

- 18.28. **Chapter 13: Traffic and Transport** assesses effects arising from the construction and operation of the proposed development. It details the assessment methodology; the baseline conditions; the likely significant effects; the mitigation measures required to prevent, reduce or offset any significant, negative impacts; and the likely residual effect after these measures have been implemented.
- 18.29. The assessment identifies that construction will be undertaken over a 4-year period and that construction traffic would increase over the local highway network with peak construction demand to comprise up to 324 vehicles per day. This would be a temporary and the effect would be negligible. During construction the impact on pedestrians and cyclists is also thought to be

negligible because the nature of the routes around the site do not support a large number of pedestrians and cyclists.

- 18.30. A Construction Traffic Management Plan (CTMP) would be produced and implemented during the construction phase and this would include restrictions and control measures on vehicle routing, working times and delivery times to minimise potential adverse effects associated with construction.
- 18.31. The operation of the proposed development would result in a small increase in HDV traffic (less than 30%) for the majority of the links. Overall the impact on road users was assessed as being temporary and minor adverse in its significance.
- 18.32. The effect on other areas including severance, driver delay, pedestrian delay, pedestrian amenity and accidents were all found to be negligible but did require the implementation of a travel plan.

18.1.8 Waste and Resources

- 18.33. **Chapter 14: Waste and Resources** assesses the effects of the proposed development in the generation of waste and materials management.
- 18.34. The proposed development has been designed to optimise the use of recycled materials and minimise waste generated on-site, thereby making a substantial contribution to national and local objectives in moving the management of waste up the waste hierarchy.
- 18.35. The proposed development would make efficient and effective use of existing recycling and energy recovery infrastructure in particular the biomass plant, MRF and OCC to complement the new paper processing plant.
- 18.36. As part of the requirements of the Outline CEMP and Site Waste Management Plan, it is proposed that all waste generated on Site would be recorded and reviewed regularly with a view to optimising performance in accordance with the waste hierarchy and travel distance.

18.1.9 Socio Economic

- 18.37. **Chapter 15: Socio-Economic**, considers the predicted socio-economic effects associated with the construction of the proposed development during both construction and operation.
- 18.38. This assessment has considered data from the extensive baseline review to determine the likely effects of the proposed development on the local economy, together with local effects on land use and recreation assets. The potential effects on the economy and identified assets take account of good practice measures to be adopted. No specific mitigation has been identified to be required and therefore residual effects of the proposed development are effectively the same as the predicted effects. Predicted adverse effects have been assessed as not significant; predicted beneficial effects have been assessed as significant with regard to effects on the local construction sector during the construction phase and the WSA employment with regard to the operational phase.

- 18.39. With regard to local land use, no significant adverse construction phase effects have been identified. Operational phase impacts are thought to be insignificant, often with little to no significant change from the current baseline.
- 18.40. There has been a moderate impact assessed on a highly sensitive recreational receptor due to the NCN route, however, with professional judgement and a contextual understanding of the proposed development, the residual impact is considered to be Low, with little actual impacts during the construction phase. As with land use, operational impacts are considered to be negligible, with little change from the current baseline.
- 18.41. During the construction of the proposed development there will be a beneficial effect (medium to the labour market and major to the economy) on the Wider Study Area as the scheme will bring employment to the area.

18.1.10 Other Environmental Issues

- 18.42. **Chapter 16: The Cultural Heritage Assessment** has concluded that:
- no known historic assets (designated or non-designated) are located within the Site;
 - the potential for unknown archaeological remains is very low due to the historical environmental conditions, the land reclamation processes during the 19th and 20th centuries, and the subsequent construction and demolition of industrial infrastructure within the Site;
 - in the unlikely event that there are surviving archaeological remains, these may be preserved *in situ* beneath the substantial layers of made ground, which have been identified within existing borehole data as being least 2m in depth across the Site; and
 - there is no anticipated harm to any historic assets as a result of changes to setting. In all cases, the key contributing interests to the significance of those historic assets, the key views towards and from them (including from 'third points') and the *ability to appreciate* their significance would be preserved under the proposals.
- 18.43. Overall the Cultural Heritage Assessment has identified no significant adverse impacts to archaeological remains or built heritage as a result of the proposed development.
- 18.44. In addition the Cultural Heritage an assessment has been provided for **Major Accidents and Incidents**. This is a new topic under the updated EIA Regulations. The assessment has found that with regard to major accidents and disasters from internal and external sources, the risk is low.

18.1.11 Summary

- 18.45. The Environmental Statement has assessed the potential effects of the construction and operation of the proposed development on the receiving environment and suggested mitigation which should be included within the proposed development.
- 18.46. **Technical Appendix 5.3** provides the Outline CEMP which must be further developed by both designer and principal contractor to ensure that appropriate mitigation is developed and implemented into the design and construction of the scheme to manage the likelihood of

significance adverse environmental impacts as a result of the construction of the proposed development.

- 18.47. The assessment has found a significant effect on one viewpoint for landscape and a potential significant effect as a result of changes to air quality on nearby ecological designations.
- 18.48. The Socio-Economic assessment has identified major beneficial effects through increased employment during construction and operation which would have moderate benefits to the local work force and major benefits to the local economy.