Energy Recovery Facility, Grangetown Prairie, Redcar

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

Volume 1: Environmental Statement

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Purpose

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Abbreviations

AEP	Annual Exceedance Probability
APC	Air Pollution Control
AQMP	Air Quality Management Area
BAP	Biodiversity Action Plan
BFI	Base Flow Index
BGS	British Geological Survey
BoCC	Birds of Conservation Concern
CA	Conservation Area
CIRIA	Company providing research and training for construction industry
CWS	County Wildlife Site
DBA	Desk Based Assessment
DBC	Darlington Borough Council
DCLG	Department for Communities and Local Government
Defra	Department of Environment Food and Rural Affairs
DPD	Development Planning Document
EA	Environment Agency
EC	European Community
EfW	Energy from Waste
EIA	Environmental Impact Assessment
EPS	European Protected Species
ES	Environmental Statement
EWF	Emergency Work Force
ERF	Energy Recovery Facility
FEH	Flood Estimation Handbook
FGT	Flue Gas Treatment
FRA	Flood Risk Assessment
FRM	Flood Risk Mapping
GIS	Geographical Information System
HBC	Hartlepool Borough Council
HE	Highways England
HGV	Heavy Goods Vehicle
HSE	Health & Safety Executive
IBA	Incinerator Bottom Ash
IEMA	Institute of Environmental Management and Assessment
JWMS	Joint Waste Management Strategy
LA	Local Authority
LiDAR	Light Detection And Ranging
LNR	Local Nature Reserve
MAFF	Ministry of Agriculture Food and Fisheries (now part of Defra)
mAOD	metres Above Ordnance Datum
mbgl	Metres below ground level
NERC	Natural Environment Research Council
NGR	National Grid Reference

NNR	National Nature Reserve
NPPF	National Planning Policy Framework
NWL	Northumbrian Water Limited
PAC	Powered Activated Carbon
PPG	Planning Policy Guidance
QBAR	Mean Annual Maximum Flood
Ramsar	Convention on Wetlands, signed in Ramsar, Iran, in 1971
RBMP	River Basin Management Plan
RCBC	Redcar and Cleveland Brough Council
RDF	Refuse Derived Fuel
SAAR	Standard Average Annual Rainfall (mm)
SAC	Special Area of Conservation, EU Habitats Directive
SEA	Strategic Environmental Assessment
SEPA	Scottish Environment Protection Agency
SI	Site Investigation
SPA	Special Protection Area, protected under the EU Habitats Directive
SPR	Standard percentage runoff
STDC	South Teesside Development Corporation
SSSI	Site of Special Scientific Interest
SW	Scottish Water
TA	Tees Archaeology
TPO	Tree Preservation Order
WFD	Water Framework Directive

1 Introduction

1.1 Purpose of the Document

This document is an Environmental Statement to support the proposed Energy Recovery Facility (ERF) plant, Redcar and Cleveland, North East England. The purpose of the Environmental Statement (ES) is to:

- **Inform:** local people, interested parties, organisations and statutory bodies of how the proposed scheme for Energy Recovery Facility (also referred to as 'the Scheme') is being approached in order to help understand their values about the environment that may be affected.
- **Identify and Review:** identify the environmental impacts of the proposed Scheme and addresses issues raised following the environmental scoping of the Scheme. It also documents the Environmental Impact Assessment (EIA) process that has been undertaken to review the possible significant effects of the Scheme on people and the environment, as well as identifying mitigation and possible opportunities for environmental improvements.

1.2 Legislative and Regulatory Requirements

1.2.1 Planning and EIA approach

The scheme comprises an Energy Recovery Facility capable of processing up to 450,000 tonnes of waste per annum. It is proposed that the scheme will be submitted for Outline Planning Permission to establish the principle of the development with the local planning authority. Once outline permission has been approved, a detailed proposal is then put forward. This approach has been discussed with Redcar and Cleveland Borough Council.

The proposal is governed by the following regulations:

- The Town and Country Planning (Environmental Impact Assessment) Regulations 2017, which govern the requirements for the scope and detail the process of an EIA.

The Scheme has been submitted under the new EIA regulations. The purpose of the 2017 EIA Regulations has been to transport the 2014 amended Environmental Impact Assessment Directive into UK Law. The 2017 EIA Regulations set out more stringent procedural requirements to be taken by the relevant planning authority when considering whether planning permission or subsequent consent should be granted for EIA development and increases the scope and subject matter for ES.

This includes consideration by the local planning authority that the Environmental Statement (ES):

- Addresses the likely significant effects on the environment
- Considers whether it is appropriate to impose post-development monitoring measures.

The new EIA Regulations also bring about:

- Changes to the timing, requirements and weighting of screening & scoping opinions
- Stronger commitment to the delivery of post-consent mitigation and monitoring
- A requirement that competent experts undertake EIA.

The new EIA Regulations place a requirement to ensure the completeness and quality of the environmental statement, and the developer must ensure that the environmental

statement is prepared by competent experts. In addition, the scope of the ES has been developed to include:

- New environmental assessment topics (human health, hydromorphology, risk of/vulnerability to accidents/disasters, emissions of greenhouse gases, and climate change adaptation)
- Greater emphasis on selecting environmental alternatives and mitigation at all stages of EIA

This ES is accompanied by a statement outlining the relevant expertise of the ES editors, Appendix A.

The Scheme lies in Redcar and Cleveland the determining Authority is Redcar and Cleveland Borough Council (RCBC).

Screening with RCBC confirmed that the scheme would be a Schedule 1 development as specified in Category 10 of the Regulations:

Waste disposal installations for the incineration or chemical treatment (as defined in Annex I to Directive 2008/98/EC under heading D9) of non-hazardous waste with a capacity exceeding 100 tonnes per day.

1.2.2 Environment Agency Environmental Permits and Ordinary Watercourse Consent

An Environmental Permit – Flood Risk Activities is required, where proposals are:

- on or near a main river;
- on or near a flood defence structure;
- in a flood plain;
- on or near a sea defence.

These permits are regulated under The Environmental Permitting (England and Wales) Regulations 2016 (formerly flood defence consents) and consented by the Environment Agency.

Non-Main rivers are consented through Ordinary Watercourse Consents by the Lead Local Flood Authority (LLFA). LLFAs are county councils and unitary authorities. They lead in managing local flood risks (i.e. risks of flooding from surface water, ground water and ordinary (smaller) watercourses). This includes ensuring co-operation between the Risk Management Authorities in their area. Under the Flood and Water Management Act 2010.

Appropriate Flood Risk Management (FRM) permits and/or Ordinary Watercourse Consents (OWC) would be required in additional to planning based on the detailed design of the facility.

1.2.3 Water Framework Directive (WFD)

As a part of the WFD, an objective of the scheme is to ensure that there is no further deterioration of the current status of the water bodies in the surrounding area and to support the achievement of the of WFD objectives.

A WFD Screening has been undertaken. This is included in the Water Environment Chapter.

1.2.4 Flood Risk Assessment

A Flood Risk Assessment has been undertaken to support this scheme. A separate document has been completed and is provided in Volume 3. Further information is provided in Section 9.

1.3 Approach and Structure

An EIA is an interpretive process that identifies, predicts and evaluates the likely impacts of a proposed project upon the environment. Through the evaluation of these impacts, measures can be identified to allow for mitigation to minimize any environmental impacts and to maximize any potential benefits for the environment and local community as a result of the Scheme.

Chapters 1 and 2 of this Environmental Statement (ES) establish the background for the Scheme. The proposed options and strategy of selection of the preferred option are outlined in Chapter 3; along with a summarisation of the physical characteristics and construction methods of proposed works. The EIA consultation process is covered in Chapter 4 and the methodology discussed in Chapter 5.

Chapters 6 to 12 comprise the main component of the ES, the environmental assessment, which establishes the baseline conditions, assesses the significance of the beneficial and adverse impacts of the Scheme, and identifies mitigation measures. The following receptors have been addressed per the scoping process:

- Chapter 6 - Ecology and Biodiversity;
- Chapter 7 - Landscape and Visual Impact;
- Chapter 8 – Soils, Geology and Contaminated Land
- Chapter 9 – Flood Risk, Hydrology and Water Quality;
- Chapter 10 – Archaeology and Cultural Heritage;
- Chapter 11 - Traffic and Transportation;
- Chapter 12 – Air Quality, Noise and Vibration;
- Chapter 13 – Socio-economic;
- Chapter 14 – Major Accidents and/or Disasters

Chapter 15 discusses any potential cumulative environmental impacts as a result of the proposed scheme.

The ES has been based on the Highways Agency's Design Manual for Roads and Bridges (DMRB) Volumes 10 and 11.

Figures (except where included in the text), and appendices are included in Volume 2. Relevant Technical Reports are included in Volume 3.

The receptor chapters are formatted as follows:

- Methodology: includes baseline data collection, survey methods, current legislation and guidance pertinent to the receptor, as well as the definition of sensitivity of receptors for that topic, magnitude of potential effects and the assessment of the significance of the environmental receptor.
- Baseline: a description of the baseline conditions including the development of the baseline without the proposed development.
- Assessment of impacts: identification of predicted impacts, the expected environmental effects of the predicted impacts, and an evaluation of significance of the predicted effects. Assumptions and uncertainties are outlined.
- Mitigation: identification of ways to avoid, reduce or remedy environmental effects.
- Residual impacts: the significance of effects following mitigation, including highlighting any residual impacts that cannot be mitigated.
- Summary

Further information regarding this Scheme is available from:

Steven Abbey
Hartlepool Borough Council,
Civic Centre,
Hartlepool,
TS24 8AY.

2 Background

2.1 Nature and Background of the Project

Hartlepool Borough Council is procuring a new Residual Waste Treatment Contract, working in partnership with the other Tees Valley authorities. The proposed Energy Recovery Facility will be capable of processing up to 450,000 tonnes of waste per annum.

The need for the proposed development has arisen from the Tees Valley Joint Waste Strategy, which has recently been extended until 2035 (from 2020). The identification of a long-term residual waste treatment solution for the region was highlighted during the Options Appraisal process, which was undertaken by the Tees Valley Councils and resulted in the selection of a draft Preferred Option.

A comprehensive site identification and selection process was undertaken to support the development of an Outline Business Case for the proposed development. An appraisal of potential locations was undertaken using a systematic, evidence-based analysis. The initial long list included 176 sites which were screened and shortlisted to 3 Preferred Sites.

2.2 Location and Site Description

The Proposed Development Site ("the site") is located on the former South Tees Eco Park, Grangetown Prairie, located to the north of Grangetown approximately 4 miles to the north east of Middlesbrough Town centre. The Proposed Development Site extends to an area of approximately 10 hectares (ha). It is centred on National Grid Reference NZ54312145, Figure 2-1. The River Tees is located approximately 1.2km to the north of the development. It is well defined by existing infrastructure corridors such as the Tees Valley Railway Line, which runs along the north of the Site.

The Proposed Development Site is brownfield, comprising made up ground and has a heavy industrial history. The Proposed Development Site was cleared for redevelopment during the 1980s. Future access onto the site will be from the southeast.

The scheme is located within the combined administrative area of the five Tees Valley Authorities: Darlington Borough Council; Hartlepool Borough Council; Middlesbrough Council; Redcar & Cleveland Borough Council; and Stockton-on-Tees Borough Council.

2.3 Site History

According to the South Tees Development Corporation's Regeneration Master Plan, the Grangetown Prairie site has a long history of iron and steel works uses and was extensively occupied by buildings and freight rail infrastructure. Former uses included the Cleveland Iron and Steel Works, where the heavy end operations (coke ovens, iron making and steel making) were located along the western periphery of the site, with mills dominating the central and eastern zones. The Torpedo Ladle Workshop was previously home to open hearth furnaces. The original site entrance still exists and, if re-opened, provides the site with direct vehicular access to the A66 at the existing Whitworth Road junction, through the Bolckow Industrial Estate. The majority land area (50+ hectares) has Enterprise Zone status.

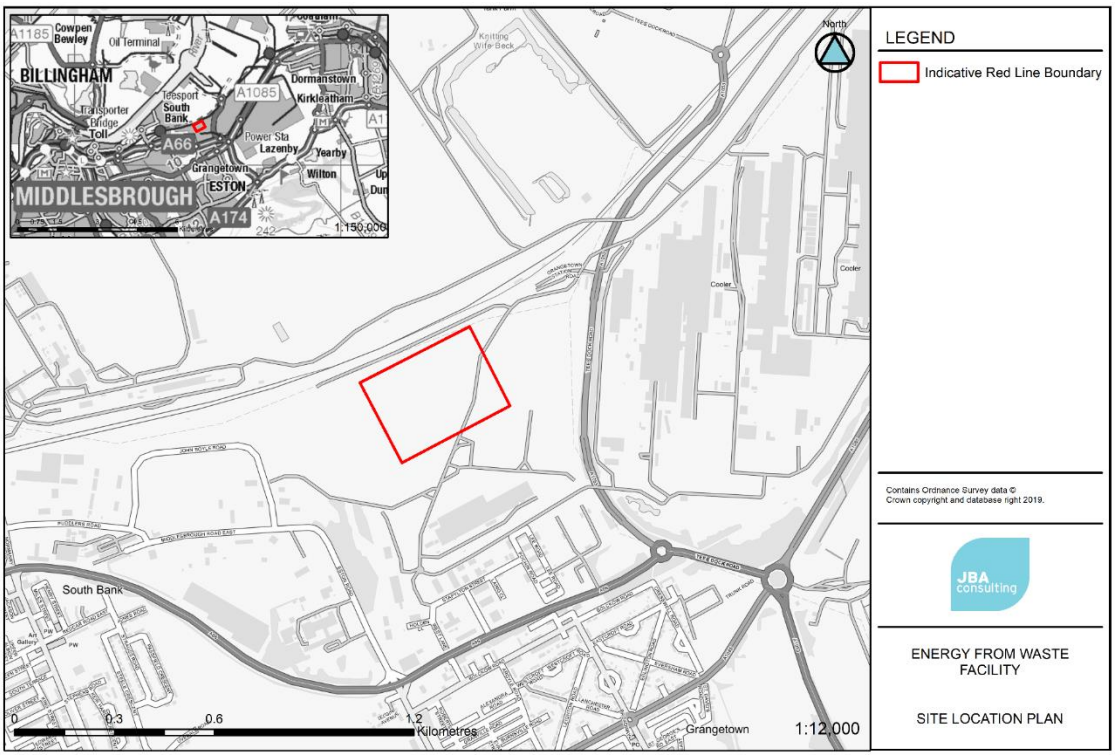

Figure 2-1: General site location – Grangetown Prairie

2.4 Planning Framework

The scheme falls with Redcar and Cleveland Borough Council (RCBC). The RCBC planning department confirms that planning permission would be required for the proposal, which would fall under Schedule 1 Category 10 of the EIA regulations, as determined in the screening opinion provided on 10 December 2019. A copy of the Screening and Scoping Opinions are provided in Appendix B.

Reference: Planning Application R/2019/0700/SCP - LAND EAST OF JOHN BOYLE ROAD AND WEST OF TEES DOCK ROAD SOUTH TEES ECO PARK (GRANGETOWN PRAIRIE) GRANGETOWN

Further information is provided in the Planning and Design and Access Statement, Appendix C.

2.4.1 Government 25-Year Plan

This 25 Year Environment Plan sets out government action to help the natural world regain and retain good health. It aims to deliver cleaner air and water in our cities and rural landscapes, protect threatened species and provide richer wildlife habitats. It calls for an approach to agriculture, forestry, land use and fishing that puts the environment first. By adopting this Plan development within the UK will aim to achieve:

- Clean air.
- Clean and plentiful water.
- Thriving plants and wildlife.
- A reduced risk of harm from environmental hazards such as flooding and drought.
- Using resources from nature more sustainably and efficiently.
- Enhanced beauty, heritage and engagement with the natural environment.

In addition, we will manage pressures on the environment by:

- Mitigating and adapting to climate change.
- Minimising waste.
- Managing exposure to chemicals.
- Enhancing biosecurity.

2.4.2 National Planning Policy Framework

The National Planning Policy Framework (NPPF) was published by the Department for Communities and Local Government (DCLG) in 2012. The Framework was updated on 19 February 2019 and sets out the government's planning policies for England and how these are expected to be applied. This revised Framework replaces the previous National Planning Policy Framework published in March 2012 and revised in July 2018.

The NPPF sets out national planning policy for England. The NPPF states that the purpose of the planning system is to contribute to achieving sustainable development. This means planning is required to perform the following three specific roles:

- An economic role, contributing to building a strong, responsive and competitive economy;
- A social role, supporting strong, vibrant and healthy communities;
- An environmental role, protecting and enhancing the natural, built and historic environment.
- The NPPF makes particular reference to the following:
- be prepared with the objective of contributing to the achievement of sustainable development;
- be prepared positively, in a way that is aspirational but deliverable;
- be shaped by early, proportionate and effective engagement between plan makers and communities, local organisations, businesses, infrastructure providers and operators and statutory consultees;
- contain policies that are clearly written and unambiguous, so it is evident how a decision maker should react to development proposals;
- be accessible through the use of digital tools to assist public involvement and policy presentation; and
- serve a clear purpose, avoiding unnecessary duplication of policies that apply to a particular area (including policies in this Framework, where relevant).

2.4.3 Redcar and Cleveland Local Plan

The Redcar & Cleveland Local Plan (May 2018) sets out the vision and overall development strategy for the Council's area and how it will be achieved for the period until 2032. The Redcar & Cleveland development plan consists of the Redcar & Cleveland Local Plan and the Tees Valley Joint Minerals and Waste Development Plan Documents.

The policies that are relevant to the proposed development are set out below:

SD 1 (Sustainable Development) states that the Council will take a positive approach that reflects the presumption in favour of sustainable development contained in the NPPF.

SD 4 (General Development Principles) outlines the criteria that will be utilised by the Council when assessing the suitability of a site or location which are as follows:

a) meets the requirements of the Locational Policy and accords with other Local Plan policies and designations;

b) will not have a significant adverse impact on the amenities of occupiers of existing or proposed nearby land and buildings;

c) will not result in the unacceptable loss or significant adverse impact on important open spaces or environmental, built or heritage assets which are considered important to the quality of the local environment;

d) minimises the loss of best and most versatile agricultural land;

e) avoids locations that would put the environment, or human health or safety, at unacceptable risk;

f) will not increase flood risk either on site or downstream of the development;

g) will have access to adequate infrastructure, services and community facilities to serve the development; and

h) will not result in an adverse effect on the integrity of a Natura 2000 site, either alone or in combination with other plans or projects.

Additionally, the policy outlines the design standard requirements including:

- minimising pollution including light, noise and vibration levels;
- respect or enhance the landscape, biodiversity, geological features and historic environment; and
- providing suitable and safe vehicular access and parking suitable for the use and location.

SD 6 (Renewable and Low Carbon Energy) states that renewable and low carbon energy schemes will be supported and encouraged, and will be approved where their impact is, or can be made, acceptable.

The policy outlines issues that will be considered in determining applications, which are as follows:

a) impact on residential amenity;

b) environmental impacts;

c) sensitivity and capacity of the landscape, as detailed in the Renewable and Low Carbon Study;

d) impact on heritage assets and their settings;

e) impact on recreation;

f) scale of proposal;

g) local topography and siting of proposal to minimise harm, including through reasonable mitigation;

h) aeronautical and other military considerations;

i) operational and other relevant constraints;

j) impact on the North York Moors National Park and its setting; and

k) cumulative impacts of proposals.

The policy also states that renewable energy developments will not be allowed within, or where they are likely to have an adverse effect - alone, or in combination with other plans or projects - on designated ecological sites or on priority species, unless they meet the exceptions criteria set out in Policy N4.

N 4 (Biodiversity and Geological Conservation) states that support will be given to high quality schemes that enhance nature conservation and management, preserve the character of the natural environment and maximise opportunities for biodiversity and geological conservation. The council will protect and preserve local, national and international priority species and habitats and promote their restoration, re-creation and recovery.

2.4.4 Waste Management in the Tees Valley

Tees Valley Combined Authority is a new body created in April 2016 to drive economic growth and job creation in the area. The combined authority consists of Darlington, Hartlepool, Middlesbrough, Redcar and Cleveland and Stockton-on-Tees.

The Tees Valley Authorities have for several years been working to develop efficient and sustainable methods of dealing with waste. In 2002, the Tees Valley Authorities, except for Darlington Borough Council, produced a JWMS that set out how the Authorities would deal with the area's waste up until 2020. At this time, Darlington was partnered with Durham County Council for the delivery of services. Darlington Borough Council published its Interim Waste Management Strategy in 2003 which included the aims and objectives for their waste service until the expiry of its current waste disposal contract in 2008.

Recycling collections, with the help of residents, resulted in a household recycling and composting rate of 25% in 2006/2007. In addition, recycling and composting, energy was recovered from 52% of the household waste stream with only 23% of the household waste stream continuing to be sent to landfill for disposal

Joint Waste Management Strategy (2008). In 2008, the Tees Valley Authorities joined to review recycling and waste issues, resulting in a revised JWMS that included Waste Treatment, Waste Collection, Waste Awareness and Headline Strategy documents for the Tees Valley from 2008 to 2020.

The Headline Strategy was developed using the most recent guidance from Department of Environment, Food and Rural Affairs (Defra). In tandem with a Sustainability Appraisal (SA), it incorporates the requirements of the Strategic Environmental Assessment (SEA) Directive. An Options Appraisal Assessment was undertaken that assessed technical waste management information to help develop the Headline Strategy and selection of a draft Preferred Option for waste management, which included:

- Revised Waste Awareness and Minimisation;
- Revised Waste Collections;
- Additional Waste Treatment Facilities to divert additional waste from landfill;
- Continued use of the EfW facility for waste recovery.

The Headline Strategy set the challenges ahead of the Preferred Option, policies and actions that would allow the Authorities to meet the challenges. Details of the policies are set out within the Planning Policy Section at Chapter 9 of this statement.

Principles that steered the development of the Strategy included:

- Reduce waste generation;
- Be achievable and affordable;
- Work towards zero landfill; and
- Minimise the impact on climate change.

Under the current JWMS (2008) various recycling services are in place by each council around the Tees Valley. Household residual waste is treated through an EfW combustion facility at Billingham in Stockton-on-Tees (Haverton Hill). Tees Valley Hartlepool, Middlesbrough, Redcar and Cleveland and Stockton Authorities are currently under contract to provide SITA UK Limited with at least 180,000 tonnes per annum of municipal solid waste (MSW) for processing at the Haverton Hill EfW. This ensures that the Authorities recover value from the residual waste stream and divert waste from landfill.

Darlington Borough Council is not part of this contract. DBC residual waste is currently treated through a residual waste materials recovery facility (MRF) at Aycliffe Quarry.

The Refuse Derived Fuel (RDF) produced is exported to an EU based EfW facility. The Suez contract runs until 2020 and offers Hartlepool, Middlesbrough, Redcar and Cleveland and Stockton Authorities the opportunity to meet Landfill Allowance targets without further processing (as defined in 2008). Of the 40,000 tonnes of residual municipal waste disposed to landfill, a small proportion of this will continue to go to landfill as it doesn't conform to the requirements for incineration.

The JWMS identified that consideration would need to be given for sustainable waste management beyond 2020, which is when the EfW contract with Suez and the new Darlington contract both cease to continue the recovery of waste and diversion of materials from landfill. These have been extended until 2025.

Joint Waste Management Strategy (2019) Changes in waste management policies, and the coming to an end of the existing EfW contracts, have led to the preparation of a revised Draft JWMS which has been adopted by all 5 councils (and currently at consultation), extending it until 2035. As with previous and current JWMS, the revised document focus is the sustainable management of waste within the Tees Valley.

An Options Appraisals Report was prepared to inform the development of the updated Strategy, paying regard to:

- moving waste up the waste hierarchy (diagram can be found figure 9-2) of option through prevention, reuse, recycling and composting activities; and
- the identification of a long-term residual waste treatment solution for the region.

The Draft JWMS identifies that the Tees Valley covers an area of 790km^2, with a population of approximately 670,000, averaging inhabitants per household, with much of the population centred around the River Tees and Teesmouth.

The document identifies that although the Tees Valley has a rich industrial heritage with an economy based around manufacturing and engineering, aerospace, automotive, chemicals and processing and offshore oil and gas, there is a high level of deprivation amongst the population. This presents challenge for the provision and operation of efficient waste management services, waste avoidance and high recycling rates.

The Draft JWMS set out that in 2016/2017 just over 350,000 tonnes of Local Authority Collected Waste (LACW) was gathered across Tees Valley. This is equivalent to approximately 1 tonne per household per annum (in 2016/17). These figures exclude commercial, industrial, construction waste or private waste collections.

Waste trends tend to reflect economic growth. Predicted increase in population and housing is likely to increase waste generated across the Tees Valley. The Draft JWMS recognises that if economic regeneration planned by the Tees Valley Combined Authority is achieved, population and housing will increase, resulting in between 392,000 to 420,000 tonnes of LACW by 2035 and an assumed future waste growth rate of approximately 0.25% per annum.

The proposed option is also designed to provide North-East regional capacity taking in wastes from Newcastle and Durham.

The work undertaken as part of the JWMS (2019) looked at waste trends, quantity of material collected for recycling and composting across Tees Valley, with the aim of devising a high quality, accessible and affordable waste management service that would contribute to:

- economic regeneration, including employment and a more circular economy;
- the protection of the environment and natural resources;
- reducing the carbon impact of waste management;
- delivers customer satisfaction;
- reduces the amount of waste generated by householders and the Councils;

- increases reuse and recycling;
- then maximises recovery of waste; and
- works towards zero waste to landfill.

The Options Appraisal was supported by a series of supplementary reports that provided technical waste management information used in preparation of the revised JWMS and to informed selection of a Preferred Option.

As part of the Options Appraisal, refreshed aims and objectives were prioritised to include:

- Affordability / Income Generation
- Reuse, recycling and composting
- Raising waste awareness and education
- Service Quality / Customer Satisfaction
- Waste prevention
- Regeneration / Job Creation
- Reducing fly-tipping and litter
- Limiting environmental impacts and harm to human health
- Circular economy
- Energy recovery from waste
- Landfill diversion
- Reducing the carbon impact of waste management
- Managing the impact of plastic wastes
- Management of all municipal waste

The policies from the Minerals and Waste Core Strategy DPD that are relevant to the proposed development are set out below:

MWC6 (Waste Strategy) seeks to deliver sustainable management of waste arisings through the distribution of waste management sites across the Tees Valley so that facilities are well related to the sources of waste arisings, related industries or the markets for any products created.

The policy also states that all waste developments must be compatible with their setting and not result in unacceptable impacts on public amenity, environmental, historic or cultural assets from their design, operations, management and, if relevant, restoration.

MWC7 (Waste Management Requirements) states that land will be provided for the development of waste management facilities.

MWC8 (General Locations for Waste Management Sites) states that allocations for large waste management facilities should be located in the following general areas:

a) to the south of the River Tees - the land located around Teesport, Smiths Dock Road and the eastern end of Dockside Road (Middlesbrough and Redcar and Cleveland);

b) to the north of the River Tees - the land located around the Graythorp and Haverton Hill Road areas (Hartlepool and Stockton-on-Tees); and

c) to the north of the River Tees - the land located around the Port Clarence, Cowpen Marsh and Seal Sands areas (Hartlepool and Stockton-on-Tees).

The policies from the 2011 Policies and Sites DPD that are relevant to the proposed development are set out below:

MWP8 (South Tees Eco-Park (Redcar and Cleveland)) details that a site of approximately 27 hectares is allocated for development and is expected to recover value from 450,000 tonnes of municipal solid waste and commercial and industrial waste annually. The policy details that appropriate development for the site includes large-scale waste management facilities.

2.4.5 Redcar and Cleveland South Tees Area Supplementary Planning Document

The South Tees Area Supplementary Planning Document (SPD) was prepared to support adopted planning policies to guide and inform future planning applications that will support both the expansion of existing business operators and future employment opportunities who wish to locate to the South Tees Area.

Objective 4 of the SPD seeks to promote, and support development uses aligned with a low carbon, circular economy, while delivering redevelopment within a framework of reduced energy costs and waste minimisation.

The development principles that are relevant to the proposed development are set out below:

STDC1 (Waste Management Requirements) outlines that it seeks to promote and support uses and infrastructure connected to a low carbon and circular economy within a framework of reduced energy costs and waste minimisation.

STDC12 (South Industrial Zone) encourages port related uses, offshore energy industries, energy generation and potentially rig and large equipment decommissioning.

3 Consideration of Alternatives

3.1 Background

Part II of Sch.4 of the EIA Regulations 2017 requires the Environmental Statement provides:

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

This section provides a statement on the alternatives considered as part of scheme development and the reason for selecting the preferred option. This section describes the options considered and summaries the reasons for rejecting the options.

All figures are provided in Volume 2 of the Environmental Statement.

3.2 Baseline Situation

The Tees Valley Authorities are seeking to deliver a sustainable waste treatment option that will provide a long-term sustainable solution for the region for residual waste treatment post 2025, when the contract with the existing provider ends. In order to do that, the Partnership developed a comprehensive Outline Business Case (OBC).

The OBC considered a number of potential options with regards to long-term waste treatment including:

- Further contract extension (beyond 2025) for the existing EfW contract (Haverton Hill);
- New build energy recovery facility;
- New build refuse derived fuel facility (RDF); and
- Utilise third party energy recovery facility capacity.

To support the development of the OBC, an appraisal of locations for a new facility has been undertaken to provide an evidence-based analysis of potential locations.

3.3 Joint Waste Management Strategy Option Assessment

The current Tees Valley Joint Waste Management Strategy (JWMS) was developed to cover the period between 2008 until 2020. Since then there have been developments and changes to waste management policy that means that the existing strategy needs revision. The JWMS was updated to extent to 2035, paying particular regard to:

- Moving waste up the waste hierarchy of options through prevention, reuse, recycling and composting activities; and
- The identification of a long-term residual waste treatment solution for the region.

An options assessment was undertaken as part of the JWMS update. The first stage of the options assessment involved reviewing and updating the waste strategy objectives. The 2008 JWMS had six key principles:

- to reduce waste generation;
- to work towards zero landfill;
- to be achievable and affordable;
- to have an accountable and deliverable structure;
- to minimise the impact on climate change; and
- to contribute towards economic regeneration.

The refreshed aims and objectives which were prioritised as follows:

1. Affordability / Income Generation
2. Reuse, recycling and composting
3. Raising waste awareness and education
4. Service Quality / Customer Satisfaction
5. Waste prevention
6. Regeneration / Job Creation
7. Reducing fly-tipping and litter
8. Limiting environmental impacts and harm to human health
9. Circular economy
10. Energy recovery from waste
11. Landfill diversion
12. Reducing the carbon impact of waste management
13. Managing the impact of plastic wastes
14. Management of all municipal waste
15. Managing the impact of food waste

A revised set of assessment criteria and associated scoring and weighting was utilised to assess the options.

Whilst a key output of the revised JWMS is to help determine the nature of any future residual waste treatment facility for the Tees Valley, it is also intended that the revised JWMS helps each Council make decisions about waste prevention, reuse and recycling options they may wish to adopt in the future. Therefore, a range of options were agreed across the waste hierarchy having regard to the policy and legislation review, potential collection systems for the Tees Valley Authorities and the ranking of themes at the first workshop.

3.3.1 Waste Treatment Options

The primary waste treatment scenarios assessed on the Tees Valley level were:

- Contract extension (beyond 2025) for existing EfW contract
- New build energy recovery facility
- New build refuse derived fuel facility (RDF)
- Utilise third party energy recovery facility capacity

There options were grouped together into scenarios to highlight what could be achieved by:

- residual waste treatment options alone;
- implementing the residual waste treatment option alongside collection changes; or
- by implementing a full range of prevention, reuse and recycling options alongside collection changes and residual waste treatment options.

Table 3-1 and Figure 3- outline the 20 scenarios assessed.

Table 3-1: Assessment Scenarios (Source: Options Appraisal Report)

Scenario	Prevention, reuse and recycling	Collection	Residual Treatment
1a	No change	No change	Contract extension (beyond 2025) for existing EfW contract (No change)
1b	No change	No change	New build energy recovery facility
1c	No change	No change	New build refuse derived fuel facility (RDF)
1d	No change	No change	Utilise 3rd party energy recovery facility capacity
2a	No change	High efficiency	Contract extension (beyond 2025) for existing EfW contract
2b	No change	High efficiency	New build energy recovery facility
2c	No change	High efficiency	New build RDF facility
2d	No change	High efficiency	Utilise 3rd party energy recovery facility capacity
2e	No change	High recycling performance	Contract extension (beyond 2025) for existing EfW contract
2f	No change	High recycling performance	New build energy recovery facility
2g	No change	High recycling performance	New build RDF facility
2h	No change	High recycling performance	Utilise 3rd party energy recovery facility capacity
3a	All measures	High efficiency	Contract extension (beyond 2025) for existing EfW contract
3b	All measures	High efficiency	New build energy recovery facility
3c	All measures	High efficiency	New build RDF facility
3d	All measures	High efficiency	Utilise 3rd party energy recovery facility capacity
3e	All measures	High recycling performance	Contract extension (beyond 2025) for existing EfW contract
3f	All measures	High recycling performance	New build energy recovery facility
3g	All measures	High recycling performance	New build RDF facility
3h	All measures	High recycling performance	Utilise 3rd party energy recovery facility capacity

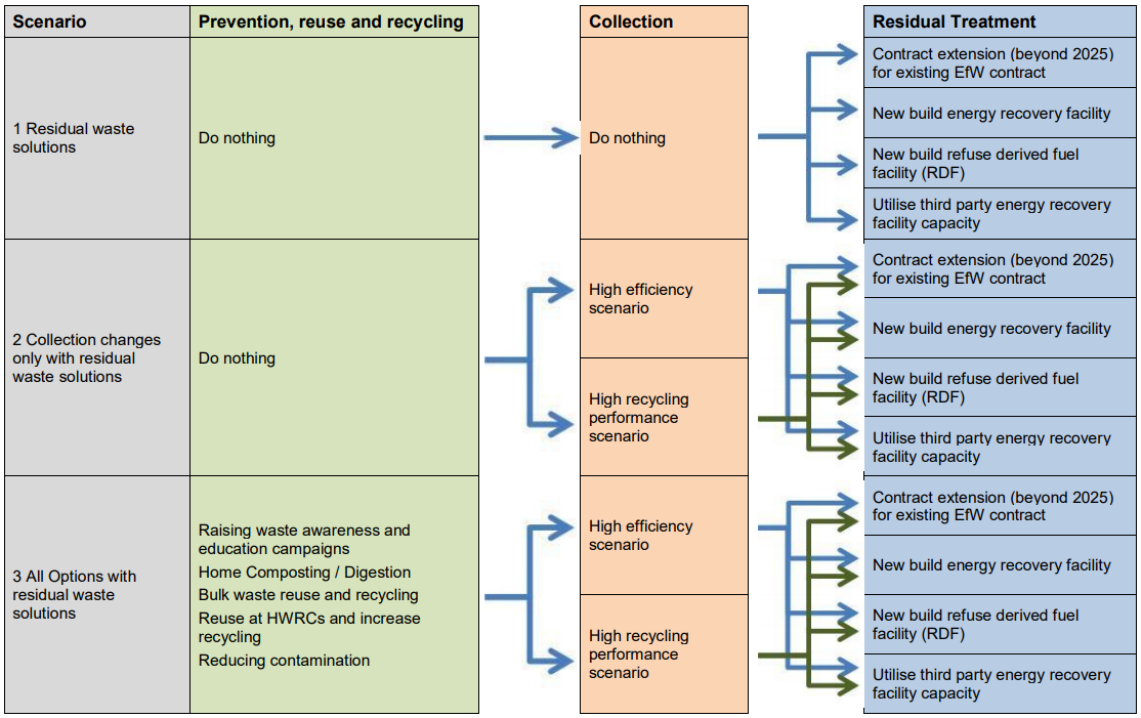

Figure 3-2: Assessment Scenarios (Source: Options Appraisal Report)

The assessment was informed by 3 models:

- Kerbside Analysis Tool (KAT) model - calculate the amount of residual waste requiring treatment;
- Waste flow model – test the performance of each scenario; and
- Waste and Resources Assessment Tool for the Environment (WRATE) model - assess environmental impacts of waste management activities during their whole life cycle.

3.3.2 Options Assessment Results

The assessment results are provided in Table 3-2. For both the unweighted and weighted scores the options which included building of a new energy recovery facility scored best within each scenario. With Scenario 3f, which includes all prevention, reuse and recycling initiatives, high recycling collections and new energy recovery facility, scoring highest overall.

Table 3-2: Assessment results

Scenario	Unweighted Score	Weighted Score
1a: Contract extension only	13	31
1b: New energy recovery only	27	60
1c: New RDF only	13	36
1d: 3rd Party Energy Recovery Plant	19	40
2a: High efficiency collection with contract extension	19	47
2b: High efficiency collection with new energy recovery	30	72
2c: High efficiency collection with new RDF facility	19	54

Scenario	Unweighted Score	Weighted Score
2d: High efficiency collection with 3rd Party Energy Recovery Plant	25	59
2e: High recycling collection with contract extension	25	64
2f: High recycling collection with new energy recovery	33	80
2g: High recycling collection with new RDF facility	22	64
2h: High recycling collection with 3rd Party Energy Recovery Plant	30	72
3a: Waste prevention with high efficiency collection and contract extension	24	61
3b: Waste prevention with high efficiency collection and new energy recovery	34	83
3c: Waste prevention with high efficiency collection and new RDF facility	24	67
3d: Waste prevention with high efficiency collection and 3rd Party Energy Recovery Plant	30	73
3e: Waste prevention with high recycling collection and contract extension	28	70
3f: Waste prevention with high recycling collection and new energy recovery	36	88
3g: Waste prevention with high recycling collection and new RDF facility	26	74
3h: Waste prevention with high recycling collection and 3rd Party Energy Recovery Plant	34	83

Collection Scenarios

Both the baseline position and the high efficiency collection scenarios in isolation have no or limited impact on the level of reuse or recycling and as a result score less well than the high recycling collection scenarios. In addition, the high efficiency collection scenarios reduce the coverage and frequency of certain collections services which results in a loss of collection jobs; whereas the high recycling collection scenarios increases the number of collection jobs.

Prevention, reuse and recycling initiatives

The various waste prevention, reuse and recycling initiatives contribute to improved engagement, reuse and recycling, resource recovery and increased deliverability (due to consistency with current and emerging national policy). Therefore, Scenario 3s score better than the comparable Scenario 2s.

Waste Treatment Options

The different waste treatment options have a range of influencing factors:

- Scenarios based on a contract extension (beyond 2025) of the existing EfW contract (at Haverton Hill) perform poorly in terms of: economic regeneration/ employment because no new jobs are created and is unlikely to help to secure other jobs in Tees Valley; the carbon impact of waste management because of the efficiency of the facility and no CHP capability; and deliverability mainly

due to the fact that further extension to the current contract without competition is highly likely to be in breach of procurement rules.

- Scenarios which include a new build energy recovery facility score well because: they have the potential to secure jobs in the construction engineering sectors during construction of a new facility and if a CHP facility is developed it could help to secure employment in the energy use and manufacturing sector; also, a CHP facility would significantly reduce the carbon impacts of waste management. However, there are some deliverability issues related to securing funding and locating a suitable site.
- Scenarios which include a new build refuse derived fuel facility (RDF) perform poorly in terms of maximising recovery, diversion of waste from landfill and reducing the carbon impacts of waste management. This is because there is a significant increase in the amount of waste sent to landfill when compared to the current situation and the other technology options considered.
- Scenarios which utilise 3rd party energy recovery facility capacity score poorly on economic regeneration/employment because it is assumed that the 3rd party facility is located outside Tees Valley, resulting in a loss of jobs in the waste management sector. It also scores less well than the new build energy recovery facility on reducing carbon impacts, as it was assumed that the 3rd party facility is not CHP enabled and there is additional transport.

Therefore, based on the agreed evaluation criteria, and regardless of weighting, the preferred option would be; all prevention, reuse and recycling initiatives, high recycling collections and new energy recovery facility. The outcome is consistent with the approach adopted in the existing Waste Strategy.

3.4 Location Alternatives Assessment

Following the preferred waste treatment options as part of the Waste Strategy, a comprehensive site identification and selection process was undertaken to support the development of an Outline Business Case for the Proposed Development. An appraisal of potential locations was undertaken using a systematic, evidence-based analysis. The initial long list included 176 sites which were screened and shortlisted to 20 shortlisted sites and 3 Preferred Sites. Figure 3-2 shows the locations of the shortlisted sites. The key steps undertaken to support the selection process were:

- Review of planning policy and land use documents
- Initial screening to remove sites inconsistent with planning policy or too small for facility
- High-level GIS assessment to analyse geographic and spatial data and evaluate range of criteria (site size, proximity to sensitive receptors)
- Detailed assessment using GIS, site observations and other relevant information
- Final list of preferred sites using evidence from screening process and judgment of qualified planning professionals

Following initial shortlisting of sites through the planning policy review and high-level GIS assessment, twenty short-listed sites were taken into the detailed site assessment stage. Whilst they are spread out across the study area, no sites located within the administrative areas of either Darlington Borough Council or Middlesbrough Council remained in the short list.

The shortlisted sites are:

- Hartlepool
  - Site TV001, Graythorp Industrial Estate
- Stockton-on-Tees o Site TV002, Haverton Hill
  - Site TV003, New Road Billingham
  - Site TV154a, Belasis
  - Site TV154b, Belasis
  - Site TV154c, Belasis
  - Site TV156a Durham Lane
- Redcar & Cleveland
  - Site TV120, Grangetown Prairies / South Tees Eco-Park
  - Site TV121, Wilton International
  - Site TV123, South Tees Industrial Estates and Business Parks
  - Site TV125, Kirkleatham Business Park
  - Site TV126, Tees Offshore Base
  - Site TV132, Dormanstown Industrial Estate
  - Site TV201, SIZ South Bank
  - Site TV203, SIZ Central
  - Site TV204, SIZ North East
  - Site TV205, SEZ South
  - Site TV211, South Bank Wharf Enterprise Zone SW
  - Site TV215, STDC South West
  - Site TV217, Bolckow Industrial Estate

Each of the short-listed sites was assessed using a combination of GIS, observation at the site visits, and other information that was gained through the site assessment process.

The assessment considered:

- relevant policy for the site;
- the availability of each site;
- the deliverability of each site, including infrastructure, human and environmental constraints; and
- key features identified from the site visit including, the current state of the site, its location within the study area, the presence of overhead lines or other infrastructure.

3.5 Selection of the Preferred Option

Following the detailed assessment, three sites were identified as preferred locations. Figure 3-2 shows the locations of the short listed sites. Site specific benefits and constraints of each site are outlined in Table 3-3

Table 3--3: Benefits and constraints of the preferred sites.

Site Reference		Benefits	Constraints
TV003	New Road, Billingham	Centrally located within the study area and allocated for strategic waste development. Appears to be an available site, ready to develop.	Billingham residential area to the west. Pipe work around the site and over New Road at the south eastern corner of the site.
TV120	Grangetown Prairies / South Tees Eco-Park	Allocated for strategic waste development. Appears to be an available site, ready to develop, however the STDC indicated that it is a popular location for other potential investors.	It is a long way to the east within the study area. It is located within an area formerly extensively used for heavy industry processes and may require comprehensive remediation.
TV126	Tees Offshore Base	It is located within the spatial strategy for strategic waste development. Appears to be an available site, ready to develop.	It is a long way to the east within the study area. It is located close to PD Ports and the river frontage and may be preferred/retained by the site owner for port related uses.

The above table illustrates the different site-specific benefits and constraints relevant to each of the short-listed sites, with no single site representing a clear preferred site. All three were considered to provide the opportunities identified for the facility, having three locations that are preferred that have been through an extensive site selection process gives the Tees Valley Authorities some greater flexibility in developing their residual waste treatment solution.

3.5.1 The Preferred Location

The preferred location lies with one of the six plots the South Tees Development Corporation (STDC) within the area locally known as the 'Grangetown Prairies', Figure 3-3. STDC will undertake the construction of a new site access on the corner of Eston Road in addition to the internal highway links.

The proposed development site lies at the north western corner of within 'Zone 1', Grangetown Prairie. This zone is identified as the 'South Industrial Zone'. It is the first Phase of re-development planned between 2019 and 2022.

These are not part of the current planning proposal.

3.6 Process Description

The proposal is for an Energy Recovery Plant capable of processing up to 450,000 tonnes of Municipal Solid Waste (MSW) per annum. The waste will be sourced from the Tees Boroughs (Darlington, Stockton, Middlesbrough, Redcar and Cleveland and Hartlepool) allows for additional streams from Newcastle and Durham regions. No hazardous waste would be used in the proposed ERF Facility.

A flow diagram for the process is shown in Figure 3-4. The process of generating energy from the waste feedstock within the Energy Recovery Facility (ERF) is described below:

- Waste is taken to the ERF, mainly by road;
- Waste is transferred to the ERF tipping hall and transferred to the boiler hall;
- Waste is combusted to produce heat;
- Heat is used to boil water to create steam;
- The steam is then used to generate electricity through the movement of turbines, which takes place in the turbine hall. The electricity is distributed to the national grid or a private wire;
- The air pollution control equipment cools and cleans the gases, and a baghouse controls the emissions. This takes place in the air cooling condenser and flue gas treatment building and released via the stack. Emissions are continuously monitored (submit to an Environment Agency permit);
- Particular matter is collected and treated, and bottom ash and metals are recovered for recycling.
- Residual material is beneficially reused. That which cannot be reused is disposed of at landfill.

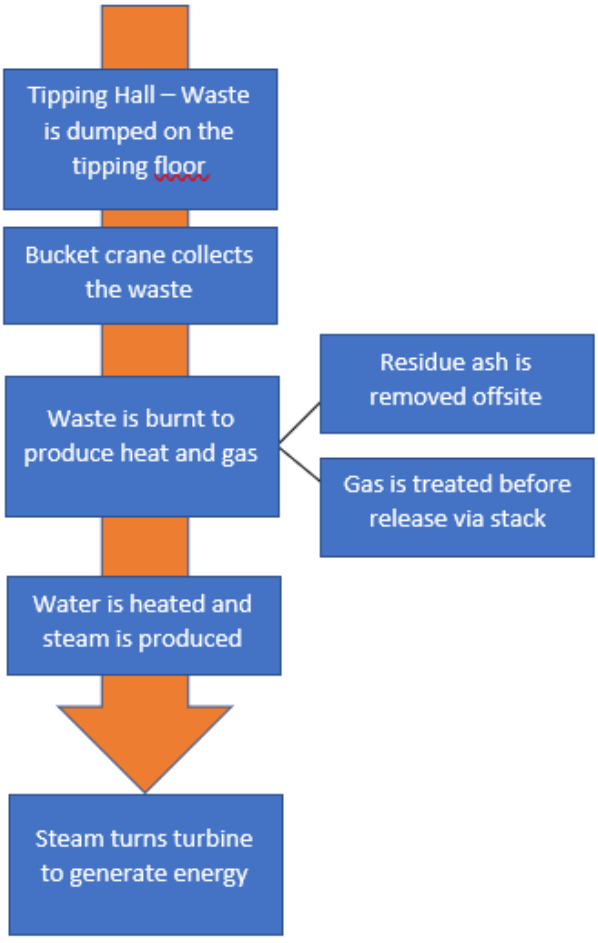

Figure 3-4: Simplified ERF process

Several buildings and structures are required for the process and form part of the proposed development. Full details are set out on the accompanying planning drawings (Appendix C).

Tipping Hall - The tipping hall is where the waste is delivered. Heavy Goods Vehicles (HGVs) and refuse collection vehicles (RCV) will enter the building and discharge their loads. The tipping hall will be totally enclosed with access via roller shutter doors to prevent the external release of dust, odours and emissions. Additionally, these will be controlled by continuously drawing air from the refuse pit through the combustion units i.e. the negative air pressure will retain any odours in the building rather than let them

out. The tipping floor will be concrete, suitable for HGVs and RCVs. It will be sloped in order to contain any spillages into a bunder pit.

Boiler Hall - The boiler hall is where the waste feedstock combusts in a furnace, releasing heat. The hot gases which are generated pass through the boiler generating steam. As the combustion gases from the furnace pass through the boiler, they are cooled to a temperature suitable for the flue gas cleaning system. Fuel oil is required to safely start and shutdown the plant but once operating temperatures are reached, waste can be burned without the need for any auxiliary fuel.

Turbine Hall - The steam generated by the boilers passes through a condensing steam turbine-generator.

Flue Gas Treatment Building - The flue gas treatment (FGT) building houses air pollution control (APC) equipment which cleans any gases prior to being discharged to atmosphere.

Air Cooled Condenser - Steam is exhausted at low pressure from the turbine into an air-cooled condenser which condenses the steam back into water. The water is then pumped back into the boiler. The heat lost by the steam when it condenses is transferred to the atmosphere. The air-cooled condenser has fans which draw air across the condenser tubes, so there is no visible plume.

Stack - Once cleaned, the flue-gases from the boilers are discharged to atmosphere via a stack. Stack height being between 80 metres.

Fuel Oil - A fuel oil storage tank, with a secondary containment, will be provided. An HGV unloading area adjacent to the road will also be provided. This area will be bunded.

Fire Fighting Water Tank - A fire protection water storage tank will be provided on site.

Standby Diesel Generator - In case of a power interruption or outage, a standby diesel generator is provided. The generator and the diesel engine will be mounted on a steel base frame. The diesel generator shall be enclosed.

A designated heritage and biodiversity area, landscaping, internal access roads and car-parking also form part of the proposals, the details of these will be dealt with by reserve matters.

Air Cooled Condenser Building – The air-cooled condenser condenses the steam exhausting the steam turbine, pulling a vacuum for power generation. Condensed water is returned to the boilers.

Incinerator Bottom Ash (IBA) Building – the 'clinker' that is left after the waste is burned (this is typically 20% by weight of the waste being burned) will be stored before being recycled.

Air Pollution Control Residue (APCr) Silos - Fine material that is captured by the bag filters in the FGT is transported to the APCr silos before being removed from site in road tankers for treament.

Powdered Activated Carbon (PAC) – is added to the flue gas in the FGT to remove dioxins, furans, mercury etc.

Lime Tank - Lime is used to remove any acidic pollutants from the flue gas as part of environmental management systems to minimise the impact of these activities on air quality.

Ammonia (NH_3) Storage Tank – Ammonia or urea is injected into the boiler to reduce NOx levels to EA permitted levels.

Administration Building – Will provide office facilities associated with the operation of the site and welfare facilities for employees and visitors.

Electrical Equipment Building – Containing the electrical equipment associated with the operation of the facility.

Car Parking – Designated staff and visitor car parking.

3.7 Construction Details

3.7.1 Construction Compound

The construction compound will be located within the identified redline boundary and STDC plot.

3.7.2 Likely Construction Methods

Construction will be phased. As stated, the site forms part of the South Teesside Development Corporation, who is responsible for the initial site remediation works. The first phase of which will be a comprehensive ground investigation. The remediation will be informed to a large extent by the findings of the GI and until these results are back there won't be any firmer proposals but, as a minimum, it is likely to involve the clearance of any contamination/debris/rubbish obstructions down to 2.5m. After on-site processing, the material will be replaced.

The buildings will sit on a concrete base and these will be piled into the underlying ground. The current ground conditions are likely to be a collection of materials including slag and underlying alluvial deposits. These are unlikely to be suitable for heavily loaded structures on plant. The principal engineering activities to be carried out for all parts of the development would be:

- Site establishment including installation of site offices, utility services and welfare facilities;
- Creation of ecological mitigation areas;
- Stripping of the site;
- Demolition work and removal of existing services;
- Installation of drains;
- Land-raising operations;
- Groundwork construction;
- Earthworks;
- Piling work;
- Concrete construction of foundations, walls etc.;
- Steelwork erection;
- Roof and cladding works;
- Building work;
- Construction of roads, paved areas, rail link, car and HGV parking;
- Construction of temporary structures (including scaffolds, formwork and falsework);
- Mechanical installation including pipework and fixed plant;
- Electrical installation including lighting and connection to the Grid;
- Security fencing;
- Site finishes, signing etc.;
- Plant commissioning and testing; and
- Landscape planting.

3.7.3 Timing and Duration of the Works

It proposed that construction will start in 2022, with a start-date for the facility of 2025. The construction period is expected to extend to 36 months.

Normal construction hours of work are proposed to be as follows:

- Monday to Friday: 07:30 to 18:00.
- Saturday: 08:00 to 13:30.
- Sundays & Bank Holidays: No construction work.

These hours would be generally adhered to at all times, unless for some exceptional or emergency works.

4 Consultation

4.1 To Date

The purpose of this section is to provide a summary of the consultation undertaken as part of the Scheme and how the consultation has supported Scheme development.

On the 9th of August 2019, a meeting took place with Claire Griffiths, Development Services Manager and Adrian Miller, Head of Planning and Development, both from Redcar Borough Council, in attendance with Dorian Latham, Technical Director (Environmental Impact Assessment (EIA) and Environmental Management), Della Adams, Principal Environmental Consultant and Mike McDonald Technical Director (Hydrogeology), of JBA.

The meeting was held at Redcar Borough Council Offices. During the meeting it was agreed that the proposals would form EIA Schedule 1 Development. The supporting information and level of detail required for the Environmental Statement (ES) and Outline Application was also discussed.

Consultation responses obtained from the EIA Scoping Response from key stakeholders have been taken on board as part of the preparation of the planning application and have formed the basis of some of the supporting information.

4.2 Screening

Screening for the scheme was undertaken in September 2019. Screening confirmed that the scheme is a Schedule 1, category 10 development under the EIA regulations. Consultation with RCBC confirmed that the project was a Schedule 1 project, therefore no formal Screening Opinion was requested, and it was decided to proceed with a voluntary ES.

4.3 Scoping

A formal Scoping Opinion was obtained from Hartlepool Borough Council on the 10th December. The following topic areas were formerly scoped into the EIA. Full details of the Scoping Opinion are provided in Appendix B.

Table 4-1:Responses from the Scoping Opinion Request, Dec 2019

Consulted	Details
Environment Agency (EA)	Thank you for referring the above Scoping Opinion which we received on 13 November 2019. Having reviewed the supporting documentation, we would expect the following matters to be dealt with as part of any planning application of these works: **Water Framework Directive (WFD)** The development needs to give due regard to the objectives of the Water Framework Directive. In considering the development further, we would expect a WFD Assessment to be submitted as part of a planning application. The WFD assessment should undertake an assessment of the proposed activity on the water environment. **Water Quality** If the proposed development intends to make a discharge to the environment, the applicant will need to ensure that they connect to mains sewage. If this is not feasible, the Applicant will need to apply for an appropriate environmental permit from the Environment Agency. The Tees Estuary incorporates areas protected for conversation purposes. Therefore, any discharges to the Tees Estuary will need to assess the impact to the protected areas, and to the objectives of the WFD. The Applicant may need to undertake modelling and assessments which demonstrate the environmental impacts of any proposed discharges. In addition, best practice should be employed

Consulted	Details
	during the construction of the site to prevent leaks and spills of oils / fuels / chemicals, and mitigation of silty surface water. **Waste** The Applicant will need to demonstrate that the use of the proposed facility will follow the waste hierarchy. The Applicant will also have to demonstrate that the facility will be designed to make use of both heat and electricity production, and utilise the most efficient design in order to follow the Waste Strategy for England 2019. **Environmental Permitting Regulations (EPR)** It is unclear whether the proposed was will involve the use of hazardous residual waste. If the development proposal involves the use of non-hazardous residual waste, then the plant will require an EPR permit from the Environment Agency. Based on the information submitted, the proposed development appears to fall into Schedule 1 listed activity S5.1 A1 (b) "Incineration of non-hazardous waste in a waste incineration plant or waste co-incineration plant with a capacity exceeding 3 tonnes per hour". The proposed stack height is stated as being between 70m to 80m. However, the stack heights could be higher. This is dependent on the outcomes of air quality and/or habitats assessments. It is noted that a similar type plant in the North Tees area has a stack height of 111m. The proposed development will be of high public interest. Therefore, as part of the EPR permit, we will likely run a consultation to give people the opportunity to comment on the permit application. We strongly recommend that pre-application discussions are initiated with the Environment Agency at a suitable early opportunity. **Water Resources Consent** If the Applicant is proposing to abstract from a Surface Water (including the Tees Estuary) or any underground strata, then a Water Resources licence may be required from the Environment Agency. Any Water Resource license granted may have conditions attached to protect the environment. These conditions may provide protection for migratory fish and eels, and may limit the periods when abstraction could take place. It should be noted that there is no guarantee that an abstraction licence will be granted. Therefore, we strongly recommend that the Applicant submits a pre-application enquiry with the Environment Agency. **Contributing to Local Environmental Initiatives and Priorities** The Tees Estuary Partnership are developing a habitat banking scheme to offset any ecological impacts which could arise from development. This is based on the Biodiversity 2.0 Net Gain metric, and has been tweaked to fit the local context of Teesside. The Industry and Nature Conservation Association are currently finalising this metric. Therefore, we recommend that consideration is given to achieving a biodiversity net gain from the development.
Natural England (NE)	Natural England was consulted as part of Redcar and Cleveland BC's Scoping Request. Natural England advises that the potential impact of the proposal upon features of nature conservation interest and opportunities for habitat creation/enhancement should be included within this assessment in accordance with appropriate guidance on such matters. Guidelines for Ecological Impact Assessment (EcIA) have been developed by the Chartered Institute of Ecology and Environmental Management (CIEEM) and are available on their website. EcIA is the process of identifying, quantifying and evaluating the potential impacts of defined actions on ecosystems or their components. EcIA may be carried out as part of the EIA process or to support other forms of environmental assessment or appraisal. The National Planning Policy Framework sets out guidance in S.174-177 on how to take account of biodiversity interests in planning decisions and the framework that local authorities should provide to assist developers.

Consulted	Details
Redcar and Cleveland Senior Strategic Transport Officer	The Teesdale Way public footpath lies to the north of the site but has a pipeline route between the path and the site boundary. There should be no interference with the availability and use of the PROW. The traffic impact of the site will need to be the subject of a detailed Transport Assessment.
Health and Safety Executive (HSE)	Do Not Advise Against, consequently, HSE does not advise, on safety grounds, against the granting of planning permission in this case. There is at least one unidentified pipeline in this Local Authority Area. You may wish to check with the pipeline operator where known or the Local Authority before proceeding. The details HSE have on record for these pipelines is as follows: 4440193_ Sabic UK Petrochemicals Ltd North Tees to Olefins 6.
Network Rail	In relation to the protection of the railway, any Environmental Impact Assessment for the site should include consideration of how the scheme may impact on operational railway safety. The Transport Assessment should include consideration of construction and haulage routes related to the proposed development and any impact these may have on railway assets such as bridges and level crossings.
Northumbrian Water Limited	It should also be noted that, following the transfer of private drains and sewers in 2011, there may be assets that are the responsibility of Northumbrian Water that are not yet included on our records. Care should therefore be taken prior and during any construction work with consideration to the presence of sewers on site. The Developer should develop their Surface Water Drainage solution by working through the Hierarchy of Preference contained within Revised Part H of the Building Regulations 2010. Namely: Soakaway Watercourse, and finally Sewer We recommend that the developer contact Northumbrian Water to agree allowable discharge rates and points into the public sewer network.
Teesside International Airport	Teesside International Airport has some concerns about the impact to Aircraft from possible emissions released from the chimney that is to be part of the proposed ERF plant. The location of the proposed ERF plant falls close to the extended centreline from Teesside International Airport, thus any aircraft on an approach or take-off could be affected by possible smoke or airborne ash deposits that could put the safety of aircraft in flight at risk. Therefore, we object to the above proposition in its current form. If some mitigation is provided with assurance that there will be no such emissions from the chimney, then we will be happy to review our response.
Highways England	Our interest is the continued safety and operation of the Strategic Road Network (SRN). The closest point of the SRN is the A1053, Greystones Road, approximately a kilometre from the site. It is unlikely that the traffic from this development causes us any concern, however for certainty if you could consult on receipt of the planning application. As the scoping report points out the impact is probably greater at the construction stage than during operation so if a relevant Construction Transport Management plan can be included this would be helpful.
Redcar and Cleveland Lead Local Flood Authority – Lyndsey Hall	A site specific FRA should accompany any application and should be in accordance with Policy SD7 Flood and Water Management.

4.4 Pre application Consultation

As part of the wider consultation for the STDC extensive consultation took place during the preparation of the STDC Regeneration Master Plan which included the plans to re-develop Grangetown Prairie. As part of the adoption process, a draft Master Plan was prepared in March 2017, which included a 'Development Potential Illustrative Plan' for each Zone. Subsequent to comments received an updated Masterplan was published in March 2019.

The purpose of the consultation was to gage view of the local community and other stakeholders and consider how their comments and suggestions could be utilised as part of the proposals. In addition to the public, identified interested stakeholders included:

- Tees Valley Combined Authority (Redcar & Cleveland Borough Council, Middlesbrough Council, Stockton on Tees Borough Council, Hartlepool Borough Council, Darlington Borough Council)
- Environment Agency
- Highways England
- Network Rail
- National Grid
- Health & Safety Executive Natural England
- South Tees Site Company
- Thai Banks Consortium
- Official Receiver
- SSI Task Force
- Tata Steel
- Greybull Capital
- PD Ports
- British Steel
- Redcar Bulk Terminal
- Northumbrian Water Ltd
- BOC
- MGT Power Teesside
- Sembcorp Utilities (UK) Ltd
- Operators at Wilton International
- Sirius Minerals
- Industry Nature Conservation Association (INCA)
- Tees Estuary Partnership
- Teesside Valley Wildlife Trust
- Major utilities providers
- Wood Group (CATS Pipeline)
- Local public transport service providers

As part of the consultation exercise a range of activities and events were undertaken over a seven-week period, including formal public presentations and events, workshops and stakeholder meetings, meetings with and/or presentations to major operators in the area, regulators, and local and regional business networks and forums.

A total of 27 consultation events took place. As set out in the Masterplan, consultation helped STDC not only helped develop positive relationships with stakeholders, it also to developed a better understanding of current operations, constraints, logistics needs and business plans, enabling the development of the Master Plan that would also enable these key stakeholders to operate better and be more successful, so helping to realise and sustain significant growth in the Tees Valley economy.

5 Methodology

This section of the report details the general methodology adopted for the impact assessment. For each of the individual environmental topic areas e.g. landscape individual, sector based methodology may be applied. Such methodology is detailed in the individual environmental topic sections.

5.1 General Approach

5.1.1 The EIA Process

Development projects are increasingly faced with a complex array of environmental consenting requirements. Environmental Impact Assessment (EIA) is widely recognised as delivering valuable and accessible information that positively influences development design and consenting to the benefit of developers, communities and the environment. However, it is also becoming increasingly recognised that EIA needs to be more effective and more proportionate to deliver these benefits as (IEMA Proportionate EIA Strategy, 2017). It is essential for there to be coordination between the design process and the EIA process in order to enable the iteration of design development and reporting in the ES. This process should be based on a design freeze, whereby aspects of the design are sufficiently fixed to avoid material changes to the design going unreported in the ES. This is reflected in Figure 5-1.

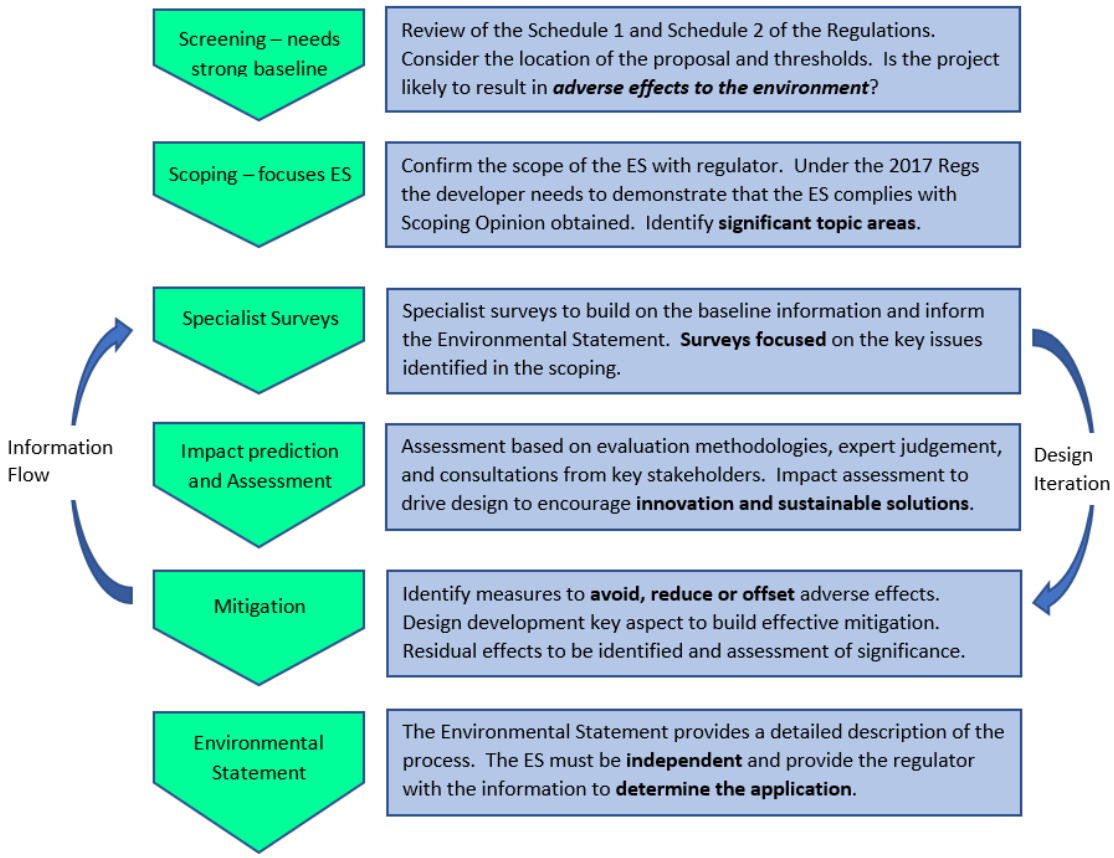

Figure 5-1: The EIA Process

5.1.2 Impact Identification Process

The procedure for the assessment and evaluation stage of the Environmental Statement is as follows:

- Overlay the proposed Scheme onto the baseline information;
- Consider the interactions of the Scheme with the environmental receptors throughout the life of the project (construction and operation) and identify potential impacts;
- Establish appropriate mitigation measures required to remove or reduce potential impacts to an acceptable level, and determine what environmental improvements or enhancements may be delivered; and
- Determine the significance of the residual impacts.
- Impact of the Scheme are discussed and summarised in each individual topic section (Sections 6 to 13).

5.1.3 Impact Assessments

The general approach of the Impact Assessment is to determine the **significance** of impacts through a combination of the **sensitivity** or **value** of the baseline conditions, as well as the **magnitude** of the potential impacts.

The sensitivity of environmental receptors/resources is evaluated through the general criteria presented in Table 5-1. The sensitivity of a receptor is determined by its vulnerability or rarity, its level of statutory or non-statutory protection, special expertise, views of consultees, and professional judgement. Where appropriate, further justification for the assessment of the sensitivity of a receptor or environmental resource is provided within the relevant assessment chapters.

Table 5-1: General Criteria for Classifying the Sensitivity or Value of Environmental Receptors or Resources.

Value	Criteria
Very High	International Importance
High	National Importance
Medium	Regional Importance
Low	District / Parish Importance*
Negligible	No Listed Importance
*Importance value of low here refers to the receptor's value on a national scale. Locally, the receptor may still be considered important.	

The magnitude of the impact is dependent upon the frequency, extent and timescale of the impact. The frequency is the number of times an impacting activity takes place through the life of the Scheme (construction and operation). The magnitude of the impact is assessed using the features of the impact in Table 5-2.

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Table 5-2: General Criteria for Classifying the Magnitude of Environmental Effects.

Magnitude	Definition
Major Negative	Impact with serious consequences and/or on a large area.
Moderate Negative	Impact with undesirable consequences.
Minor Negative	Discernible negative impact and/or on a small scale.
Negligible	No impact or no discernible impact.
Minor Positive	Discernible positive impact and/or on a small scale.
Moderate Positive	Impact with favourable consequences.
Major Positive	Impact provides substantial gains and/or a large area.

The sensitivity of the receptor and the magnitude of the impacts for each of the receptors is defined (where appropriate) in the early part of each topic section.

5.1.4 Significance Criteria

The significance of the environmental effects is measured through the combination of the sensitivity of the receptor and the magnitude of the impacts and they vary in degrees of significance. The degree of significance is described as follows:

- Negligible: The impact is only very slightly detectable/noticeable or is undetectable and of no significance.
- Minor: The impact is slightly detectable/noticeable and of some temporary and localised effect, or a reversible nature.
- Moderate: The impact is fairly easily detectable/noticeable and likely to be of either temporary or permanent effect, unlikely to exceed local influence.
- Major: The impact is easily detectable/noticeable and likely to be of permanent, long-term significance, with irreversible implications exceeding the local area.

The degrees of significance can be beneficial or adverse to the environment and this will be noted within the individual assessments of each impact. Table 5-3 provides a matrix illustrating the various degrees of significance of the environmental and residual effects.

Table 5-3: Matrix for the Evaluation of the Significance of Environmental and Residual Effects.

		Sensitivity/Value			
		Very High (International Importance)	High (National Importance)	Medium (Regional / County Importance)	Low (District / Parish Importance)
Magnitude and Nature of Impact	Major negative (Impact with serious consequences and/or on a large area)	Major Adverse	Moderate-Major Adverse	Moderate Adverse	Minor-Moderate Adverse
	Moderate negative (Impact with undesirable consequences)	Moderate-Major Adverse	Moderate Adverse	Minor-Moderate Adverse	Minor Adverse
	Minor negative (Discernible negative impact and/or on a small scale)	Minor-Moderate Adverse	Minor-Moderate Adverse	Minor Adverse	Minor Adverse
	Negligible (No impact or discernible impact)	Negligible			
	Minor positive (Discernible positive impact and/or on a small scale)	Minor-Moderate Beneficial	Minor-Moderate Beneficial	Minor Beneficial	Minor Beneficial
	Moderate positive (Impact with favourable consequences)	Moderate-Major Beneficial	Moderate Beneficial	Minor-Moderate Beneficial	Minor Beneficial
	Major positive (Impact provides substantial gains and/or on a large area)	Major Beneficial	Moderate-Major Beneficial	Moderate Beneficial	Minor-Moderate Beneficial

5.2 Mitigation Measures

In general, any environmental effects assessed as moderate or major are considered significant within the terms of EIA regulations; therefore, any potential impacts of moderate or greater significance will be identified as priorities for mitigation.

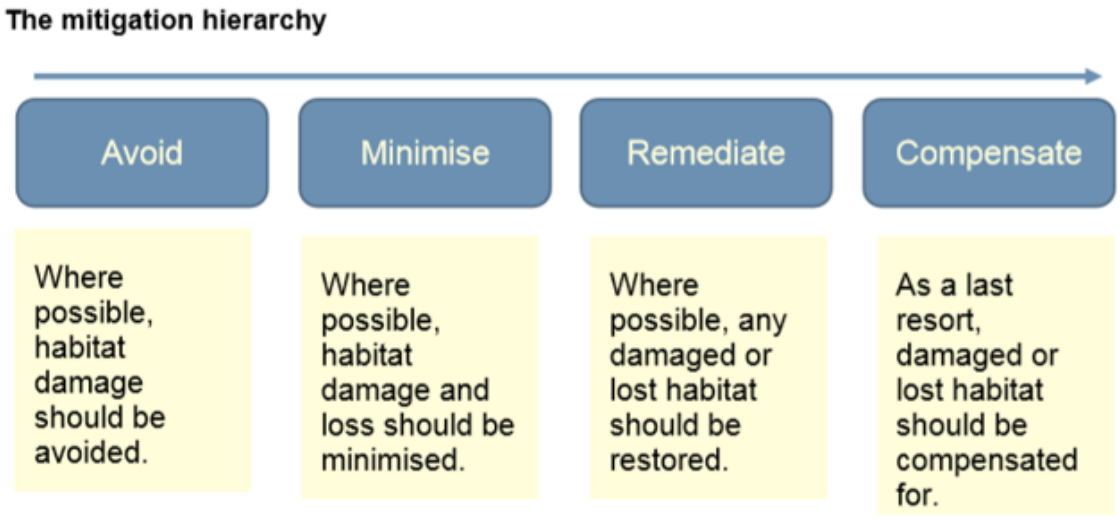

Figure 5-2: Defra's Mitigation Hierarchy

Figure 5.2 illustrates Defra's Mitigation Hierarchy. In this instance the example is based on ecological impacts, however the principle of avoidance first through re-design, reducing the impact through minimising losses, restoration and finally compensation can be applied all environmental topic areas.

It is important that mitigation is not confused with *enhancement,* where enhancement is improvements over and above an accepted baseline.

For each of the environmental topic areas mitigation measures have been identified to reduce any potential effects to an acceptable level and, where possible, prevent any significant impacts on the environment as a result of the Scheme.

The mitigation measures are discussed in detail in each of the topic chapters and are set out in an Environmental Action Plan (EAP). The EAP is the means through which the environmental impacts set out in the ES are managed, and it contains the objectives, actions and targets that will be monitored throughout the detailed design, construction and post constructions stages of the Scheme. This will ensure that the proposed mitigation measures are undertaken.

A Construction Environmental Management Plan (CEMP) will be prepared by the contractor so it can be referenced throughout the construction phase to identify any potential impacts and provide the associated specific mitigation measures where necessary. The CEMP will also detail guidelines and procedures that are to be followed by the contractor to ensure the adequate management of generic site environmental aspects.

5.2.1 Embedded Design Measures and Mitigation

EIA is a sequential process, and this concept is reflected in the mitigation process. Migration aims to avoid, mitigate and compensate ecological impacts and is centred on the significant impacts identified in the assessment process. Where practical, impacts should always be avoided by designing out a potential ecological conflict to ensure no negative impacts, e.g. re-positioning of a structure to avoid impacts to valuable habitat.

Avoidance can include the careful timing of an activity to prevent an impact occurring, e.g. vegetation clearance. Avoiding and/or minimising impacts is best achieved through

consideration of potential impacts of a project from the earliest stages of scheme design and throughout its development. Many impacts can be avoided or reduced by consideration of alternatives.

Measures incorporated into the scheme design are described as 'embedded mitigation'. Such Mitigation is particularly beneficial as there is greater certainty that it will be delivered.

Where it may not be possible to design-out an impact, then specific mitigation is required. This may include for example habitat compensation or new planting, landscape screening or attenuation / storage of drainage.

A summary table detailing the environmental effects without mitigation, with the proposed mitigation and any residual impacts following the implementation of mitigation measures, can be found at the end of each topic section. These tables are combined as the summary of Environmental Commitments in Section 15.

5.3 Net Environmental Gain

Environmental Net Gain (ENG) was proposed in the Government's 25 Year Environment Plan as a development to the increasingly established Biodiversity Net Gain (BNG). The Plan committed to embed ENG for development, including housing and infrastructure as a critical enabler of its headline pledge.

Biodiversity Net Gain (BNG) is an approach to development that leaves biodiversity in a better state than before. The principle assumes that developers to provide an increase in appropriate natural habitat and ecological features over and above that being affected and managed through the application of the mandatory mitigation. BNG aims to halt the current loss of biodiversity through development.

Defra has recently consulted on making biodiversity net gain an element of the English planning system however many developers are already designing net gain into their development projects and national planning policy frameworks already encourage the net gain approach (CIEEM, 2019).

Biodiversity net gain still relies on the application of the mitigation hierarchy to avoid, mitigate or compensate for biodiversity losses. It is additional to these approaches, not instead of them.

5.4 Assumptions and Limitations

The Environment Statement supports an Outline Planning Application. There are elements that are yet to be confirmed with regard to the design and facility layout, these are highlighted through the statement chapters.

6 Ecology and Biodiversity

6.1 Introduction

This chapter describes the current biodiversity value identified for the study area and assesses the potential impacts of the Scheme on ecological receptors (e.g. nature conservation sites, habitats and species). Where potentially significant effects on ecological receptors have been identified, mitigation measures have been incorporated into the project design (as embedded design) or included as part of the construction or operational phases.

Scheme design and background details are provided in Section 1 to 3. All figures are provided in Volume 2 and Technical Reports in Volume 3.

Planning and Access Statement and planning drawings are provided in Appendix C.

6.2 Legislation, Policy and Guidance

6.2.1 Designated Sites

Designated sites are areas of high nature conservation value which are protected to varying degrees by statute, international conventions, or local authority planning controls. Generally, the priority for the protection of designated sites is as follows:

- International/European/National sites (Ramsar, SACs, SPAs, SSSIs);
- Regional or local sites;
- Other wildlife sites.

The Conservation of Habitats and Species Regulations 2017 as amended consolidate the Conservation of Habitats and Species Regulations 2010 as amended 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 UK law. They also transpose elements of the EU Wild Birds Directive in England and Wales. The Regulations provide for the designation and protection of 'European Sites' (SAC and SPA), and the adaptation of planning and other controls for the protection of European Sites.

SSSIs are legally protected under 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. This legislation gives Natural England powers to ensure better protection and management of SSSIs and safeguard their existence into the future.

The protection afforded to sites by local authority designations, such as County Wildlife Sites (CWS), Local Nature Reserves (LNR) and Local Wildlife Sites (LWS) is normally significantly less than for statutory designations. Such designations are predominantly for planning purposes only and, while a local authority may have a stated policy of avoiding development in these areas, there is no statutory protection process.

6.2.2 Protected Species

Certain species are considered to be rare or subject to persecution and are also afforded protection through international, European and national law. The Conservation of Habitats and Species Regulations 2010 identify 'European protected species'. The regulations make it an offence (subject to exceptions) to deliberately capture, kill, disturb, or trade in the animals listed in Schedule 2, or pick, collect, cut, uproot, destroy or trade in the plants listed in Schedule 4. However, these actions can be made lawful through the granting of licences by the appropriate authorities. Licences may be granted for a number of purposes (such as science and education, conservation, preserving public health and safety), but only after the appropriate authority is satisfied

that there are no satisfactory alternatives, and that such actions will have no detrimental effect on the wild population of the species concerned.

The Wildlife and Countryside Act 1981 (as amended) affords various levels of protection to nesting birds (Schedule 1), animal species listed on Schedule 5 and plant species listed on Schedule 8. In addition, Schedule 9 lists non-native invasive species which the Act prohibits from releasing into the wild.

Certain species are protected under specific legislation for other reasons rather than conservation. For example, the Badger is afforded protection under the Protection of Badgers Act 1992. This creates the offence to kill, injure or take a badger, or to damage or interfere with a sett unless a licence is obtained from a statutory authority. The Badger is protected against ill-treatment and persecution rather than for conservation reasons *per se*.

6.2.3 Biodiversity

Section 40 of the Natural Environment and Rural Communities Act (2006) states that 'Every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity'. Section 40(3) also states that 'conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat'. Section 41 requires the Secretary of State to publish a list of 'Habitats and Species of Principal Importance' for the purpose of conserving biodiversity. To meet this requirement the England Biodiversity List (the S41 list) has been developed. The S41 list, which replaces the list published under Section 74 of the Countryside and Rights of Way (CRoW) Act 2000, should be used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under section 40 of the NERC Act 2006 to have regard to the conservation of biodiversity in England, when carrying out their normal functions.

6.2.4 Planning Policy

National Planning Policy

The National Planning Policy Framework (NPPF) was published by the Department for Communities and Local Government (DCLG) in 2012 and has since been revised in July 2018 and again in February and June 2019. The NPPF sets out the Government's planning policies for England and how these are expected to be applied, with a presumption in favour of sustainable development a core element of the framework. Twelve core planning principles are identified within the framework, with that relevant to biodiversity stating it will:

Contribute to conserving and enhancing the natural environment and reducing pollution. Allocations of land for development should prefer land of lesser environmental value, where consistent with other policies in this Framework (Department for Communities and Local Government, 2012).

The Framework recognises that, when determining planning applications, local planning authorities should aim to conserve and enhance biodiversity by:

- Ensuring that adverse impacts are avoided, adequately mitigated or compensated for;
- Refusing developments that may adversely impact on Sites of Special Scientific Interest (SSSIs) or their interest features unless the benefits of the development clearly outweigh the impacts;
- Permitting developments where the primary objective is to conserve or enhance biodiversity;

- Encouraging proposals to incorporate biodiversity in and around developments; and
- Refusing planning permission for developments that would result in the damage or deterioration of irreplaceable habitats (e.g. ancient woodland, veteran trees).
- Planning policies and decisions should contribute to and enhance the natural and local environment by:
- 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);
- 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;
- maintaining the character of the undeveloped coast, while improving public access to it where appropriate;
- minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;
- 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 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
- remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.

Local Planning Policy

The Redcar and Cleveland Local Plan was adopted in May 2018 and sets out the vision and overall development strategy for the Council's area and how it will be achieved for the plan period until 2032. The local planning policies relevant to the proposed development with regards to ecology and nature conservation are detailed in Table 6-1.

Table 6-1: Redcar and Cleveland Borough Council Local Plan Environmental Policy Objectives

Policy	Summary of Policy Objectives
SD4 – General Development Principles	The Borough Council will permit development where it will not result in an adverse effect on the integrity of a Natural 2000 site, either alone or in combination with other plans or projects.
N4 – Biodiversity and Geological Conservation	The Borough Council seeks to protect and enhance the borough's diversity and requires biodiversity to be considered at an early stage in the development process. Priority will be given to protecting internationally important sites, including the Teesmouth and Cleveland Coast Special Protection Area/Ramsar and European Marine Site, and the North York Moors Special Protection Area and Special Area of Conservation. Developments likely to impact on nationally important SSSI sites will not normally be allowed.

Policy	Summary of Policy Objectives
	Developments likely to have an adverse impact on Local Sites or Local Nature reserves will only be approved where: the benefits clearly outweigh any adverse impact on the site; no reasonable alternatives are available; and mitigation, or where necessary compensation, is provided for the impact.

6.3 Assessment Methodology

The assessment methodology comprised a collection of ecological information through a desk study and field studies, followed by an assessment of the predicted impacts.

6.3.1 Zone of Impact/ Influence for Ecological Receptors

The ecological search area for the desk study encompassed the development plot, link roads and ancillary sites (e.g. compound) with a buffer distance of 2km around the indicative working area. This area was considered to be sufficient to cover the likely zone of influence of the Scheme.

The 'zone of influence' for a project is the area over which ecological features may be affected by the predicted changes as a result of the proposed project and associated activities. This is likely to extend beyond the project site, for example where there are ecological or hydrological links beyond the site boundaries. The zone of influence will vary for different ecological features depending on their sensitivity to a change.

For individual species, best practice guidance can used to determine zones of influence. For example, Natural England has produced guidelines for the 'Interpretation of 'Disturbance' in relation to badgers occupying a sett (Natural England 2007), and for Great Crested Newts (GCN) *Triturus cristatus* where the survey area typically includes ponds within 500m of the indicative working area. Statutory organisations may also specify impact zones in standing advice or guidance documents. The Impact Risk Zones (IRZs) developed by Natural England may be used to make a rapid initial assessment of the potential risks to SSSIs posed by development proposals. The IRZs define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts. The IRZs also cover the interest features and sensitivities of European sites, which are underpinned by the SSSI designation and "Compensation Sites", which have been secured as compensation for impacts on European/Ramsar sites.

6.3.2 Impact Assessment

The ecological impact assessment is based on guidance provided by the Chartered Institute of Ecological and Environmental Management (CIEEM), 2018 and the Interim Advice Note 130/10, Ecology and Nature Conservation: Criteria for Impact Assessment, provided by Highways England (2010). The assessment is on three elements:

- valuation;
- characterisation of ecological impacts; and
- determination of 'significance of effects'.

It is impractical for an assessment of the ecological impacts of a project to consider every ecological receptor (species, habitat etc.) that may be affected; instead it should focus on those that are considered most important. Scoping is the process of focusing the ecological impact assessment on the receptors of highest importance. The importance or value of an ecological feature should be considered within a defined

geographical context. For the purposes of this assessment the following frame of reference has been used:

- International and European
- National
- Regional
- County
- Local

Ecological features have been valued using the scale set out in Table 6-2, with examples provided of criteria used when defining the level of importance.

Table 6-2: Criteria used to define the importance of Ecological Features

Level of Importance	Examples
International	An internationally important site e.g. SPA, SAC, Ramsar (or a site considered worthy of such designation); Biogenic Reserves, World Heritage Sites, Biosphere Reserves.
National	A nationally designated site e.g. SSSI, or a site considered worthy of such designation; areas of key/priority habitat such as those listed in Section 41 of the NERC act; areas of ancient woodland.
Regional	Areas of key/priority habitats identified in LBAP; areas of key/priority habitat identified of being of regional value etc.
County	Designated sites including Sites of Nature Conservation Importance (SNCI's); County Wildlife Sites (CWS); Local Nature Reserves (LNR's); Areas of key /priority habitats identified in the LBAP.
Local	Designated sites including LNR's designated in the local context; trees protected by Tree Preservation Orders (TPO's); areas of habitat or populations/communities of species considered to appreciably enrich the habitat resource within the local context (such as veteran trees), including features of value for migration, dispersal or genetic exchange.

The impact assessment process involves:

- Identifying and characterising impacts;
- Incorporating measures to avoid and mitigate (reduce) these impacts;
- Assessing the significance of any residual effects after mitigation;
- Identifying appropriate compensation measures to offset residual effects; and
- Identifying opportunities for ecological enhancement

The assessment includes potential impacts (direct, indirect, secondary and cumulative) on each ecological feature determined as important from all phases of the project and describes in detail the impacts that are likely to be significant, making reference to the following characteristics:

- Positive or negative
- Extent
- Magnitude
- Duration

- Timing
- Frequency
- Reversibility

6.3.3 Determining Ecologically Significant Effects

Significance is a concept related to the weight / importance that should be attached to effects when decisions are made, especially in relation to mitigation requirements. For the purpose of ecological assessment, 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general. In broad terms, significant effects encompass impacts (both positive or adverse) on structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution).

Significant effects encompass impacts on structure and function of defined sites and ecosystems, leading to changes in the baseline characteristics. The following factors have been considered in this assessment:

- For designated sites – is the project and associated activities likely to undermine the site's conservation objectives, or positively or negatively affect the conservation status of species or habitats for which the site is designated, or may it have positive or negative effects on the condition of the site or its interest/qualifying features?
- For ecosystems – is the project likely to result in a change in ecosystem structure and function?

Table 6-3 shows criteria for determining significance. Assessment is based on the Highways Agency's Interim Advice Note 130/10: Ecology and Nature Conservation: Criteria for Impact Assessment.

Table 6-3 Determining significance of effects

Magnitude	Typical Descriptors of Effect (Ecology)
Very Large	An impact on one or more receptors of international, European, UK or national value. Only adverse effects are normally assigned this level of significance. Considered to represent key factors in the decision-making process.
Large	An impact on one or more receptors of regional value. Considered to be very important and are likely to be material in the decision-making process.
Moderate	An impact on one or more receptors of county/area. These effects may be important but are not likely to be key decision-making factors.
Slight	An impact on one or more receptors of local value. Unlikely to be critical in the decision-making process but are important in enhancing subsequent design of the project.
Neutral	No significant impacts on key ecological receptors.

In the evaluation of significant effects best available scientific evidence has been applied based on professional judgement. In cases of reasonable doubt, where it is not possible to robustly justify a conclusion of no significant effect, a significant effect has been assumed.

6.4 Baseline Conditions

The ecological assessment is supported by baseline studies completed by INCA and walk-over studies completed by the Project Team.

6.4.1 Desk-based Study Results

A desk-based assessment was undertaken with data obtained from Environmental Records Information Centre North East (ERICNE) and review of the Defra's Magic website, which provides authoritative geographic information about the natural environment from across government.

Statutory Designated Sites

The Teesmouth and Cleveland Coast has overlapping designations as a Special Protection Area (SPA) and Ramsar site and is located 1.6km north west, at its closest point. The SPA is designated for two Annex I Species, Little Tern *Sterna albifrons* (breeding) and Sandwich Tern *Sterna sandvicensis* (passage). It is also designated for its Annex II Species, Knot *Calidris canutus* (wintering) and Redshank *Tringa tetanus,* and its waterfowl assemblage of over 20, 000 individuals comprising of Cormorant *Phalacrocorax carbo*, Shelduck *Tadorna tadorna*, Teal *Anas crecca*, Shoveler *Anas clypeata*, Sanderling Calidris alba and Knot Cal*idris canutus islandica*.

The Ramsar site qualifies in accordance with two Ramsar Criteria (5 and 6). A wetland should be considered internationally important if it regularly supports 20,000 or more water birds, under Criterion 5, and if it regularly supports 1% of the individuals in a population of one species or subspecies of water bird, under Criterion 6. The Teesmouth and Cleveland Coast has peak counts of 21, 312 individuals in winter and species/populations of Knot, Redshank and Sandwich Tern occurring at international importance.

Proposals have been put forward to extend both the SPA and Ramsar site. The potential SPA (pSPA) extends to include the Tees Estuary (1.4km north west), Drainage Cut and Tees Dock, both located within 2km. The pSPA is designated for the presence of two Annex I species, Common Tern *Sterna hirundo* (breeding) and Pied Avocet *Recurvirostra avosetta* (breeding), and an Annex II species, Ruff *Philomachus pugnax* (passage). The proposed Ramsar (pRamsar) site would extend to include Dabholm Gut and the mud and sand area, which are located over 2km from the site. Therefore, the closest point of the proposed Ramsar remains 1.6km north west. The pRamsar site is also assessed as qualifying under the same criteria as the Ramsar site.

Teesmouth and Cleveland Coast is also designated as a Site of Special Scientific Interest (SSSI), which includes the Tees Estuary and Tees Dock, 1.4km north west. This site includes nationally important features that occur within and are supported by the wider mosaic of coastal and freshwater habitats:

- Jurrasic geology
- Quaternary geology
- Sand dunes
- Saltmarshes
- Breeding Harbour Seals *Phoca vitulina*
- Breeding Avocet *Recurvirostra avosetta*, Little Tern and Common Tern *Sterna hirundo*
- A diverse assemblage of breeding birds of sand dunes, saltmarsh and lowland open waters and their margins
- Non-breeding Shelduck *Tadorna*, Shoveler *Spatula clypeata*, Gadwall *Mareca strepera*, Ringed Plover *Charadrius hiaticula*, Knot, Ruff *Calidris pugnax*,

Sanderling *Calidris alba*, Purple Sandpiper *Calidris maritima*, Redshank and Sandwich tern

- An assemblage of more than 20,000 water birds during the non-breeding season
- A diverse assemblage of invertebrates associated with sand dunes

Figure 6-1 presents the locations of the statutory designated sites within 2km of the proposed development. There are no additional statutory designated sites within 2km.

Two further statutory designated sites are considered in the Habitats Regulations Assessment within a wider radius of 10km from the site (JBA, 2019). This includes the overlapping designations of the North York Moors as a Special Area of Conservation (SAC) and SPA. The SAC is designated as it supports Annex I habitats, 4010: Northern Atlantic wet heaths with *Erica tetralix*, 4030: European dry heaths and 7130: Blanket bogs (if active bog – priority feature). The SPA is designated as it supports two Annex I species, Merlin *Falco columbarius* and Golden Plover *Pluvialis apricaria*.

Non-Statutory Designated Sites

There are no locally designated nature conservation sites within a 2km radius of the proposed development.

Habitats

There are three Priority Habitats designated under Section 41 of the NERC Act (2006) within 2km, including mudflats, intertidal substrate foreshore and deciduous woodland. Mudflats are present 1.6km north west, surrounded by intertidal substrate foreshore, and are associated with the Teesmouth and Cleveland Coast SPA and Ramsar sites. Small areas of deciduous woodland are present to the south of the site, with the closest area located 200m south east in Clay Lane Commercial Park.

Species

Several protected species were identified from ERICNE within 2km of the site. Historic records (those recorded prior to the year 2000) have been excluded. Figure 6-2 presents the location of these records.

Amphibians. Four species of amphibian were identified within 2km of the site and are summarised in Table 6-4.

Table 6-4: Amphibian species within 2km of the site

Common Name	Scientific Name	Status / Protection	Most recent record
Common Toad	*Bufo bufo*	S. 41 NERC Act 2006, W & CA 1981 Sch. 5 partial	2009
Palmate Newt	*Lissotriton helveticus*	W & CA 1981 Sch. 5 partial	2008
Smooth Newt	*Lissotriton vulgaris*	W & CA 1981 Sch. 5 partial	2008
Common Frog	*Rana temporaria*	Habitats Directive A5 1992, W & CA 1981 Sch. 5 partial	2016

Badgers. No records of Badger *Meles meles* were returned by ERICNE within 2km of the site. Wilton Woods, 3.7km south east offers suitable habitat for Badger (INCA, 2018).

Bats. One record of Common Pipistrelle *Pipistrellus pipistrellus* was returned from ERIC within 2km, in 2008, as well as one unidentified bat roost in 2010. All bat species are afforded full protection under Schedule 5 of the Wildlife and Countryside Act (1981).

Birds. Nineteen species of bird were identified by ERICNE within 2km. Table 6-5 shows five amber listed and one red listed Birds of Conservation Concern 4 (BoCC4), indicating an increasing level of conservation concern (Eaton et al., 2015).

Table 6-5: Amber and red listed BoCC4 species records returned within 2km

Common Name	Scientific Name	BoCC4 list	Most recent record
Linnet	*Carduelis cannabina*	Red	2008
Swift	*Apus apus*	Amber	2012
House Martin	*Delichon urbicum*	Amber	2008
Kestrel	*Falco tinnunculus*	Amber	2008
Dunnock	*Prunella modularis*	Amber	2008
Bullfinch	*Pyrrhula pyrrhula*	Amber	2008

Fish. No records of fish species were returned by ERICNE within 2km of the site.

Freshwater Pearl Mussel. No records of Freshwater Pearl Mussel *Margaritifera margaritifera* were returned by ERICNE within 2km of the site.

Invertebrates. Two species of invertebrate were identified by ERICNE within 2km. All of which are afforded protection under Section 41 of the NERC Act (2006). Several records of Small Heath *Coenonympha pamphilus* were returned, from 2002 and 2005, as well as several records of Wall *Lasiommata megera* were returned in 2002.

Reptiles. No records of reptile species were returned by ERICNE within 2km of the site.

Other mammals. Five mammal species were returned from ERICNE within 2km and are summarised in Table 6-6.

Table 6-6: Mammal species within 2km of the site

Common Name	Scientific Name	Status / Protection	Most recent record
European Water Vole	*Arvicola amphibious*	S. 41 NERC Act 2006, W & CA 1981 Sch. 5 full	2014
Roe Deer	*Capreolus capreolus*	Deer Act 1991	2010
West European Hedgehog	*Erinaceus europaeus*	S. 41 NERC Act 2006, W & CA 1981 Sch. 6	2016
Brown Hare	*Lepus europaeus*	S. 41 NERC Act 2006, W & CA 1981 Sch. 5a and 6a	2016
Weasel	*Mustela nivalis*	Bern Convention A3	2010

White-Clawed Crayfish. No records of White-Clawed Crayfish *Austropotamobius pallipes* were returned by ERICNE within 2km of the site. This species is absent from Cleveland.

Invasive non-native species. One record of American Mink *Mustela vison* was returned within 2km in 2010. No other invasive non-native species records were returned from

ERICNE. Giant Hogweed *Heracleum mantegazzianum* is known to be present at Teesport, 1km north east (INCA, 2018).

6.4.2 Field Surveys

Industry Nature Conservation Association (INCA) and Hartlepool Borough Council have undertaken separate Preliminary Ecological Appraisals (PEAs) of the proposed site. A PEA was undertaken by INCA on 10th May 2018 (INCA, 2018). The entire Grangetown Prairie area was surveyed to identify valued ecological receptors and buildings were inspected for their potential to support roosting bats.

Environmental DNA (eDNA) tests for GCN were carried out on 30th May 2018 by SureScreen Scientifics, an accredited company for carrying out eDNA analysis. This followed the methodology as set out in Biggs et al. (2014) with a total of 20 water samples being taken.

INCA also undertook another PEA on 17th April 2019, which surveyed the wider STDC area (INCA, 2019). This survey did not assess areas located within the site boundary, however the findings are similar to those from the previous INCA report in 2018. An additional site visit and survey was also undertaken by Hartlepool Borough Council in August 2019 and by JBA Consulting Ltd.

This was followed by an interim assessment of the site, whereby the Defra Metric 2.0 was applied to calculate the loss of brownfield habitat. Both of which focused on an area east of the current site, which was then assessed by Hartlepool Borough Council and JBA Consulting on 13th November 2019. This final survey builds on previous surveys and is considered to describe the key ecological conditions of the site.

This section outlines the findings of these surveys. The surveys are available in Volume 3.

6.4.3 Field Survey Results

Habitats

All of the field surveys describe the same habitats, which are described below.

Brownfield (J1.3 Cultivated/disturbed land - ephemeral/short). Most of the site comprises brownfield habitat, which is developing on thin calcareous soils. This is a Tees Valley Local Biodiversity Action Plan Habitat and a NERC Act 2006 (Section 41) Habitat of Principal Importance, listed as Open Mosaic Habitats on Previously Developed Land. While each of the five qualifying criteria were broadly met (Table 6-7) the site has not been comprehensively cleared of industrial artefacts and was littered with concrete, rubble, cable, steel, timbers and other materials. This has reduced the nature conservation value of the site, although this habitat is a material consideration in planning and is subject to the mitigation hierarchy.

Table 6-7 Qualifying criteria for Open Mosaic Habitats on Previously Developed Land (Source: UK BAP, 2010).

Criterion	Description
1.	The area of open mosaic habitat is at least 0.25 ha in size.
2.	Known history of disturbance at the site or evidence that soil has been removed or severely modified by previous use(s) of the site. Extraneous materials/ substrates such as industrial spoil may have been added.
3.	The site contains some vegetation. This will comprise early successional communities consisting mainly of stress-tolerant species (e.g. indicative of low nutrient status or drought). Early successional

Criterion	Description
	communities are composed of (a) annuals, or (b) mosses/liverworts, or (c) lichens, or (d) ruderals, or (e) inundation species, or (f) open grassland, or (g) flower-rich grassland, or (h) heathland.
4.	The site contains unvegetated, loose bare substrate and pools may be present.
5.	The site shows spatial variation, forming a mosaic of one or more of the early successional communities (a)–(h) above (Criterion 3) plus bare substrate, within 0.25 ha.

Ponds (G1 Standing water). There were several shallow ponds present on site, with very clear water. However, it is likely that many of these ponds, particularly in the north eastern area, may merge into one larger water body or several smaller water bodies depending on the time of year. Some ponds appeared polluted, due to the lack of submerged vegetation, and the soils present were considered highly permeable. Many of the ponds were surrounded by a narrow fringe of Common Reed *Phragmites australis*. A medium-sized pond was present in the north east corner of the site, which had formed on a white, chalk-like precipitate. Ponds are a Tees Valley Local Biodiversity Action Plan Habitat and are listed as a Habitat of Principal Importance under the NERC Act 2006 (Section 41).

Scrub (A2.1 Dense/continuous scrub). Areas of scrub were present throughout the site, comprising largely of Sea Buckthorn *Hippophae rhamnoides* as well as *Buddleia*, Birch *Betula sp.* and Willow *Salix* spp.

Woodland (A1.1.1 Broadleaved semi-natural woodland). The south western corner of the site comprises of young woodland with species such as Silver Birch *Betula pendula*, some Rowan *Sorbus aucuparia* and Willow *Salix* spp. *Buddleia* bushes were also present on the sides of the embankment.

J2.8 Earth bank. A small earth bank was present bordering the track to the south of the site. This was similarly littered with concrete, rubble and other materials, like much of the site.

J5 Hardstanding. A concrete track ran along the northern, eastern and southern borders of the site. There were several small areas of concrete surrounding the ponds in the centre of the site.

The former course of Holme Beck runs immediately to the west of the site, in a north/northwest direction, and comprising the linear topographic low. The watercourse is now culverted and diverted to lie north of the site boundary, being culverted to the east to join the Cleveland Channel which flows into the Lackenby Channel.

Figure 6-3 provides a summary of habitats recorded on the proposed development site in accordance with JNCC Phase 1 classifications (JNCC, 2016).

Species

Amphibians. A single Smooth Newt was seen in the large pond in the north eastern corner of the site (INCA, 2018). Common Toad tadpoles were present in almost all the pools of standing water in the Grangetown Prairie area (INCA, 2018). The ponds were still present in the surveys by Hartlepool Borough Council, which are anticipated to still provide breeding habitat. Hibernacula was also present in the piles of rubble and wood on site.

The results of the SureScreen Scientifics eDNA tests in 2018 were negative for GCN. No records of GCN were returned from ERICNE within 2km and previous surveys by INCA and Peak Ecology for GCN in the wider area, within a 5km radius, returned negative results (INCA, 2018).

There is suitable habitat for amphibians on site, breeding in the ponds and utilising the piles of rubble and wood for refugia.

Badger. Although, the open grassland on site provides suitable foraging habitat for Badger, however no foraging or digging signs were identified on site.

Bats. The buildings surrounding the site were assessed as having negligible roosting potential for bats (INCA, 2018). The water bodies and young woodland to the south of the site offer limited foraging opportunities only for bats, which would be limited to Common Pipistrelle.

Birds. A flock of approximately 200 Herring Gulls *Larus argentatus* were observed utilising the large pond in the north eastern corner of the site (National Grid Reference NZ 54486 21455) for bathing and a Moorhen *Gallinula chlorops* was present among the smaller pools. Single breeding territories of Lapwing *Vanellus vanellus* and Skylark *Alauda arvenis* were recorded on the proposed development site and in the surrounding area. Passerine birds were also noted in the surrounding area (INCA, 2018).

Surveys by Hartlepool Borough Council also noted the potential for the site to support several bird species including Lapwing, Herring Gull, Black-Headed Gull *Chroicocephalus ridibundus*, Skylark, Reed Bunting and Meadow Pipit *Anthus pratensis*. These birds were seen to be utilising the water bodies present on site and the shrub areas of suitable nesting and foraging habitats. The undisturbed open ground also offers suitable nesting opportunities for ground nesting birds.

All of these bird species are listed under Section 41 of the NERC Act (2006) as Species of Principal Importance, apart from Black-Headed Gull, Meadow Pipit and Moorhen. Lapwing, Herring Gull and Skylark are also red listed BoCC4.

Brown Hare. Two Brown Hare were seen on site during the field survey in May 2018 (INCA, 2018). Brown Hare was also seen during the site visit on the 13th November 2019. The grassland within the scrub on site provides suitable habitat for the creation of forms, whilst scrub species on site provide suitable foraging habitat.

Butterflies. There is potential for both Dingy Skipper *Erynnis tages* and Grayling to be present on site as there are foraging opportunities on Birds Foot Trefoil *Lotus corniculatus* and Red Fescue *Festuca rubra*. Surveys by Hartlepool Borough Council also noted the site had potential to support these species as well as Wall and Small Heath. Meadow brown *Maniola jurtina* and Common Blue *Polyommatus icarus* butterflies and Painted Ladies *Vanessa cardui* have also been recorded on site.

The widespread coverage of Buddleia on site would also provide foraging habitat for these NERC Act 2006 (Section 41) Species of Principal Importance.

Fish. No fish were noted in any of the ponds, most likely due to their ephemeral nature. Holme Beck, located south of the site, lacked suitable substrate for fish spawning and it is anticipated that will have been subject to pollution through leaching. Therefore, this was assessed as unsuitable for fish. There is, however, potential for fish to be present within the Tees Estuary.

Freshwater Pearl Mussel. Due to the poor water quality and lack of flow within Holme Beck, it was considered unsuitable for Freshwater Pearl Mussel as it is a filter-feeder.

Otters. Lutra lutra have been recorded at Dabholm Gut, Coatham Marsh and several locations north of the River Tees (INCA, 2018). Otters are known to occupy large home ranges; however, the habitats present on site offer negligible opportunities for foraging or resting and therefore Otters are unlikely to venture onto the site. No field signs, spraints or holts, were identified in any of the field surveys.

Reptiles. Basking reptiles may utilise the exposed hardstanding areas on site, particularly in the central part of the site around the blast furnace area. Areas of scrub will provide shaded areas for reptiles and areas of rubble, wood and earth will offer

suitable hibernacula. There is limited connectivity of suitable habitats for reptiles, due to the highly industrial nature of the area.

Water Vole. The closest current record of Water Vole *Arvicola amphibius* was returned from Spencer Beck, 2km south west (INCA, 2018). The site offers no suitable foraging or burrowing habitat for Water Vole. They are therefore unlikely to be present on site and no field signs were identified in any of the field surveys.

White-Clawed Crayfish. There is no suitable habitat for White-Clawed Crayfish on site due to the lack of running freshwater. Holme Beck, to the south, did not possess suitable substrate for use as refuges or suitable burrowing sites, due to its concrete lining. This species is considered to be absent from Cleveland.

Other mammals. Roe Deer *Capreolus capreolus* were noted during the site visit in November 2019. The site offers suitable foraging habitat in the shrub areas. No other mammal species were observed in any of the field surveys.

Invasive non-native species. INCA (2018) records a small number (<10) of Cotoneaster shrubs present across the Grangetown Prairie site. These includes Small-leaved Cotoneaster *Cotoneaster microphylla*, which is listed on Schedule 9 of the Wildlife & Countryside Act (1981) as a species which it would be illegal to cause to grow in the wild. No other Schedule 9 plant species were observed.

Air Quality and Habitats

Habitats are sensitive to deposition resulting in eutrophication and acidification. Deposition occurs both in the form of dry deposition and wet deposition. Dry deposition occurs when material is lost from the air through contact with solid surfaces, such as at the surface of the ground, thus reducing the airborne concentration of the pollutant. Wet deposition occurs when there is precipitation (rain, sleet, snow, etc.) and material is washed out of the air to the surface of the ground. With respect to wet deposition, Environment Agency (2011) states:

"It is considered that wet deposition of SO_2, NO_2 and NH_3 is not significant within a short range".

Therefore, the assessment only considers dry deposition of nutrient Nitrogen (N) compounds (i.e. NO_2 and NH_3), acidic Nitrogen (N) compounds and acidic Sulphur (S) compounds (i.e. SO_2). Sensitive habitats have declared critical loads. The Air Pollution Information Service (APIS) contains information on applicable critical loads for various habitats and species.

Eutrophication critical loads are given as a range and have units of kg N/ ha/yr. Generally, the lower end of the range should be used for a conservative assessment. The critical loads for acidification are more complicated, in that both N and S deposition fluxes must be considered at the same time. Therefore, a critical load function is specified for acidification, via the use of three critical load parameters:

- CLmaxS — the maximum critical load of S, above which the deposition of S alone would be considered to lead to an exceedence;
- CLminN — a measure of the ability of a system to "consume" deposited N (e.g. via immobilisation and uptake of the deposited N); and
- CLmaxN — the maximum critical load of acidifying N, above which the deposition of N alone would be considered to lead to an exceedence.

While reduced nitrogen dominate acid deposition in the UK, other compounds also contribute to acid deposition, e.g. hydrochloric acid (HCl) and hydrofluoric acid (otherwise known as hydrogen fluoride, HF), where appropriate these have been included in the assessment.

The critical loads used to assess the impact of compounds deposited to land which result in eutrophication and acidification are expressed in terms of kilograms of N deposited

per hectare per year (kg N/ha/yr) and kilo-equivalents H+ ions deposited per hectare per year (keq/ha/yr). The unit of 'equivalents' (eq) is used, rather than a unit of mass, for the purposes of assessing acidification from multiple species. The unit eq (1 keq ≡ 1,000 eq) refers to molar equivalent of potential acidity resulting from e.g. sulphur, oxidised and reduced N, as well as base cations. Essentially, it means 'moles of charge' and is a measure of how acidifying a particular chemical species can be.

Natural England has published records of site-specific critical loads for SPA, SAC and SSSI sites in England. The sites of interest for this assessment are locally designated sites (LNR and AW), therefore there are no site-specific critical loads. However, the APIS website does provide habitat-specific critical loads for use in impact assessment. The main habitats for the LNRs have been taken from the 'MAGIC' website managed by Natural England on behalf of the MAGIC partnership organisations. The critical loads used in this assessment are presented in Table 6-8 and Table 6-9.

Table 6-8 Nitrogen Critical Loads

Area	Habitat / Ecosystem	N Critical Load (CL) range (kg N/ha/yr)
Teesmouth and Cleveland Coast Ramsar/SPA/SSSI	Shifting coastal dunes	10-20
	Coastal stable dune grasslands - acid type	8-10
	Coastal stable dune grasslands - calcareous type	10-15
	Pioneer, low-mid, mid-upper saltmarshes	20-30
North York Moor SAC	Raised and blanket bogs	5-10
	Northern wet heath: Erica tetralix dominated wet heath	10-20
	Dry heaths	10-20

Table 6-9 Habitat Critical Loads

Area	Habitat / Ecosystem	Acidity $CL_{min}N$-$CL_{max}N$ (keq /ha/yr)	Acidity $CL_{max}S$ (keq /ha/yr)
Teesmouth and Cleveland Coast Ramsar/SPA/SSSI	Acid grassland	MinCLminN: 0.223 | MaxCLminN: 0.438 MinCLMaxN: 1.998 | MaxCLMaxN: 4.508	MinCLMaxS: 1.56 | MaxCLMaxS: 4.07
	Calcareous grassland	MinCLminN: 0.856 | MaxCLminN: 1.071 MinCLMaxN: 4.856 | MaxCLMaxN: 5.071	CLmaxS: 4
North York Moor SAC	Bogs	MinCLminN: 0.321 | MaxCLminN: 0.321 MinCLMaxN: 0.504 | MaxCLMaxN: 0.705	MinCLMaxS: 0.183 | MaxCLMaxS: 0.384
	Dwarf shrub heath	MinCLminN: 0.499 | MaxCLminN: 1.25 MinCLMaxN: 0.792 | MaxCLMaxN: 4.962	MinCLMaxS: 0.15 | MaxCLMaxS: 4.07

Future Baseline

Scrub is likely to continue to develop across the site. This will decrease the ecological value of the site as the open grassland, which is attractive to a range of butterflies, will be lost

6.5 Impacts during construction

It is assumed that Zone B (Area of Archaeological Interest will not be subject to enabling works). A Zone of Influence (ZoI) of 10km was judged to be suitable in line with Defra air emissions guidance.

A Habitats Regulations Screening Assessment was undertaken to assess the impacts of the proposed facility on European statutory designated sites (JBA, 2019) and is provided in Volume 3.

6.5.1 Impacts on Statutory and Non-statutory Sites

Six European designated sites within the ZoI were considered for the assessment. These were the Teesmouth and Cleveland Coast SPA, proposed SPA (pSPA), Ramsar and proposed Ramsar (pRamsar), and North York Moors SAC and SPA. The HRA was based on the available information relating to the outline planning application for the facility construction.

No Likely Significant Effects (LSE) on the Teesmouth and Cleveland Coast SPA, pSPA, Ramsar and pRamsar were identified in the Screening Study (Volume 3). No hazards were assessed to produce a LSE on the North York Moors SAC and SPA.

Three major infrastructure projects listed on the Planning Inspectorate website were identified that could have potential in-combination effects on the designated sites: Tees Combined Cycle Power Plant (CCPP), York Potash Harbour Facilities Order and Teesside

Cluster Carbon Capture and Usage project. The latter is currently in the early stages of planning, therefore it is difficult to assess potential in-combination effects from this project. The CCPP and Potash Facilities have both been granted a Development Consent Order. No likely significant effects were identified from the CCPP project alone, however it is still anticipated that there could be likely significant in-combination effects. Likely significant effects were noted for the Potash Facilities.

The HRA Screening Assessment concluded that in the absence of mitigation, the project will have likely significant effects both alone and in-combination on the Teesmouth and Cleveland Coast SPA, pSPA, Ramsar and pRamsar. As a result, the HRA process was required to proceed to an Appropriate Assessment. This will be undertaken during detailed design / reserve matter stage.

The Teesmouth and Cleveland Coast SSSI bird features will be subject to the same adverse impacts as the other European designated sites both during construction and decommissioning, and works will be subject to the submission of a SSSI assent application to Natural England.

No non-statutory sites or locally designated wildlife sites were identified within 2km of the development site. It is not anticipated that there will be any adverse impacts on any non-statutory sites further than 2km from the site.

6.5.2 Impact on Habitats

Several Tees Valley Local Biodiversity Action Plan and NERC Act 2006 (Schedule 41) Habitats of Principal Importance recorded that will be lost as part of the construction of the facility. Ponds and open mosaic habitats on previously developed land are present throughout the development site.

During decommissioning, habitat will not be impacted through direct habitat loss. Early successional species will naturally recolonise the area surrounding the decommissioned facility, or if it is to be demolished, the footprint of the building. Given time, the habitat is predicted to return to the pre-development state. Habitats will be impacted in the following ways during construction of the facility.

Open Mosaic Habitat on previously developed land. Areas of open mosaic habitat will be lost within the footprint of the works during the construction.

Ponds. Ponds will be lost within the footprint of the works as a result of the construction of the facility. These ponds have been assessed as having some ecological value for Common Toad and newts, however a lack of diversity within the ponds is evident.

Scrub. Areas of scrub will be lost as part of the construction of the facility. Scrub species such as Sea Buckthorn, Buddleia, Birch and Willow make up the scrub habitat on site. Adverse impacts upon the remaining scrub habitat post construction is anticipated from the potential introduction of invasive non-native species during construction.

Woodland. Areas of woodland are located within the Biodiversity area and may be lost to provide more preferable ecological enhancements, as the woodland is young and offers limited potential for protected species other than birds.

Earth bank. The earth bank will be lost as part of the construction of the facility; however, this habitat is of low ecological value.

Hardstanding. Areas of hardstanding may be lost as a result of construction of the facility; however, this habitat is of low ecological value.

Running Water. Releases of contaminants from vehicles into Holme Beck during the construction of the facility is possible. Accidental releases of contaminants into the watercourse may impact upon the water quality.

Non-Native Invasive Species. Other areas may be impacted by the spread of invasive non-native species. Small-leaved Cotoneaster has been recorded adjacent to the site and has the potential to be spread by construction activities. It may colonise new areas

and out-compete native plant species. Although not an invasive non-native species, Sea Buckthorn was prolific on site and may be spread as part of the proposed works. The species may choke out other species if allowed to spread throughout the site. Table 6-10 provides a summary of the habitat loss across the proposed development site.

Table 6-10 Estimated habitat losses

Habitat Classification	Area on site	Area Lost (%)
Open mosaic habitat on previously developed land	24.37ha	17.51ha (71%)

6.5.3 Impacts on Species

Direct impacts to species using the development site will be associated with loss of habitat used by the species and disturbance during the construction / decommissioning of the facility.

Indirect impacts to species are anticipated from air pollution through increased vehicle movements and release of compounds into the water environment.

There are no impacts on European protected species anticipated. Summaries of the impact status associated with each species is included below.

Amphibians. Amphibians will be impacted by direct habitat loss of rubble and wood piles and disturbance during construction works. Common Toad is evident from the recording of tadpoles in all areas of standing water present during the 2018 INCA survey. eDNA testing completed in 2017 produced a negative result for Great Crested Newt (GCN) and no populations of GCN have been recorded within 5km of the site. It is not expected that GCN will be impacted as a result of the works. Impacts to these species will result from direct habitat loss and disturbance during the construction works. Piles of rubble and wood provide suitable hibernacula for the species and ponds provide good breeding areas.

Badger. The open grassland on site provides suitable foraging habitat for Badger, however no foraging or digging signs were identified on site. It is not anticipated that this species will be adversely impacted by the works.

Bats. No trees or buildings either within or adjacent to the site possessing potential for roosting bats were noted. Open habitat within the development site provides suitable foraging habitat for bats, therefore there is the potential for loss of foraging habitat. However, impacts on bats through the proposed development are assessed as negligible.

Birds. Impacts to bird species will include loss of ponds used by Herring Gull and Black-headed Gull, loss of shrubs used for nesting and foraging by passerine species and loss of undisturbed open ground suitable for supporting ground nesting birds. Skylark and Lapwing are the main ground nesting birds of concern as single breeding territories of these species were recorded on site during the 2018 INCA survey.

Increased vehicle movements as a result of the construction of the development will cause rises in air pollution and disturbance. Birds are particularly susceptible to air pollution which can cause a number of issues including reproductive problems. Therefore, air pollution could cause an adverse impact on birds on the site and the surrounding area.

Brown Hare. The grassland on site provides suitable habitat for the creation of forms, whilst scrub species on site provide suitable foraging habitat. Potential impacts on this species could occur through direct loss of habitat and disturbance during construction. Brown Hare have a large home range, therefore loss of habitat within the works footprint is not expected to cause a significant impact. Disturbance from construction will be

temporary and therefore is not assessed as causing a likely significant increase in disturbance levels combined with disturbance across the whole STDC site.

Butterflies. The site is likely to support a number of butterflies associated with brownfield sites. Among these are species listed under Schedule 41 of the NERC Act 2006 Species of Principal Importance, such as Grayling, Wall, Dingy Skipper and Small Heath. Impacts to butterfly species on site will be from loss of habitat, although no larval foodplants were identified within the footprint of the works.

Fish. The only watercourse on site is Holme Beck. Due to the contaminated nature of the water and the lack of suitable substrate within the channel, it is not expected that fish will be present on site. There may be indirect impacts on fish through accidental release of compounds into the water environment, however it is expected that embedded mitigation measures will be in place to prevent this occurrence.

Freshwater Pearl Mussel. As the ponds on site appear polluted and soils present are highly permeable, it is anticipated that the Holme Beck will have been subject to pollution through leaching. The poor water quality and lack of flow within the Holme Beck was considered unsuitable for Freshwater Pearl Mussel due to the species filter feeding habits.

Otter. The only watercourse noted on site was Holme Beck. This was a small channel running along the west side of the 'Grangetown Prairie'. The majority of the watercourse was lined by concrete and possessed low ecological value as only a very small section of the bank remained in a vegetated state. No impact from the works on Otter is anticipated due to the lack of suitable habitat on site.

Reptiles. Exposed concrete areas suitable for basking reptiles were recorded throughout the site. These were mainly concentrated in the central part of the site around the blast furnace area. Areas of scrub will provide shaded areas for reptiles and areas of rubble, wood and earth will provide suitable hibernacula.

Despite this, it is not expected that reptiles will be present on site due to the isolation of the brownfield habitat on site from other surrounding habitats. The nearest record for reptiles is approximately 1km away. Impacts on reptiles are expected to be negligible, however some minimal mitigation measures shall be put in place for reptiles, in case of the unlikely event of encountering them on site.

Water Vole. As with Otter, there is no suitable habitat on site as Holme Beck is mainly concrete lined. No impacts on this species is anticipated as a result of the works.

White-clawed Crayfish. Holme Beck did not possess suitable substrate for use as refuges by White-clawed Crayfish. This species is considered to be absent from Cleveland.

Other mammals. Mammal species may utilise the area in a transient manner and therefore no adverse construction impacts are anticipated as they are able to translocate into the surrounding areas.

6.6 Impacts During Operation

Impacts during operation were assessed in conjunction with construction / decommissioning impacts within the HRA Screening Assessment. Impacts pathways are anticipated to be similar to the construction phase.

6.6.1 Impacts on Statutory and Non-statutory Sites

During the operation phase, likely significant effects from four potential hazards were identified during the HRA Screening Assessment. These are as follows:

- Introduction of synthetic compounds
- Introduction of non-synthetic compounds

- Introduction of Invasive Non-native Species
- Air pollution

All of the hazards were identified as likely significant effects on the Teesmouth and Cleveland Coast SPA, pSPA, Ramsar and pRamsar. No hazards were assessed to produce a likely significant effect on the North York Moors SAC and SPA.

No non-statutory sites or locally designated wildlife sites were identified within 2km of the development site. It is not anticipated that there will be any adverse impacts on any non-statutory sites further than 2km from the site.

6.6.2 Impacts on Habitats

Habitats surrounding the constructed facility will be impacted in the following ways during the operation of the facility.

Open Mosaic Habitat on previously developed land. Any open mosaic habitat remaining after construction will remain untouched during the operation of the facility. The planned biodiversity area will aim to maintain brownfield connectivity throughout the Grangetown Prairie site.

In the event of an accidental release of compounds, it is not anticipated that the brownfield habitat will be impacted due to the already contaminated nature of the soils on site.

Ponds. Remaining ponds will only be impacted in the event of an accidental release of compounds. Existing ponds on site already show a lack of diversity due to contamination from previous development on the site, so impacts are not expected to be severe.

Scrub. Scrub species such as Sea Buckthorn, Buddleia, Birch *Betula sp.* and Willow sp. *Salix sp.* make up the scrub habitat on site. Remaining scrub after construction will be concentrated within the biodiversity and heritage area planned for the south-west corner of the works footprint. Adverse impacts upon the remaining scrub habitat are anticipated from the potential introduction of invasive non-native species and pollution. Any additional pollution whether in the soil or airborne is not expected to cause an adverse impact upon the scrub habitat due to the lack of sensitivity of the existing species to pollution evident from the species naturally colonising the already polluted area.

Running Water. Releases of contaminants into Holme Beck are not anticipated as part of the operation of the facility. Accidental releases of compounds into the watercourse may impact upon the water quality.

6.6.3 Impacts on Species

Direct impacts to species through disturbance are anticipated during the operation of the facility.

Indirect impacts to species are anticipated from air pollution through increased vehicle movements and release of compounds into the water environment.

There are no impacts on European protected species anticipated. Summaries of the impact status associated with each species is included below.

Amphibians. Impacts on amphibians are not anticipated during the operation of this facility. Ponds on site were found not to be used by GCN following eDNA surveys testing negative in 2017. It is not expected that GCN will be impacted as a result of the facility operation.

Badger. The operation of the facility is not anticipated to adversely impact upon this species.

Bats. The facility is anticipated to be in operation 24 hours a day with waste deliveries between 7am and 3pm. There may be impacts upon both foraging and commuting bats through night-time lighting.

Birds. Increased vehicle movements as a result of the transport of waste to and from the facility during operation will cause rises in air pollution and disturbance. Birds are particularly susceptible to air pollution which can cause a number of issues including reproductive problems. Therefore, air pollution could cause an adverse impact on birds on the site and the surrounding area.

Brown Hare. Impacts on this species during operation of the facility are expected to be from disturbance. Disturbance will mainly be caused by vehicle movements during waste deliveries and shift changes, however it is not anticipated that levels of disturbance will rise above existing levels present in other areas of the STDC site.

Butterflies. Impacts on butterflies are not anticipated during the operation of the facility.

Fish. Accidental release of compounds into the watercourse as a result of the operation of the facility may cause impacts on any fish in the watercourse by increasing levels of contaminants.

Freshwater Pearl Mussel. Holme Beck is not considered suitable for Freshwater Pearl Mussel due to low water quality, therefore impacts upon this species are unlikely during the operation of the facility.

Otter. The Holme Beck is assessed as being unsuitable for Otter, therefore no impact from the operation of the facility on Otter is anticipated due to the lack of suitable habitat on site.

Reptiles. It is not expected that reptiles will be present on site, therefore impacts on reptiles are assessed as negligible from the operation of the facility.

Water Vole. As with Otter, there is no suitable habitat on site, therefore no impacts on this species is anticipated as a result of the facility operation.

White-clawed Crayfish. Holme Beck is assessed as having low suitability for White-clawed Crayfish, This species is considered to be absent from Cleveland, therefore impacts upon this species are not anticipated during the operation of the facility.

Other mammals. No operational impacts on other mammal species are anticipated.

Impacts during all stages of the development are summarised on Figure 6-4.

6.7 Mitigation

Mitigation measures for impacts on species and habitats of concern during construction and decommissioning are given in the following sections. It is recommended that surveys are conducted prior to decommissioning of the facility and a revised Environmental Management Plan is prepared.

Construction operations will be managed through the preparation of a Construction Environmental Management Plan (CEMP). This document will be prepared by the Principal Contractor and implement the Environmental Commitments stated in Chapter 15.

To prevent impacts from the spread of invasive non-native species, site staff shall use standard biosecurity measures following the check-clean-dry procedure. More information can be found at: www.nonnativespecies.org/checkcleandry.

Mitigation measures shall be implemented prior to the construction phase to ensure that water quality is not adversely affected through pollution incidents and the release of contaminants from the site. This will involve implementation of embedded mitigation to prevent the release of compounds from the facility and the implementation of appropriate pollution prevention measures e.g. CIRIA Guidance: Control of water

pollution from construction sites. Guidance for consultants and contractors (C532D) (Masters-Williams, 2001). Other information useful for working near water and pollution prevention can be found at:

https://www.ciria.org/Resources/All_toolbox_talks/Env_toolbox_talks/Working_on_or_near_watercourses.aspx [site accessed 3rd December 2019]

Proposed mitigation is summarised on Figure 6-5.

6.7.1 Mitigation during construction

Habitats

An area of approximately 7ha will be safeguarded, enhanced and managed for the lifetime of the facility as a designated biodiversity area.

Several ponds will be created in the designated biodiversity area and managed for the lifetime of the facility. These will be integrated with the attenuation areas and designed for wildlife benefit.

Species

Bats. Night working is unlikely to be required. If unavoidable, use minimal lighting fitted to directional cowls to reduce the impact on foraging and commuting nocturnal mammals.

Birds. Initial mitigation in the form of pre-construction checks for breeding birds shall be undertaken. Any vegetation clearance required to permit works and access should be carried out outside of the bird breeding season (i.e. avoiding March to September inclusive). If works are proposed for the bird breeding season, or if following initial clearance, it becomes apparent that some further de-vegetation is necessary during the bird breeding season, an experienced ecologist should first check all areas for the presence of nesting birds. Should any nests be found, they should have an appropriate exclusion zone put in place, if possible, to safeguard the nests until the chicks have successfully fledged.

Butterflies. Butterflies will be safeguarded within the designated biodiversity area.

Amphibians. Suitable breeding habitat will be available for this species within the biodiversity area and should provide enough mitigation for the loss of ponds within the works footprint. Artificial refuges could be created to provide replacements for valuable piles of rubble which will most likely be moved as part of the works.

Reptiles. Suitable breeding habitat will be available for this species within the biodiversity area and will provide enough mitigation for the loss of habitat within the works footprint.

6.7.2 Mitigation of Operational Effects

Mitigation measures for impacts on species and habitats during operation are given in the following sections. The scheme EAP will include management and monitoring for the new habitats to provide information on establishments and habitat development during the operational stage.

Habitats. To prevent the spread of invasive non-native species, it is recommended that the patch of Small-leaved Cotoneaster is removed from adjacent to the site to reduce the likelihood of future maintenance works spreading the plant around the site and taking the plant off site.

It is assumed that embedded mitigation measures will be included within the detailed design of the facility that incorporate appropriate pollution prevention measures to safeguard the unlikely event of an accidental release of potential contaminants into the surrounding environment.

Bats. As the facility is in operation 24 hours a day, street lighting will be in operation during night-time hours. Minimal lighting fitted to directional cowls shall be used to reduce the impact on foraging and commuting nocturnal mammals.

Birds. It is assumed that embedded mitigation will be incorporated into the facility design to ensure that safety measures are in place should an accidental release occur from the facility during operation.

6.7.3 Ecological Enhancement

Ecological enhancements will be included within the design of the biodiversity area. As the loss of habitat from the development is unavoidable, as part of the outline design of the development, there are plans to keep a biodiversity area within the south-east corner of the site to mitigate for the loss of ponds and open mosaic habitats on previously developed land. It is hoped this area will also aid in ensuring that habitat connectivity is preserved in combination with other areas of brownfield habitat within the overall STDC site. The biodiversity area will include a number of enhancements aimed to provide mitigation for the development and improve the availability of valuable habitat across the STDC site.

The creation of ponds was considered as part of mitigation for loss of ponds within the footprint of the facility, however this form of mitigation was considered ill-suited to the existing habitat. The aim of creating the ponds would be to create suitable habitat for newts, toads and other species, however, it is evident that the soil on site is highly permeable, therefore created ponds would require lining with an impermeable material to be made more permanent. Lined ponds would not provide the habitat required for newts as submerged vegetation suitable for egg-laying would be unable to penetrate the lining.

The alternative solution to ponds involves the creation of reedbeds to aid in the attenuation of water. This is assessed as a more suitable mitigation option for the loss of ponds, providing good habitat for birds and amphibians. The reedbeds wil also useful for trade waste effluents in the case of accidental discharge from the facility.

The biodiversity area will be improved by integrating the biodiversity area and heritage area to increase the size of the biodiversity area whilst still conserving the heritage assets. Natural colonisation of the heritage area is suggested after placing material from the footprint of the works on the archaeological remains to help create more brownfield habitat as any anthropogenic intervention through planting of trees etc. may impact upon the heritage assets. Planting of shallow rooting grassland plants is also an option.

Other enhancements within the area will include the creation of artificial refuges for amphibians and reptiles to mitigate the loss of valuable hibernacula present within the works footprint and the planting of seed mixes containing Common Bird's Foot Trefoil *Lotus corniculatus* and Red Fescue *Festuca rubra* to provide larval food plants for brownfield butterfly species such as Grayling and Dingy Skipper. This is with a view to developing brownfield grassland within the area.

All mitigation and enhancement options will use the existing available low-quality soil on site to aid in preserving the habitat types on site. Any soil removed to create foundations for the facility will be used elsewhere on the site as it is not considered appropriate to remove soil from the site due to its contaminated nature.

6.8 Residual Impacts

Following detailed surveys of the development and application of the appropriate mitigation following the mitigation hierarchy, no significant residual impacts are predicted during construction, operation or decommissioning of the project.

Table 6-11 Summary of ecological resource impacts

Ecological Resource	Impact	Importance of Feature	Impact without Mitigation	Mitigation	Significance of Effects of Residual Impacts
During Construction and Decommissioning					
Designated sites					
Teesmouth and Cleveland Coast SPA / pSPA	Introduction of synthetic and non-synthetic compounds	International: The SPA / pSPA is designated for a number of Annex I and Annex II bird species during breeding, passage and wintering. This also includes a waterfowl assemblage of over 20,000 individuals.	No LSE Accidental releases of compounds from vehicles into Holme Beck may impact upon the water quality of the Tees Estuary.	Implementation of appropriate pollution prevention measures e.g. CIRIA guidance: Control of water pollution from construction sites. Guidance for consultants and contractors (C532D).	No significant effect from residual impacts.
	Introduction of Invasive Non-native Species	As above	No LSE Small-leaved Cotoneaster lies adjacent to the site. Spread of this species is possible which may result in out-competing of native plant	Mitigation shall include appropriate	No significant effect from residual impacts.
	Air pollution	As above	No LSE Increased vehicle movements causing increases in air pollution which, in turn, may cause bird health issues.	Levels of traffic within the area are already very high due to the industrial nature of the site, however efforts shall be made to limit vehicle movements where possible.	No significant effect from residual impacts.

Ecological Resource	Impact	Importance of Feature	Impact without Mitigation	Mitigation	Significance of Effects of Residual Impacts
Teesmouth and Cleveland Coast Ramsar / pRamsar	Introduction of synthetic and non-synthetic compounds	International: The Ramsar / pRamsar qualifies under Ramsar Criterion 5 and 6: Criterion 5 – A wetland should be considered internationally important if it regularly supports 20,000 or more water birds; Criterion 6 – A wetland should be considered internationally important if it regularly supports 1% or more of the individuals in a population of the following bird species, in any season: Knot *Calidris canutus islandica*, Redshank *Tringa totanus totanus* and Sandwich Tern *Sterna sandvicensis*.	No LSE Accidental releases of compounds from vehicles into Holme Beck may impact upon the water quality of the Tees Estuary.	Implementation of appropriate pollution prevention measures e.g. CIRIA guidance: Control of water pollution from construction sites. Guidance for consultants and contractors (C532D).	No significant effect from residual impacts.
	Air pollution	As above	Increased vehicle movements causing increases in air pollution which, in turn, may cause bird health issues.	Levels of traffic within the area are already very high due to the industrial nature of the site, however efforts shall be made to limit vehicle movements where possible.	No significant effect from residual impacts.
	Introduction	As above	No LSE	Mitigation shall include	No significant effect

Ecological Resource	Impact	Importance of Feature	Impact without Mitigation	Mitigation	Significance of Effects of Residual Impacts
	of Invasive Non-native Species		Small-leaved Cotoneaster lies adjacent to the site. Spread of this species is possible which may result in out-competing of native plant species.	appropriate biosecurity measures. These shall follow the Check-Clean-Dry biosecurity procedure ensuring that all PPE and equipment is cleaned before leaving site.	from residual impacts.
North York Moors SPA	No adverse impacts on the qualifying features anticipated as part of the works.				
North York Moors SAC	No adverse impacts on the qualifying features anticipated as part of the works.				
Habitats					
Open Mosaic Habitat on previously developed land	Habitat loss	National: The brownfield habitat provides valuable habitat for Brown Hare and ground nesting birds.	Loss of valuable for ground nesting Lapwing and Skylark as well as the home range of Brown Hare.	Replacement habitat to be provided before construction starts to allow species to move into this area when displaced.	No significant effect from residual impacts.
	Introduction of invasive non-native species	National: The brownfield habitat provides valuable food plants for invertebrates.	Small-leaved Cotoneaster lies adjacent to the site. Spread of this species is possible which may result in out-competing of native plant species.	Mitigation shall include appropriate biosecurity measures. These shall follow the Check-Clean-Dry biosecurity procedure ensuring that all PPE and equipment is cleaned before leaving site.	No significant effect from residual impacts.
Ponds	Habitat loss	Local: Ponds provide valuable breeding habitat for Common	Loss of newt and Common Toad breeding habitat.	Scrapes will be created within the designated biodiversity area which	No significant effect from residual impacts.

Ecological Resource	Impact	Importance of Feature	Impact without Mitigation	Mitigation	Significance of Effects of Residual Impacts
		Toad and newts.	Known population of breeding Common Toad on site.	may be able to hold water and provide suitable habitat for breeding Common Toad and newt.	
Scrub	Habitat loss	Local: Scrub areas provide opportunities for nesting and foraging.	Loss of scrub habitat used by birds and Brown Hare.	The planned biodiversity area is expected to offset any valuable scrub habitat lost.	No significant effect from residual impacts.
Woodland	Habitat loss	National: Woodland areas provide opportunities for nesting and foraging and shelter refuge for amphibians.	Loss of scrub habitat	The planned biodiversity area is expected to offset any valuable scrub habitat lost.	No significant effect from residual impacts.
Running Water	Introduction of synthetic and non-synthetic compounds	Less than Local: Holme Beck is the only watercourse on site. It was not assessed to be suitable for species likely to be impacted by the works, however it has the potential to discharge into the Tees Estuary. NB Holme Beck is culverted.	Accidental releases of compounds from vehicles into the watercourse may impact upon the water quality.	Implementation of appropriate pollution prevention measures e.g. CIRIA guidance: Control of water pollution from construction sites. Guidance for consultants and contractors (C532D).	No significant effect from residual impacts.
Species					
Badger	No adverse impacts on Badger are anticipated as part of the works.				

Ecological Resource	Impact	Importance of Feature	Impact without Mitigation	Mitigation	Significance of Effects of Residual Impacts
Bats	No adverse impacts on Bats are anticipated as part of the works.				
Birds – Nesting	Visual, noise and vibration disturbance	Local: Area provides valuable habitat for birds in the form of ponds used for loafing, shrubs used for nesting / foraging and undisturbed open ground suitable for ground nesting birds.	Increased vehicle movements causing displacement of bird species through disturbance.	Replacement habitat to be provided before construction starts to allow species to move into this area when displaced.	No significant effect from residual impacts.
	Habitat loss	As above	Loss of ponds, shrubs and open ground causing a decrease in available habitat for foraging and nesting.	As birds are fairly mobile, it is not anticipated that adverse impacts will be significant, however the planned biodiversity area is expected to offset any habitat loss that may impact upon bird populations using the site.	No significant effect from residual impacts.
	Air pollution	As above	Increased vehicle movements causing increases in air pollution which, in turn, may cause bird health issues.	Levels of traffic within the area are already very high due to the industrial nature of the site, however efforts shall be made to limit vehicle movements where possible. This could include making sure waste delivery vehicles are at full	No significant effect from residual impacts.

Ecological Resource	Impact	Importance of Feature	Impact without Mitigation	Mitigation	Significance of Effects of Residual Impacts
				capacity before coming to the site.	
Brown Hare	Disturbance	Local: The site is estimated to be within the home range of two Brown Hare. Grassland suitable for forms and scrub species suitable for foraging.	Temporary disturbance causing displacement from construction.	Replacement habitat to be provided before construction starts to allow species to move into this area when displaced.	No significant effect from residual impacts.
	Habitat loss		Loss of foraging and sheltering habitat.	No mitigation required as loss of only small amount of habitat within Brown Hare range. The provision of habitat within the biodiversity area is expected to be enough to offset the small loss of habitat.	No significant effect from residual impacts.
Butterflies	Habitat loss	Local: The site is likely to support a number of brownfield sites such as Grayling and Dingy Skipper.	Loss of foraging habitat, however no larval foodplants identified within footprint of works.	The planned biodiversity area is expected to offset any habitat loss that may impact upon butterfly populations using the site.	No significant effect from residual impacts.
Amphibians	Disturbance	Less than Local: Piles of rubble, wood and soil provide good hibernacula. Ponds provide suitable breeding habitat.	Temporary displacement from disturbance during construction.	Replacement habitat to be provided before construction starts to allow species to move into this area when displaced.	No significant effect from residual impacts.
	Habitat loss	Local: Loss of ponds	Loss of habitat	Provision of replacement	No significant effect

Ecological Resource	Impact	Importance of Feature	Impact without Mitigation	Mitigation	Significance of Effects of Residual Impacts
		and breeding sites (see Ponds)	valuable for breeding and hibernating.	scrapes that could be used for breeding, plus the creation of artificial hibernacula.	from residual impacts.
Fish	Introduction of synthetic and non-synthetic compounds	Less than Local: Holme Back may provide habitat for fish. NB Holme Beck is culverted.	Indirect impacts to fish through accidental release of compounds into the watercourse.	Implementation of appropriate pollution prevention measures e.g. CIRIA guidance: Control of water pollution from construction sites. Guidance for consultants and contractors (C532D) (Masters-Williams, 2001).	No significant effect from residual impacts.
Freshwater Pearl Mussel	No adverse impacts on Freshwater Pearl Mussel are anticipated as part of the works.				
Great Crested Newt	No adverse impacts on Great Crested Newt are anticipated as part of the works.				
Otter	No adverse impacts on Otter are anticipated as part of the works.				
Reptiles	Habitat loss and disturbance	Less than Local: The plot is considered to be largely unsuitable for reptiles.	Loss of some basking, shade and hibernaculum habitat.	Creation of artificial hibernacula suitable for reptiles. Basking surfaces and scrub species that provide shade are available as existing habitat within the biodiversity and heritage area.	No significant effect from residual impacts.
Water Vole	No adverse impacts on Water Vole are anticipated as part of the works.				

Ecological Resource	Impact	Importance of Feature	Impact without Mitigation	Mitigation	Significance of Effects of Residual Impacts
White-clawed Crayfish	No adverse impacts on White-clawed Crayfish are anticipated as part of the works.				
Other mammals	No adverse impacts on other mammal species are anticipated as part of the works.				
During Operation					
Designated Sites					
Teesmouth and Cleveland Coast SPA / pSPA	Introduction of synthetic and non-synthetic compounds	International: The SPA / pSPA is designated for a number of Annex I and Annex II bird species during breeding, passage and wintering. This also includes a waterfowl assemblage of over 20,000 individuals.	No LSE Accidental releases of compounds from the facility into Holme Beck may impact upon the water quality of the Tees Estuary.	It is expected that embedded mitigation measures will be in place to prevent impacts on the designated site from an accidental release of compounds.	No significant effect from residual impacts.
	Introduction of Invasive Non-native Species	As above	No LSE Small-leaved Cotoneaster lies adjacent to the site. Spread of this species is possible which may result in out-competing of native plant species.	Mitigation shall include appropriate biosecurity measures. These shall follow the Check-Clean-Dry biosecurity procedure ensuring that all PPE and equipment is cleaned before leaving site. To prevent the spread of the Small-leaved Cotoneaster, it is recommended that it is removed from adjacent to the site to reduce the likelihood of vehicles	No significant effect from residual impacts.

Ecological Resource	Impact	Importance of Feature	Impact without Mitigation	Mitigation	Significance of Effects of Residual Impacts
				spreading the plant around the site and taking the plant off site.	
	Air pollution	As above	No LSE Increased vehicle movements causing increases in air pollution which, in turn, may cause bird health issues. There is also the potential for the accidental release of pollutants from the facility.	Embedded mitigation measures are expected to be incorporated into the design of the facility to mitigate accidental releases. Levels of traffic within the area are already very high due to the industrial nature of the site, however efforts shall be made to limit vehicle movements where possible. This could include making sure waste delivery vehicles are at full capacity before coming to the site.	No significant effect from residual impacts.
Teesmouth and Cleveland Coast Ramsar / pRamsar	Introduction of synthetic and non-synthetic compounds	International: The Ramsar / pRamsar qualifies under Ramsar Criterion 5 and 6: Criterion 5 – A wetland should be considered internationally important if it regularly supports 20,000 or more water birds;	No LSE Accidental releases of compounds from the facility into Holme Beck may impact upon the water quality of the Tees Estuary.	It is expected that embedded mitigation measures will be in place to prevent impacts on the designated site from an accidental release of compounds.	No significant effect from residual impacts.

Ecological Resource	Impact	Importance of Feature	Impact without Mitigation	Mitigation	Significance of Effects of Residual Impacts
		Criterion 6 – A wetland should be considered internationally important if it regularly supports 1% or more of the individuals in a population of the following bird species, in any season: Knot *Calidris canutus islandica*, Redshank *Tringa totanus totanus* and Sandwich Tern *Sterna sandvicensis*.			
	Introduction of Invasive Non-native Species	As above	No LSE Small-leaved Cotoneaster lies adjacent to the site. Spread of this species is possible which may result in out-competing of native plant species.	Mitigation shall include appropriate biosecurity measures. These shall follow the Check-Clean-Dry biosecurity procedure ensuring that all PPE and equipment is cleaned before leaving site. To prevent the spread of the Small-leaved Cotoneaster, it is recommended that it is removed from adjacent to the site to reduce the likelihood of vehicles spreading the plant around the site and taking the plant off site.	No significant effect from residual impacts.

Ecological Resource	Impact	Importance of Feature	Impact without Mitigation	Mitigation	Significance of Effects of Residual Impacts
	Air pollution	As above	No LSE Increased vehicle movements causing increases in air pollution which, in turn, may cause bird health issues. There is also the potential for the accidental release of pollutants from the facility.	Embedded mitigation measures are expected to be incorporated into the design of the facility to mitigate accidental releases. Levels of traffic within the area are already very high due to the industrial nature of the site, however efforts shall be made to limit vehicle movements where possible. This could include making sure waste delivery vehicles are at full capacity before coming to the site.	No significant effect from residual impacts.
North York Moors SPA	No adverse impacts on the qualifying features anticipated as part of the works.				
North York Moors SAC	No adverse impacts on the qualifying features anticipated as part of the works.				
Habitats					
Open Mosaic Habitat on previously developed land	Creation of c. 8ha of Habitat of Principal Importance	National: This is a Tees Valley Local Biodiversity Action Plan Habitat and a NERC Act 2006 (Section 41) Habitat of Principal Importance, listed as Open Mosaic	Loss of Habitat of Principal Importance.	Habitat creation with management plan.	Large Positive Impact

Ecological Resource	Impact	Importance of Feature	Impact without Mitigation	Mitigation	Significance of Effects of Residual Impacts
		Habitats on Previously Developed Land.			
Ponds	Introduction of synthetic and non-synthetic compounds	Local: Ponds provide valuable breeding habitat for Common Toad and newts.	Contamination of newt and Common Toad breeding habitat. Known population of breeding Common Toad on site.	It is expected that embedded mitigation measures will be in place to prevent impacts on the ponds from an accidental release of compounds.	No significant effect from residual impacts.
Ponds	Creation of new ponds within the BNG area	Local: Ponds are an important element of the local ecology and provide links and ecological networks for the surrounding area.	Loss of wet	Habitat creation with management plan.	Moderate Positive Impact
Scrub	Introduction of invasive non-native species	Local: Scrub areas provide opportunities for nesting and foraging.	Small-leaved Cotoneaster lies adjacent to the site. Spread of this species is possible which may result in out-competing of native plant species.	Mitigation shall include appropriate biosecurity measures. These shall follow the Check-Clean-Dry biosecurity procedure ensuring that all PPE and equipment is cleaned before leaving site. To prevent the spread of the Small-leaved Cotoneaster, it is recommended that it is removed from adjacent to the site to reduce the likelihood of vehicles spreading the plant	No significant effect from residual impacts.

Ecological Resource	Impact	Importance of Feature	Impact without Mitigation	Mitigation	Significance of Effects of Residual Impacts
				around the site and taking the plant off site.	
Running Water	Introduction of synthetic and non-synthetic compounds	Less than Local: Holme Beck is the only watercourse on site. It was not assessed to be suitable for species likely to be impacted by the works, however it has the potential to discharge into the Tees. NB Holme Beck is culverted.	Accidental releases of compounds from vehicles into the watercourse may impact upon the water quality.	It is expected that embedded mitigation measures will be in place to prevent impacts on the watercourse from an accidental release of compounds.	No significant effect from residual impacts.
Species					
Amphibians	No adverse impacts are anticipated on Amphibians as a result of the operation of the facility.				
Badger	No adverse impacts are anticipated on Badger as a result of the operation of the facility.				
Bats	Visual disturbance	Local: Habitats surrounding the operating facility will include valuable foraging and commuting habitat for bats.	Disturbance impacts from night-time lighting as facility is in operation 24 hours a day.	Minimal lighting fitted to directional cowls shall be used to reduce the impact on foraging and commuting nocturnal mammals.	No significant effect from residual impacts.
Birds	Noise, visual and vibration disturbance	Local: Area provides valuable habitat for birds in the form of ponds used for loafing, shrubs used for nesting / foraging and	Increased vehicle movements causing displacement of bird species through disturbance.	As birds are fairly mobile, it is not anticipated that adverse impacts will be significant. Habituation to the disturbance is	No significant effect from residual impacts.

Ecological Resource	Impact	Importance of Feature	Impact without Mitigation	Mitigation	Significance of Effects of Residual Impacts
		undisturbed open ground suitable for ground nesting birds.		likely to occur during operation of the facility.	
	Air pollution		Increased vehicle movements causing increases in air pollution which, in turn, may cause bird health issues. There is also potential for the accidental release of pollutants from the facility.	Embedded mitigation measures are expected to be incorporated into the design of the facility to mitigate accidental releases. Levels of traffic within the area are already very high due to the industrial nature of the site, however efforts shall be made to limit vehicle movements where possible. This could include making sure waste delivery vehicles are at full capacity before coming to the site.	No significant effect from residual impacts.
Brown Hare	Visual, noise and vibration disturbance	Local: The site is estimated to be within the home range of two Brown Hare. Grassland suitable for forms and scrub species suitable for foraging.	Disturbance during operation from increased vehicle movements.	As Brown Hare are fairly mobile, it is not anticipated that adverse impacts will be significant. Habituation to the disturbance is likely to occur during operation of the facility.	No significant effect from residual impacts.
Butterflies	Creation of c. 8ha of Habitat	National: This is a Tees Valley Local Biodiversity	Loss of Habitat of Principal	Habitat creation with management plan.	Large Positive Impact

Ecological Resource	Impact	Importance of Feature	Impact without Mitigation	Mitigation	Significance of Effects of Residual Impacts
	of Principal Importance will provide additional food plants for a range of nationally scare invertebrates.	Action Plan Habitat and a NERC Act 2006 (Section 41) Habitat of Principal Importance, listed as Open Mosaic Habitats on Previously Developed Land.	Importance.		
Fish	Introduction of synthetic and non-synthetic compounds	Less than Local: Holme Beck may provide habitat for fish. NB Holme Beck is culverted.	Indirect impacts to fish through accidental release of compounds into the watercourse.	It is expected that embedded mitigation measures will be in place to prevent impacts on the watercourse from an accidental release of compounds.	No significant effect from residual impacts.
Freshwater Pearl Mussel	No adverse impacts are anticipated on Freshwater Pearl Mussel as a result of the operation of the facility.				
Great Crested Newt	No adverse impacts are anticipated on Great Crested Newt as a result of the operation of the facility.				
Otter	No adverse impacts are anticipated on Otter as a result of the operation of the facility.				
Reptiles	No adverse impacts are anticipated on reptiles as a result of the operation of the facility.				
Water Vole	No adverse impacts are anticipated on Water Vole as a result of the operation of the facility.				
White-clawed Crayfish	No adverse impacts are anticipated on White-clawed Crayfish as a result of the operation of the facility.				
Other mammals	No adverse impacts are anticipated on other mammal species as a result of the operation of the facility.				

7 Landscape and Visual Impact

7.1 Introduction

This chapter presents the Landscape and Visual Impact Assessment (LVIA) for the proposed scheme. The LVIA aims to assess the effects of the proposal on both the landscape character and visual amenity. The assessment has involved the following key stages:

- Establishing the nature of the existing or 'baseline' landscape character and visual amenity of the determined study area.
- Determination of how the scheme will change the baseline landscape character and visual context, through consideration of specific landscape and visual 'receptors'
- Assessment and reporting of potential effects, with particular reference to those that are likely to be 'significant' and likely to be material to the planning decision-making process
- Identification of mitigation to reduce residual adverse effects

The Methodology for the LVIA is provided in Appendix D. All figures are provided in Volume 2.

7.1.1 Purpose of the Landscape and Visual Assessment

For the purposes of LVIA, a clear distinction is made between landscape and visual impacts as follows:

- **Landscape** impacts are those that may arise from the scheme on physical characteristics or components of the landscape which inform its character, such as landform, vegetation, water courses or perceptual influences.
- **Visual** impacts are those that relate to changes in the view that may arise from the scheme as experienced by specific 'receptors', such as local residents or users of footpaths.

'Residual' effects are those that are likely to remain once any mitigation has been incorporated (e.g. with new planting) and has become established.

Effects have been assessed at the following stages:

- **Construction**: which assumes a two-year programme of temporary, relatively short-term works
- **Operational effects at Year 0**, i.e. when the route opens, vegetation has yet to establish and assuming a worst-case 'winter' scenario of not being in leaf
- **Residual effects with mitigation at Year 15**, during the summer, which represents a 'best case' scenario where vegetation is sufficiently established and in full leaf

The process is supported by the use of viewpoints to illustrate and evaluate effects at key sites relevant to the proposal, but the assessment of effects is not confined to these viewpoints. Viewpoint photographs are show on 7-1, with viewpoint locations provided on 7-3

The LVIA also includes a review of planning and other policy relevant to landscape and visual considerations in the area, which has helped inform the scope of the study and the assessments.

7.1.2 Outline of Assessment Process

The assessment of landscape and visual effects has been prepared with reference to the following:

- *Guidelines for Landscape and Visual Impact Assessment*, 3rd edition (GLVIA3). The Landscape Institute and the Institute of Environmental Management and Assessment, 2013.
- *An Approach to Landscape Character Assessment*. Christine Tudor, Natural England, October 2014.
- *Visual Representation of Wind Farms.* Scottish Natural Heritage, December 2014.
- Landscape Institute Technical Guidance Note TGN 06/19 Visual Representation of development proposals, 2019.

7.1.3 Assessment Terminology

In order to determine the scale of effects, two key aspects should be established. These are the nature of the landscape or visual receptor likely to be affected, often referred to as its *sensitivity;* and the nature of the effect likely to occur, which is often referred to as the *magnitude* of the likely change. These two results are combined to form a judgement of the scale of the effect. Consideration of the scale of the effect then enables a judgement to be made as to whether the effect is significant.

A full methodology is provided in Appendix D. This methodology is broadly in line with the one that described in Chapter 5, the principal exception being the absence of a 'Very High' category for sensitivity and value; and differences in terminology for the magnitude of impact and the significance. For LVIA, significant effects arise for moderate-substantial and substantial effects.

7.1.4 Professional Judgement

GLVIA3 recognises that professional judgement is an important concept within LVIA. Whilst there is scope for quantitative measurements of some factors, in many situations the assessment must rely on qualitative judgements that are based on reasoned and informed justifications.

7.1.5 Assessment of Residential Receptors

The assessment of visual effects on residential receptors is an outline assessment only, it is not a detailed Residential Amenity Assessment.

7.1.6 Timing of Surveys

Surveys and fieldwork were carried out in November and December 2019 when deciduous trees were not in leaf. The effects of screening by vegetation were therefore low. Where deemed relevant, consideration of seasonal vegetation has been given within the assessment.

7.1.7 Glossary

Some of the terms used within the assessment have a specific meaning. A glossary of these terms is provided at the end of the Methodology section in Appendix D. The definitions are based on those provided within GLVIA 3.

7.1.8 Scheme Summary

For the purposes of this assessment, buildings have been estimated at a height of 50m, with the stack being between 80 metres in height. Planning elevations are provided in Appendix C.

Hard and soft landscaping will form part of the design of the site. Hard landscaping will be used for access roads, walkways and parking areas. Soft landscaping will include grass and vegetation, the full details to be dealt with by reserved matters.

7.1.9 Determining the Scope of the Study

The scope of the LVIA was defined through consultations with Redcar Borough Council, desk-based research, preparation of computer developed Zone of Theoretical Visibility (ZTV) and site visits. Key matters reviewed in determining the scope were:

- The extent of the study area.
- Sources of relevant landscape and visual information.
- The nature of the potential landscape and visual effects.
- The main receptors and any specific viewpoints.
- The extent and appropriate level of detail for the baseline studies to be proportionate to the scale and type of development proposed.
- Methods to be used in determining the significance of effects.
- Methods to be used for the production and presentation of any visualisations or photomontages.

7.1.10 Study Area and Zone of Theoretical Visibility

For the purposes of this report, the study area has been defined by the preparation of Zones of Theoretical Visibility (ZTVs) and by field observations. Due to the parameter and maximum heights provided, the ZTV's have been based on the broad parameters detailed above.

A 15km Study Area was selected for the visual assessment following preparation of the ZTV's and due to the height and mass of the main components of the proposed facility with a focus on viewpoints within 5km of the site. Following field studies, a focussed 5km study area will also be considered for the landscape assessment due to the nature of the baseline landscape character and the limited intervisibility between character areas. This was then discussed and agreed with RCBC.

7.1.11 Scoping and Consultation

A full record of the consultations carried out for the Environmental Assessment are detailed in the Planning and Design and Access Statement (Appendix C). The main consultations relevant to this chapter are noted below:

- Screening request issued Redcar Borough Council (RCBC) on 12th August 2019.
- Screening opinion received from RCBC on 21st August 2019, confirming that an Environmental Statement would be required.
- Scoping Letter issued to RCBC on 28th August 2019.
- Informal scoping opinion received from RCBC dated 11th September 2019, stating that:

  'one of the viewpoints should be from the Eston Hills, the point is taken about the nature of the immediate land urban form, if anything, one longer range viewpoint will illustrate the minimal impact of the development on the wider landscape.'

  Revised screening letter issued to Hartlepool Borough Council (HBC), 19th September 2019, suggesting a 15km study area for visual assessment and a 2km study area for Landscape assessment, with 6 photomontages suggested. It was suggested that one of the viewpoints should be taken from the Eston Hills.

Notification of alteration of the site location on 15th October 2019. Scoping response received from HBC on 23rd October 2019, including comments from Natural England stating that:

'3. Designated Landscapes and Landscape Character Landscape and visual impacts

Natural England would wish to see details of local landscape character areas mapped at a scale appropriate to the development site as well as any relevant management plans or strategies pertaining to the area. The EIA should include assessments of visual effects on the surrounding area and landscape together with any physical effects of the development, such as changes in topography. The EIA should include a full assessment of the potential impacts of the development on local landscape character using landscape assessment methodologies. We encourage the use of Landscape Character Assessment (LCA), based on the good practice guidelines produced jointly by the Landscape Institute and Institute of Environmental Assessment in 2013. LCA provides a sound basis for guiding, informing and understanding the ability of any location to accommodate change and to make positive proposals for conserving, enhancing or regenerating character, as detailed proposals are developed.

Natural England supports the publication Guidelines for Landscape and Visual Impact Assessment, produced by the Landscape Institute and the Institute of Environmental Assessment and Management in 2013 (3rd edition). The methodology set out is almost universally used for landscape and visual impact assessment.

In order to foster high quality development that respects, maintains, or enhances, local landscape character and distinctiveness, Natural England encourages all new development to consider the character and distinctiveness of the area, with the siting and design of the proposed development reflecting local design characteristics and, wherever possible, using local materials. The Environmental Impact Assessment process should detail the measures to be taken to ensure the building design will be of a high standard, as well as detail of layout alternatives together with justification of the selected option in terms of landscape impact and benefit. The assessment should also include the cumulative effect of the development with other relevant existing or proposed developments in the area. In this context Natural England advises that the cumulative impact assessment should include other proposals currently at Scoping stage. Due to the overlapping timescale of their progress through the planning system, cumulative impact of the proposed development with those proposals currently at Scoping stage would be likely to be a material consideration at the time of determination of the planning application.

The assessment should refer to the relevant National Character Areas which can be found on our website. Links for Landscape Character Assessment at a local level are also available on the same page.'

'4. Access and Recreation Natural England encourages any proposal to incorporate measures to help encourage people to access the countryside for quiet enjoyment. Measures such as reinstating existing footpaths together with the creation of new footpaths and bridleways are to be encouraged. Links to other green networks and, where appropriate, urban fringe areas should also be explored to help promote the creation of wider green infrastructure. Relevant aspects of local authority green infrastructure strategies should be incorporated where appropriate.

Rights of Way, Access land, Coastal access and National Trails The EIA should consider potential impacts on rights of way and coastal access routes in the vicinity of the development. Appropriate mitigation measures should be incorporated for any adverse impacts. We also recommend reference to the relevant Right of Way Improvement Plans (ROWIP) to identify public rights of way within or adjacent to the proposed site that should be maintained or enhanced.'

- Email consultation was then carried out with the case officer, Adrian Miller, dated 27th November 2019 to confirm the scope of the landscape assessment and to broadly agree suggested viewpoints locations for the visual assessment.
- Response received from RBC dated 6th December 2019.

7.2 Legislation, Policy and Guidance

This section provides an overview of policy relevant to the application site. National policy sets the wider context of landscape, whilst local policy provides a framework that informs the sensitivity of key elements, highlights issues specific to the site and how these may be considered in relation to the overall planning balance.

7.2.1 National Planning Policy (NPPF) February 2019

The National Planning Policy Framework (NPPF) must be considered in the determination of planning applications. The NPPF sets out the Government's planning policies for England and how these are expected to be applied. Elements of the NPPF that relate to landscape and visual issues are outlined here.

The NPPF was published on 27 March 2012 and revised in February 2019.

Underpinning the NPPF is the importance of the planning system to contribute to the achievement of sustainable development. Paragraph 8 outlines the three dimensions that contribute: economic, environmental and social. With particular reference to this site, the importance of creating a high quality built environment *that fosters a well-designed and safe built environment, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being noted as part of the social dimension*. One aspect of the environmental role of planning is *…contributing to protecting and enhancing our natural, built and historic environment; and, as part of this, helping to improve biodiversity…*

Paragraph 9 states that *Planning policies and decisions should play an active role in guiding development towards sustainable solutions, but in doing so should take local circumstances into account, to reflect the character, needs and opportunities of each area*.

Section 12 is titled **Achieving well-designed places.** Planning policies and decisions should ensure that (Paragraph 127) developments:

a) will function well and add to the overall quality of the area, not just for the short term but over the lifetime of the development;

b) are visually attractive as a result of good architecture, layout and appropriate and effective landscaping;

c) are sympathetic to local character and history, including the surrounding built environment and landscape setting, while not preventing or discouraging appropriate innovation or change (such as increased densities);

d) establish or maintain a strong sense of place, using the arrangement of streets, spaces, building types and materials to create attractive, welcoming and distinctive places to live, work and visit;

e) optimise the potential of the site to accommodate and sustain an appropriate amount and mix of development (including green and other public space) and support local facilities and transport networks; and

f) create places that are safe, inclusive and accessible and which promote health and well-being, with a high standard of amenity for existing and future users46; and where crime and disorder, and the fear of crime, do not undermine the quality of life or community cohesion and resilience.

Section 15 is titled **Conserving and Enhancing the Natural Environment**. Paragraph 180 states that *the planning policies and decisions should ensure that new development is appropriate for its location taking into account the likely effects of (including cumulative effects) …….living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and

c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.

Planning Practice Guidance

The National Planning Policy Framework is accompanied by a suite of web-based **Planning Practice Guidance (PPG)** documents that provide advice on many aspects of the planning process.

Sections of the PPG particularly relevant to landscape and visual issues include those on:

- Design
- Open space, sports and recreation facilities, public rights of way and local green space
- Natural environment, including Landscape
- Light pollution

Within the **Design** section, the importance of good design is highlighted:

Good design is an important part of sustainable development. Achieving good design is about creating places, buildings, or spaces that work well for everyone, look good, last well, and will adapt to the needs of future generations. Good design responds in a practical and creative way to both the function and identity of a place. It puts land, water, drainage, energy, community, economic, infrastructure and other such resources to the best possible use – over the long as well as the short term.

The PPG states the importance of places that are safe, equally easy to use for all and respond in a practical and creative way to both the function and identity of a place. Places should have multiple benefits to encourage a healthier environment. Furthermore, development should seek to promote character in townscape and landscape by responding to and reinforcing locally distinctive patterns of development. The successful integration of development with their surrounding context is an important design objective. This includes integrating it into the wider area, reduces impacts on nature and views, as well as considering views into and out of the site. The scale of developments should be considered and reference is made to avoiding overshadowing, overlooking effects on skylines, vistas and views.

Landscape is covered within guidance on the **Natural Environment**, which refers to the principle that planning should recognise the intrinsic character and beauty of the

countryside and indicates that local plans should have policies for the conservation and enhancement of the natural environment, including landscapes, both designated and the wider countryside. The guidance refers to the use of landscape character assessment at a national and local level as a tool to help inform, plan and manage change.

The **Light pollution** section highlights the potential for developments to result in 'light pollution' or 'obtrusive light', which can be a source of annoyance, undermine enjoyment of the countryside or detract from enjoyment of the night sky.

The section concerning **Public Rights of Way** notes that such routes are an important component of sustainable transport links and should be protected or enhanced.

7.2.2 Local Planning Policy

The Development Plan for the site comprises of the Redcar and Cleveland Local Plan, adopted May 2018. The Local Plan is accompanied by a Polices Map, as well as several Supplementary Planning Documents. A detailed planning policy review is included within section 9.5 of the Planning and Design and Access Statement and within section 2.0 above, and the polices and planning documents relevant to this chapter are briefly listed below:

Policy SD4 General Development Principles outlines the criteria that will be utilised by the Council when assessing the suitability of a site or location which includes the following:

a. meets the requirements of the Locational Policy and accords with other Local Plan policies and designations;

c. will not result in the unacceptable loss or significant adverse impact on important open spaces or environmental, built or heritage assets which are considered important to the quality of the local environment;

e. avoids locations that would put the environment, or human health or safety, at unacceptable risk;

Policy SD6 Renewable and Low Carbon Energy states that Renewable and low carbon energy schemes will be supported and encouraged, and will be approved where their impact is, or can be made, acceptable.

Policy LS4 South Tees Spatial Strategy includes the South Tees Development Corporation Area and aims, among other things, to:

Economy

b. support the regeneration of the South Tees Development Corporation area through implementing the South Tees Area Supplementary Planning Document;

c. grow the environmental and recycling sector;

Environment:

w. enhance the environmental quality of employment through well planned boundary treatments;

z. enhance the environmental quality of the River Tees and coastline;

ab. encourage improvements to access, interpretation and wildlife conservation and biodiversity across the area

It also states that Proposals at South Tees, South Tees Freight Park and Bolckow Industrial Estate (collectively referred to as the South Tees Development Corporation area) should have regard to the South Tees Area Supplementary Planning Document (SPD).

Policy ED6 Promoting Economic Growth states that land and buildings within existing industrial estates and business parks, as shown on the Policies Map, will continue to be developed and safeguarded for employment uses. It also states that:

'….. heavy processing industries and port logistics, will be focused in the following areas….. ED6.2 Land at South Tees.'

Policy MWP8/MWP10(b) South Tees Eco Park: details that a site of approximately 27 hectares is allocated for development and is expected to recover value from 450,000 tonnes of municipal solid waste and commercial and industrial waste annually. The policy details that appropriate development for the site includes large-scale waste management facilities.

The **South Tees Area Supplementary Planning Document** Adopted May 2018 includes the following relevant policy:

Development Principle STDC14 'South Industrial Zone' indicates that development proposals for port-related uses, including port-based fabrication, offshore energy industries, including manufacturing, materials processing and manufacturing, contract fabrication and energy generation and, potentially, rig and large equipment decommissioning within the area will be encouraged.

The **Tees Valley Joint Minerals and Waste Development Plan** was adopted by the five local authorities in the Tees Valley, including Redcar and Cleveland, in September 2011 and set out planning policies regarding minerals and waste developments until 2026. The Strategic Plan includes a strategic objective relevant to the development:

'j. *to ensure that minerals and waste developments protect and enhance the quality and diversity of public amenity and the natural, historic and cultural heritage of the Tees Valley.'*

Policy MWC8 General Location for Large Waste Management Facilities states that allocations for large waste management facilities should be located in the following general areas:

d) to the south of the River Tees - the land located around Teesport, Smiths Dock Road and the eastern end of Dockside Road (Middlesbrough and Redcar and Cleveland);

In the focussed 5km Study Area the following polices are relevant to this chapter:

Policy N1 Landscape aims to protect and enhance the borough's landscapes. Development proposals will be considered within the context of the Landscape Character Assessment, the Landscape Character Supplementary Planning Document and the Historic Landscape Characterisation. Developments will not be permitted where they would lead to the loss of features important to the character of the landscape, its quality and distinctiveness, unless the benefits of development clearly outweigh landscape considerations. In such cases appropriate mitigation will be required.

Restoration landscapes and green infrastructure are located throughout the 5km focussed Study Area at green spaces and adjacent to roads. The Eston Hills Historic Landscape is located at the southeast edge of the 5km Study Area.

Policy N2 Green Infrastructure aims to protect and enhance the green infrastructure network, and includes Green Wedges, Strategic gaps and open spaces. Strategic Landscape Areas are located along the A66 to the south and southwest of the site, the A1053 Tees Dock Road and the A1085 to the east of the site, to the east of the site. Green Wedges are located to the northeast of Wilton chemical works and between Redcar and Middlesbrough. Sensitive Landscape Areas are located along the coast to the northeast.

Policy N3 Open Space and Recreation states when development of open space is acceptable. Primary open spaces are located at the junction of the A66and Tees Dock

Road, the public open space at Alexandra Road and scattered throughout residential areas.

7.2.3 Supplementary Planning Documents (SPDs)

South Tees Area Supplementary Planning Document (May 2018)

South Tees Area Supplementary Planning Document (Adopted May 2018) is relevant to this proposal and is dealt with in detail in section 9.7.1 of the Planning and Design and Access Statement. Polices relevant to this chapter are as follows:

- **STDC1: Regeneration Priorities** states that the council will, in partnership with the STDC, seek to achieve the comprehensive redevelopment of the South Tees Area in order to realise an exemplar world class industrial business park.
- **STDC7: Natural Environmental Protection and Enhancement** requires the Council in partnership with the STDC and investment partners and other key stakeholders, to protect and, where appropriate, enhance designated and non-designated sites of biodiversity and geodiversity value and interest within the South Tees Area.
- **STDC8: Preserving Heritage Assets** states that Council will, in partnership with the STDC and in consultation with the local community and key stakeholders, seek to identify those industrial assets which it is appropriate and viable to retain as part of the development of an industrial heritage trail within the South Tees Area Open Space Strategy.
- **STDC14: South Industrial Zone** states that the Council, in partnership with the STDC, will encourage development proposals within the South Industrial Zone, for port-related uses, including port-based fabrication, offshore energy industries, including manufacturing, materials processing and manufacturing, contract fabrication and energy generation and, potentially, rig and large equipment decommissioning.

Redcar and Cleveland Local Development Framework Landscape Character SPD (March 2010)

The Redcar and Cleveland Local Development Framework Landscape Character SPD, dated March 2010, builds on the Redcar and Cleveland Landscape Character Assessment and gives recommendations for development in general, some of which are relevant to this project. These are noted below:

4. BUILT FORM

Village Form and Character

4.3 Where the use of traditional materials is not possible, particularly with regard to larger agricultural or industrial buildings, it is important that the choice of modern materials is considered with the need to integrate with existing buildings as well as with the wider landscape.

Size and Scale

4.4 These considerations can be problematic with new developments in or adjoining the countryside, particularly where modern buildings, notably farm and industrial buildings, tend to be larger than traditional structures. They can disrupt the accepted scale of the landscape, especially where seen with older traditional buildings. The effect of size and scale can be reinforced or modified by choice of site, use of colour and design of details.

7.2.4 Designations

The following section gives details of any designations relevant to this chapter within the study area.

7.2.5 National Designations

The North York Moors National Park overlaps with Redcar and Cleveland Borough Council's administrative boundary, along the southern and eastern extent. At its nearest point to the site, the National Park boundary is approximately 7km away, to the southeast. Due to the location of the elevated ground of the Eston Hills located between the site and the northern edge of the North York Moors, there is no intervisibility between the site and the National Park.

There are no Areas of Outstanding Natural Beauty (AONBs) within the 15km Study Area for this chapter.

There are several ecological designations within the study area which are considered in detail in chapter 6 of this Environmental Statement. These are Teesmouth and Cleveland Coast Special Protection Area (SPA), Teesmouth and Cleveland Coast proposed SPA, Teesmouth and Cleveland Coast Ramsar, Teesmouth and Cleveland Coast proposed Ramsar, Teesmouth and Cleveland Coast Site of special Scientific Interest, North York Moors Special Area of Conservation, North York Moors Special Protection Areas.

There are no World Heritage Sites, Scheduled Monuments, Conservation Areas, Registered Parks and Gardens or Registered Battlefields within 2km of the site. There is one Grade II* Listed Building, the Baptist Church and five Grade II Listed Buildings within the settlement of South Bank to the west of the site. There are a cluster of eighteen Bronze Age barrows and an Iron Age Hill Fort on Wilton and Eston Moors approximately 4km south southeast of the proposed site. There are also Conservation Areas with associated Listed Buildings at Wilton, Kirkleatham, Ormseby Hall Yearby and Coatham and which are located 4km southeast, 5km east, 5km southwest 5.5km east, and 6km northeast respectively.

7.2.6 Local Designations

Local landscape designations relevant to this chapter are as follows:

- Primary Open Spaces (policy N3 Open Spaces and Recreation)
- Green Wedges (policy N2 Green Infrastructure)
- Sensitive Landscapes (policy N1 Landscape)
- Historic Landscapes (Eston Hills) (policy N1 Landscape)
- Strategic Landscape Areas (policy N2 Green Infrastructure)
- Restoration Landscapes (policy N1 Landscape)
- Public Rights of Way (policy TA3 Sustainable Transport Networks)

These designations are shown on Figure 7.5. There are no locally designated nature conservation sites within a 2km radius of the proposed development.

7.3 Assessment Methodology

This study aims to assess the effects of the proposal on the landscape and visual resource of the area. It does not form part of an Environment Impact Assessment (EIA). Effects that may be important in the planning process are identified and described as ***significant*** . Landscape and visual effects, whilst interrelated, will be considered separately in the assessment.

Given the complexity of the methodology this has not been repeated in the body of the ES. The detailed methodology applied in this section is described in Appendix D.

7.4 Baseline

The following section gives details of any designations relevant to this chapter within the study area.

7.4.1 National Designations

The North York Moors National Park overlaps with Redcar and Cleveland Borough Council's administrative boundary, along the southern and eastern extent. At its nearest point to the site, the National Park boundary is approximately 7km away, to the southeast. Due to the location of the elevated ground of the Eston Hills located between the site and the northern edge of the North York Moors, there is no intervisibility between the site and the National Park.

There are no Areas of Outstanding Natural Beauty (AONBs) within the 15km Study Area for this chapter.

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7.4.2 Local Designations

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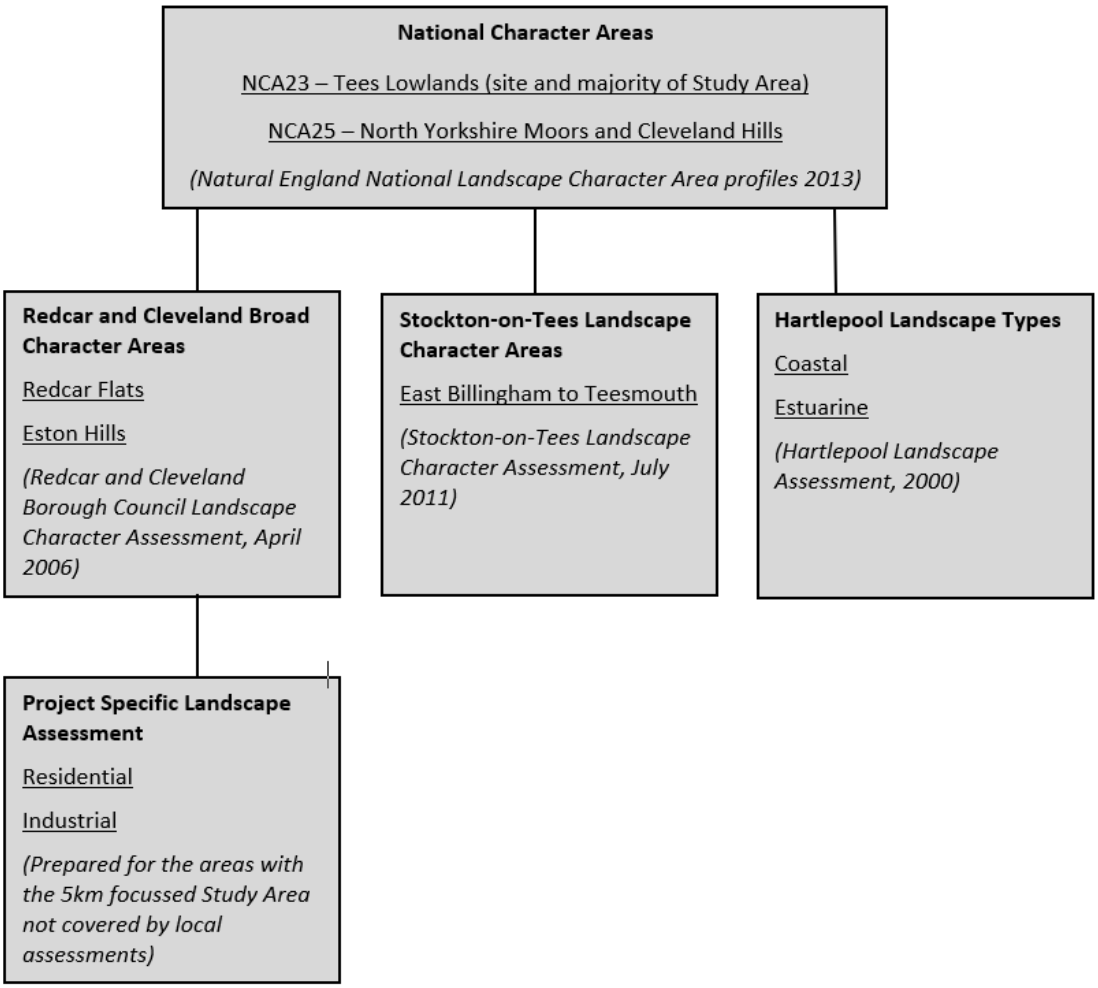
- Strategic Landscape Areas (policy N2 Green Infrastructure)
- Restoration Landscapes (policy N1 Landscape)
- Public Rights of Way (policy TA3 Sustainable Transport Networks)

These designations are shown on Figure 7-5. There are no locally designated nature conservation sites within a 2km radius of the proposed development.

7.4.3 Current Landscape Baseline Conditions

The following assessment of landscape character and landscape sensitivity provides an overview of wider character context both nationally and regionally. In lieu of the availability of a detailed landscape assessment for the urban areas within Redcar at the local level, this assessment defines broad landscape types to be assigned to the urban built form within the 5km focussed Study Area as shown on Figure 7-2.



National Character Areas (NCAs)

England has been divided into areas with similar landscape character, called National Character Areas (NCAs). The resulting map subdivides England into 159 NCAs and provides an overview of the differences in landscape character at the national scale. Each NCA is accompanied by a character description explaining the influences and features which determine the character of the area.

The site and majority of the 15km Study Area lies within **NCA23, Tees Lowlands**, with the key characteristics of the area which are considered relevant to the proposals as follows:

- *A large area of urban and industrial development around the Tees Estuary, much of which is on reclaimed land, contrasts with the quieter rural areas to the south and west.*
- *Major industrial installations around Teesmouth form a dramatic skyline, but are juxtaposed with expansive mudflats, sand dunes and salt marshes which are nationally and internationally designated for their assemblage of waterfowl.*
- *Principal transport corridors, power lines and energy infrastructure are conspicuous elements in the landscape.*
- *Brownfield sites where semi-natural vegetation has started to regenerate on previously developed land.*

The section 'Other Key Drivers' notes the following points which are of relevance to the site:

- *There has been significant investment in the energy sector in recent years, with ongoing development of, onshore and offshore wind farms and their associated infrastructure (such as the Tees Offshore wind farm), gas-fired power stations and gas pipelines, energy from waste facilities, and electricity supply infrastructure. This is likely to continue, with renewable energy becoming increasingly important within the local economy.*
- *Increased demand for industrial development around the Tees Estuary has the potential to destroy significant areas of early successional grasslands and scrub on brownfield sites. However, these habitats could potentially be retained and/or re-created around the margins of new developments.*

The southeast part of the wider 15km Study Area is within **NCA25 North Yorkshire Moors and Cleveland Hills**. The key characteristics of the area which are considered relevant to this chapter are as follows:

- *Upland plateaux, generally below 400 m, dissected by a series of dales – some broad and sweeping but others narrow, steep sided and wooded – creating strong contrasts between open moors and enclosed valleys.*
- *Valley landscapes characterised by pastoral farming, with a clear demarcation and strong visual contrast between the enclosed fields with some species-rich grasslands and wetlands, farms and settlements, and the bracken-fringed moorlands above*
- *Large-scale arable landscapes to the south and east.*
- *Panoramic views over moorland plateaux, ridges and dales and out over surrounding lowland landscapes and the North Sea.*

The excerpts highlighted above are helpful to frame and set in context the local and site based baseline to be described and assessed. However, NCAs are high-level, strategic assessments which cover a comparatively wide area. It is considered unlikely that the proposed project would have an influence on landscape character at a National Area scale. This study therefore focuses on the local landscape character assessments described below.

Local Landscape Character Assessment

The Landscape Character areas and types identified within any local landscape assessments are detailed below. The land within the focused 5km Study Area is discussed and include areas covered by **Redcar and Cleveland Landscape Character Assessment** dated April 2006 (RCLCA), **Stockton-on-Tees Landscape Character Assessment** dated July 2011 (SoTLCA) and **Hartlepool Landscape Assessment**, dated 2000, (HLA). There is no identified character assessment for the Middlesbrough area. The Cleveland Community Forest Landscape Assessment dated 1998 is now superseded by the assessments prepared for Stockton and Hartlepool and is not considered further within this assessment.

The Redcar administrative boundary overlaps with the North York Moors National Park to the south of Guisborough and to the east of Loftus. These areas of overlap are covered within the **North York Moors National Park Landscape Character Assessment**, December 2003, and are not covered within the RCLCA. These National Park areas are not within the focus 5km Study Area and there is no intervisibility with the proposed development and as such are not considered within this section or within Landscape Effects.

The following paragraphs detail the local level landscape information within the 5km focussed Study Area and help to build a picture of the local landscape character.

Redcar Landscape Character Assessment April 2006

The **Redcar & Cleveland Landscape Character Assessment** covers the landscapes across the rural parts of the Council's administrative boundary and includes areas at the fringes of the 5km focussed Study Area to the northeast and southeast. The assessment omits any form of assessment of the industrial areas around Teesmouth, within which the site is located, nor the adjacent residential areas. Due to the lack of detailed local landscape character assessment of the urban areas within the Redcar Borough and of the Middlesbrough area, for the purposes of this assessment, broad landscape types have been assigned to support a Project Specific Character Assessment to be carried out within these areas, detailed in below.

The identified Broad Landscape Character Areas from the RCLCA of relevance are described below. These Broad Landscape Areas are further subdivided into Landscape Units (or types) for the RCLCA assessment. For this project, the Broad Landscape Areas have been used as a basis for the landscape assessment, and as such details of these landscape units is not deemed relevant.

Eston Hills Broad Landscape Area

Description:

'The Eston Hills are characterised by a complex of prominent steep-sided hills linked by low saddles which form a parallel series of foothills, or outliers, to the main escarpment of the Cleveland Hills, which lie within the North York Moors National Park. Open moorland and wooded hillsides and escarpments contribute to the distinctive character of this area and give it an identity unlike any other part of the Borough. An area of parkland at Wilton is important within the tract.

Extensive and contrasting views are available from many locations; to the south there is the backdrop of the Cleveland Hills. To the north there are views over the urban and industrial developments of Teesside and Redcar.

The Eston Hills Tract consists of elevated areas: the Eston Hills upland between Dunsdale and Ormesby….'

Landscape Assessment:

'Under the Character Assessment, the landscapes in this tract are classified into Sensitive Landscapes over the landscape units on the higher land….. The uplands have a high strength of character, a product of a dominant landform and a strong woodland pattern.

In the Sensitive Landscapes, changes in character are discouraged and the emphasis is on retention of landscape elements; indeed, changes will take on a visual prominence over much of this area on the more elevated parts. Location and design are of crucial importance. New planting for screening or integration should closely reflect the nature and detail of the existing vegetation.'

This southern elevated area of Redcar contributes strongly to its rural setting and provides the backdrop to the urban areas. The area also provides strong public access and recreational opportunities for the urban population. The contrasting and panoramic views are a key characteristic.

Value is **High**.

Susceptibility to the type of development proposed is High.

Overall, **sensitivity is High.**

Redcar Flats Broad Landscape Area

Description:

The Redcar Flats are contained by the escarpment of the Eston Hills to the south and the coast to the north. Over the inland part of the tract, the presence of high quality

farmland has encouraged intensive arable cultivation and the enlargement of fields. The hedgerow pattern is sparse and there are few landscape features to interrupt the open, gently sloping landscape.

Long views predominate in this landscape, and skyline features take on particular importance. The industry at Wilton Works, and the abrupt urban edges of Redcar, Marske, New Marske, Saltburn and the A174 and railway corridors have a strong local influence on landscape character.

Landscape Assessment:

Under the Character Assessment, the coastal zone in this tract is classified as Sensitive Landscape. In this open landscape, largely the product of maritime exposure, any development will be very open to view. Location and design are of major importance, and opportunities should be taken to integrate the development into adjacent urban areas and to screen by planting, with shelter provided where exposure would otherwise hinder or prevent successful establishment.

Other Sensitive Landscape areas in this tract are the parkland at Kirkleatham and the wooded valley at Hazel Grove, where the priority is the retention of existing landscape constituents.

The remainder of this tract, inland of the coast, is classified as Restoration Landscape. Existing features in this denuded landscape are relatively sparse, due to hedgerow decline and loss, and their retention is important to 'place' new development, to act as the basis for additional planting, or for the creation of 'new landscape.' Additional planting may comprise, for example, a hedgerow to continue the line of an existing one, or, in preference, form a hedgerow pattern or network and combine with tree planting to create an enhanced landscape structure.'

This area covers high quality farmland and coastal areas, highly influenced by the industrial areas adjacent. Relatively few remaining landscape features, with good opportunities for improvement.

Value is Medium.

Susceptibility to the type of development proposed is Medium.

Overall, **sensitivity is Medium.**

Stockton-on-Tees Landscape Character Assessment

The **Stockton-on Tees Landscape Character Assessment** covers the areas of the borough within rural areas and accounts for the northwest quarter of the 5km focussed Study Area. The identified Landscape Character Areas of relevance are as follows:

East Billingham to Teesmouth

Summary of East Billingham to Teesmouth Character Area:

- *Industrial landscape fringing Billingham integrated with large areas of open space including wetlands and reclaimed semi improved pasture;*
- *Farmland is open and flat with minimal landscape features;*
- *Industry dominates area to the east along the River Tees;*
- *Open space within industrial areas contain significant wildlife value with a number of ecological designations present including Sites of Special Scientific Interest (SSSI's), Site of Nature Conservation Importance (SNCI), Special Protection Area (SPA), Ramsar Site and Teesmouth National Nature Reserve;*
- *Important 'ridge and furrow' within the field pattern around the settlement of Cowpen Bewley;*
- *The Stockton to Hartlepool railway line is notable feature within the landscape, dividing the Landscape Character Area between estuarine and non-estuarine/rural fringe influences; and*
- *Cowpen Bewley Woodland Park provides the only wooded element within this Landscape Character Area.*

Landscape Characteristics:

The key landscape characteristics of this area are the ecological wetland habitats, in particular the SSSI's at Seal Sands and Cowpen Marsh. These are unique features within the Borough and provide a substantial amount of ecological benefit to an otherwise industry dominated landscape. Industrial features such as large storage tanks and flares associated with the oil refineries and chemical works within the Tees estuary dominate views towards the east with vertical features outside the industrial areas, comprising transmission towers and overhead power lines.

The River Tees runs along the southern boundary of this area where it exits land at Tees Mouth, just north of Seal Sands.

Landscape Change and Condition:

The condition of this landscape varies from that with excellent ecological value and managed as an ecological resource to a landscape devoid of natural features and dominated by industrial structures and hardstandings. It is assumed that as industry gradually migrates out of the area the ecological habitat will replace that which is lost, albeit it at a slow rate of change.

Areas of active landfill punctuate the skyline within the area forming areas of temporary degraded landscapes. These are however transitional landscapes that will in time be reclaimed and restored.

This area is located on the north bank of the River Tees, with a contrasting mix of industrial uses and ecological wetland habitats of value.

Value is Medium.

Susceptibility to the type of development proposed is Medium.

Overall, **sensitivity is Medium.**

Hartlepool Borough Council Landscape Assessment

The **Hartlepool Landscape Assessment** covers the areas within the borough outside of the development limits and accounts for small areas on the northwest edge of the 5km focussed Study Area. The identified Landscape Types of relevance are as follows:

Coastal Landscape Type

a) Coastal Fringe

The coastal fringe area to the east of the Borough encompasses not only the beach area itself, but also those adjoining areas of land which can clearly be seen to have been influenced by or be part of the maritime ecosystem.

This character area, for the purposes of the study, extends to the normally exposed tidal beach, exposed rock and sea cliff areas, and also man-made features such as coastal defences, harbour or sea wall installations. In addition to these features are the fringe elements normally found adjoining the coast itself, these being defined as coastal dunes, coastal grassland, salt marshes or areas of low tree and shrub cover.

Landscape Appraisal:

The Coastal fringe area is of a generally high quality toward the northern and southern ends of the study area, with a marked decline in quality along the coastline adjoining parts of the main urban area.

Intrusive impact of Teesside industrial conurbation on southern coastal fringe area.

This area is located to the north of the Estuarine character area.

Value is High.

Susceptibility to the type of development proposed is Medium.

Overall, **sensitivity is Medium.**

Estuarian Landscape Type

b) Estuarine

The estuarine area lies in the southeast and eastern fringe of the Borough. Typically, it is defined by flat, featureless plains, which are permeated by or in close proximity to estuarine water bodies.

This definition includes areas of semi-natural open water (tidal and fresh), associated salt marsh, reed beds, sand and mud flats. These areas also typically include low lying agricultural land, low tree and shrub cover and some coastal grassland. Estuarine land characteristically does not exceed 10 metres AOD.

Landscape Appraisal:

Hartlepool's estuarine sites represent just a small part of the 500ha of inter-tidal land that comprises the Tees Estuary. However, whilst the visual quality of the landscape is immediately compromised by the presence of heavy industry, this landscape type has considerable natural and ecological value.

The Estuarine landscape occupies a small but visually unique area of the study area, which suffers due to its proximity to the adjacent oil storage depot, BNFL power plant and Tioxide works. On a broader scale, the visual backdrop created by the Teesside industrial complex has a strong visual influence on the general landscape, an influence that is unfortunately exacerbated by the flat, low-lying nature of the surrounding landscape.

Whilst it is acknowledged that little can be done to ameliorate the impact of industrial development on this area of Hartlepool, it is considered important to capitalise on the inherent natural value of the landscape by ensuring its continued protection and conservation for future generations.

Unique aesthetic value of natural marsh landscapes to Hartlepool; extremely important in terms of nature conservation against highly developed backdrop of Teesside.

Generally flat, featureless appearance of landscape set against heavy industrial backdrop creates a visually barren impression, especially in terms of views across the estuary from surrounding areas and transport corridors.

Overwhelming concentration of electricity pylons in some areas; Visual impact on views out of the estuary towards Hartlepool created by corridors of pylons.

This area is located to the north of the East Billingham to Teesmouth area on the edge of the focussed 5km Study Area, and is of high ecological value, with degraded visual amenity due to the presence of industrial uses.

Value is **Medium.**

Susceptibility to the type of development proposed is **Low.**

Overall, **sensitivity is Medium.**

Project Level Character Assessment

The following broad descriptions of landscape types cover those urban areas which are not considered within the above local level landscape assessments.

Residential

Human scale residential urban landscape, with a fine grain, irregular but linear pattern of local and arterial roads, dominated by residential housing, schools, local shops, and other associated built elements, interjected with recreational areas and footpath connections.

Short and mid-range views from within the developed residential areas often with a backdrop of industrial development when viewed facing north, sometimes with a backdrop of the Eston Hills facing south.

Value: **Medium**

Susceptibility to proposed change: **Low**

Overall sensitivity: Medium to **Low**

Industrial

Large scale industrial landscape, on the north and south banks of the River Tees, with a coarse grain and sometimes regular and often linear pattern of industrial buildings, silos, chimneys, stacks and other works units. Often with local or private road access or rail lines and sidings to facilitate access and egress. Jetties and docks are also evident along the river banks associated with works. Medium and large open or brownfield areas are frequent and sometimes separate individual works units.

Short and mid-range views from within the industrial areas, often formed from large and very large scale individual and groups of buildings and other industrial built elements. Glimpse views of the river are possible where gaps in the built form allow but these do not dominate in the main.

Value: **Low**

Susceptibility to proposed change: **Low**

Overall sensitivity: **Low**

7.4.4 Landscape History

Cleveland Steel works was opened at the proposed development site in 1885, by Bolckow, Vaughan & Co Ltd. Along with other partnership, including that of Dorman Long (later giving its name to Dormanstown) the site continued to produce iron and steel, becoming the largest producer in Great Britain and possibly the world, by 1900. The site and surrounding works areas were served by the Darlington to Saltburn line (travelling east-west) and the Eston Branch Railway line (traveling north-south).

The industry employed a workforce of over 20,000 by the early 1920's and in 1917 building of Dormanstown, Redcar, began to house the workman of the steel, with further expansion over the coming 3 decades.

The initial development of Grangetown was due to the discovery of ironstone in the Eston Hills in 1840, and the subsequent development of the iron and steel industry. The residential areas of Grangetown rapidly expanded southeast in the between 1914 and 1939 on the north side of the Eston Branch railway line which served the steel works. Both the steel companies and the local council built estates from Bolckow Road to and across the new A1085 Trunk Road. The population in 1939 was approximately 9,000. After the war, council house building was extended and in the 1950s reached Fabian Road.

The majority of the Victorian terraces of Grangetown built to house steel workers and their families which were situated immediately adjacent to the Cleveland Steel works.

Many were cleared in the early 1970's with the introduction of the A66 to the north of Grangetown separating the remaining residential areas from the steel works to the north, and the introduction of warehouses and depots of lighter industry on the southern edge of the industrial zone.

Large scale buildings associated with steel production at the site were in situ until the site was cleared in the early/late 1980's after which it was used for storage associated with the adjacent remaining steel works productions. Buildings to the east of the site remain in situ, though are unused, and include buildings to a maximum height of 90m.

The port of Teesport is located to the north of the site. Following residential development in the 1920's, this was gradually replaced during the 1930's to allow for development associated with steel works and ship building. 3 oil refineries were then developed at the site in the 1960's, and served the area referred to as Tees Dock. Teesport now occupies both the north and south bank of the River Tees, and is characterised by large buildings, landfill areas and tall cylinders.

Bolckow Industrial Estate is located to the south of the site and includes the Torpedo Ladle Repair Shop which stands at approximately 23.5m tall and is located immediately south of the proposed development site. Lighter industrial uses are located between the Repair shop and the A66, beyond which is the residential area of Grangetown.

South Tees Freight Park is located to the west of the site which formally housed Cleveland Iron Works, Clay Lane Iron Works and associated tip and storage areas in the 1930's to 1950's. Following the addition of the A66 in the early 1970's the residential area of South Bank was separated from the industrial areas to the north.

Teesport commerce park is also located to the north west of the site, previously occupied by ship yards, concrete works, slag works and tar works on the north side of the railway line for much of the 19thc.

7.4.5 Future Baseline

The site is allocated for various employment uses within the RCBC Local Plan, in line with policies LS4 and ED6, and in line with the South Tees Regeneration Master Plan proposals. The site forms part of the proposed South Industrial Zone with the masterplan, with the target industries as follows:

- Port-related uses, including port-based fabrication;
- Offshore energy industries, including manufacturing;
- Materials processing and manufacturing;
- Contract fabrication;
- Potential for rig and large equipment decommissioning; and
- Energy generation.

Should the proposed development not gain planning permission, it is assumed that alternative industrial development would be proposed, with a focus on recycling and manufacturing use, which is reliant on good access to multi-purpose port facilities. This may include raw material storage and processing. Further options include development for the offshore energy industry and associated manufacturing.

Land uses surrounding the site are very likely to remain in industrial use, with the likely retention of landfill and waste management facilities to the north of the site, as part of the wider South Industrial Zone. IT is also anticipated that South Tees Freight Park and Bolckow Industrial Estate will be retained to the west and south respectively.

7.5 Impact Assessment

The proposed site is located within a brownfield area forming the part of the Teesport Industrial Estate. The land within the site lies at approximately 5m AOD with localised

changes in topography as a result of the former landuses. The site lies approximately 6.5km to the west of Redcar town centre and approximately 5km east of Middlesbrough town centre, within the district of Redcar and Cleveland Borough Council.

The site proposed for the ERF is one of 6 parcels of land which form the Grangetown Prairie area. These are subject to the South Tees Area Supplementary Planning Document (adopted May 2018) and form part of the South Tees Regeneration Masterplan. The proposed site is the north west parcel of the Grangetown Prairie area.

The brownfield area, known as Grangetown Prairie, is an area of land remaining from the former British Steel works and is sandwiched between the derelict Basic Oxygen Steel (BOS) building located on the east of Tees Dock Road, the Torpedo Ladle Repair Shop at the northern extent of the Bolckow Industrial Estate to the south and the South Tees Freight Park to the west. The Teesport Landfill disposal site (operated by Highfield Environmental) is located immediately north of the Grangetown Prairie area, separated from it by the Darlington to Saltburn railway line and Teesdale Way Recreational Route. This landuse forms a localised mounding immediately north of the site.

The River Tees corridor is located approximately 1.2km to the north of the site and meanders east through Middlesbrough, turning northeast through Teesport and then north towards to mouth of the Tees where it reaches the coast approximately 6.5km from the site. To the north and east of the site, concentrated on the banks of the River Tees, the industrial areas of Graythorp, Seal Sands, Wilton Chemical Works and Teesport accommodate oil refineries, the remains of steel works, jetties distilleries and other associated heavy industrial uses.

The Study Area includes the residential areas of Redcar, Middlesbrough Stockton-on-Tees, Hartlepool Saltburn-by-the-Sea and Guisborough. These areas are connected to the A19 arterial route which travels north south through the region, by a network of trunk roads, A Roads and local roads. The Darlington to Saltburn railway line travels east-west across the centre of the Study Area, with branches connecting to North Yorkshire from Middlesbrough, as well as the Sunderland to Hartlepool line travelling north-south through the Study Area. Numerous rail connections are also evident throughout the industrial areas facilitating connections to works.

The Teesdale Way Recreational Route travels east-west through the Study Area and is located immediately north of the site. The route follows the north bank of the River Tees from Stockton-on-Tees to Middebrough. After which it follows the south river bank then returns to follow the railway line between the Middlesbrough Transporter Bridge and Dormanstown, before travelling north through Coatham Sands on its way along the River Tees from Cumbria to the Coast.

The northeast section of the England Coast Path National Trail travels broadly south to north through the Study Area along the coast from Saltburn-by-the-Sea, through Redcar, joining the Teesdale Way through Middlesbrough where it passes immediately north of the site. The path then turns north towards Hartlepool on its route connecting The Wash to the Scottish Borders.

The Tees Link National Trail which connects the Teesdale Way to the Cleveland Way travels through the Study Area between Highcliffe Nab near Guisborough and Middlesbrough Dock. It is is located approximately 2km to the west of the site at its closet point. Several Public Rights of Way are scattered across the Study Area, connecting rural areas with the urban conurbation of Teesside, focussed in areas such as the Eston Hills, the north edge of the North York Moor National Park and rural areas between Middlesbrough and Hartlepool as well recreational areas within the urban built form.

7.5.1 Landscape Effects

The identified Landscape Character Areas and Types of primary relevance to this study are considered in this section in terms of value, susceptibility and overall sensitivity. The magnitude of change as a result of the proposed project is then determined and assessment of the resulting significance of effect given. The assessment comprises a consideration of the following:

- Impacts on landscape fabric: the potential effects of the proposed development on the physical landscape of the application site; and
- Impacts on landscape character: The effect on the key characteristics of the landscape character areas potentially affected by the proposed development.

Landscape Effects tables are provided in Appendix D.

7.5.2 Summary of Landscape Effects

The landscape baseline assessment included above highlights the varied and changing nature of the landscape character within the Study Area, with some sensitive rural landscapes such as the Eston Hills immediately adjacent to the lowland areas of the Tees Valley with its industrial and large-scale development. The landscapes within the focussed 5km Study Area frequently include degrading features such as pylons and intrusive A-roads, however, the stark contrast between landscapes of such extremes is recognised as a strong positive within the Study Area, with extensive views over a varied and interesting range of landscapes with good public access for the adjacent population. As such, these contrasting landscapes sit side by side with a relative harmony that has been present for many decades.

The presence of large-scale industrial development is a key characteristic of the 5km focussed Study Area and has influenced and often given rise to the residential development alongside it. The proximity of the more sensitive landscapes to the fringes of the urban areas is well documented over many decades and overall sensitivity to the type of development proposed is considered low. As a result, the landscape can accommodate this proposal without any significant effects arising on either the national or local level landscape character areas and types, and in some circumstances gives rise to slight beneficial effects due to the redevelopment of derelict brownfield areas within the allocated employments zones. There are no residual significant impacts on landscape character resulting from the proposed development. Other recorded impacts of note are as follows:

- **Slight adverse** effect on the landform of the site.
- **Slight adverse** effect on the vegetation cover of the site
- **Slight beneficial** effect on the pattern and scale of the site.
- **Slight beneficial** effect on the land use of the site.
- **Slight beneficial** effect on the identified Industrial Area.

7.6 Visual Amenity Baseline Conditions

This section provides a description of the baseline visual amenity condition of the Study Area and for the key visual receptors that have been identified. Where visual receptors are expected to have "effects judged unlikely to occur or so insignificant that it is not essential to consider them further" (GLVIA3), these are 'scoped out' of the assessment with reasons given.

Visual receptors are people that may experience views of the landscape. These may include residents and visitors to settlements, places of works, roads, Public Rights of Way and promoted routes, informal paths, recreational facilities, visitor attractions or identified viewpoints. Preparation of ZTV's, desktop and site survey have been used to

identify the key visual receptors likely to be affected by the proposal, to include the following:

- Public Rights of Way and other recreational receptors;
- Residential receptors and settlements; and
- Transport routes, road and rail (local and regional).

7.6.1 Zone of Theoretical Visibility (ZTV) and Field Studies

For the purposes of this report, the study area has been defined by the preparation of Zones of Theoretical Visibility (ZTVs) and by field observations. These are shown on Figures 7-6 to 7-11. The ZTV's have been developed on the basis of the project description above.

The ZTV's indicate that within 2km of the proposed site, views are likely to be frequent from most directions. However, during field studies open views to the site were found to be limited due to existing large scale industrial development surrounding the proposed site, the presence of buildings up to 90m in height, at the Basic Oxygen Steel (BOS) plant to the east, and raised topography at the Teesport Landfill site to the north. Pockets of visibility were identified at publicly accessibly locations within Dormanstown to the east, and within Grangetown to the south, and have been included within the visual assessment.

The ZTV's also indicate that there is a concentration of likely visibility at between 2 and 5km from the proposed site, from the northwest and southeast, with only patchy visibility from the northeast and southwest. Views are limited from the east. Between 2km and 5km views appear to be concentrated along the area around the A1053 and within the Eston Hills to the southeast, and around Cowpen Marsh and A178 to the northwest.

Beyond 5km likely views from the north are limited to around the mouth of the River Tees and along the coast to the south of Seaton Carew. To the east views beyond 5km are limited to areas south of Redcar, with potential views from The Cleveland Way at Saltburn-by-the-Sea. Due to distance from the site this long-distance view has been scoped out of the visual assessment.

The ZTV's illustrate that beyond the Eston Hills to the south and southeast, views are limited due to the topography, which at a maximum height of approximately 217m AOD, prevents wider and more distant views across almost a third of the 15km Study Area (Figures 7-6 to 7-11). Beyond these hills to the south and southeast there are no predicted views, except for a small pocket of elevated land at Airy Hill Farm. The Airy Hill Farm location has been scoped out of the visual assessment having views along footpaths within the Eston Hills, which represent a worst-case scenario of views from the southeast. Similarly, the ZTVs confirmed that there will be no views from the North York Moors National Park, accordingly this has been scoped out of the visual assessment.

There are very limited views beyond 2km from the west, due to the dense urban area of Middlesbrough and limited opportunities for elevated views from this direction. Beyond 5km long distance views from the northwest are indicated from elevated areas to the west of Hartlepool.

Field studies identified that close-range views from sensitive receptors are most likely to experience a change in their visual amenity. Therefore the viewpoint assessment has concentrated on these areas, with a focus on landscape and visual impacts within 5km of the site, within residential areas in Redcar (with a focus on Dormanstown, Grangetown, Lazenby, Lackenby, Eston, Normanby and South Bank), residential areas in Middlesbrough (with a focus on Ormesby and Bramble Farm), and the public rights of way network within the Eston Hills and along the river and coastline.

7.6.2 Selected Viewpoints

Potential viewpoints have been selected through desk and field-based research. All of the recorded views are listed in Table 7-1 below along with a reason for either their inclusion, or exclusion, from the subsequent assessment, which is shown on the Viewpoint Assessment sheets included in Figure 7.1 and Viewpoint Assessment Table, Appendix D.

Table 7-1 Summary Viewpoints

Viewpoint (VP)	Distance and direction from proposed development	Summary	Viewpoint and figure number
VP1: Footpath to Stainsby Hall Farm, Stainsby.	VP is situated on a designated footpath, as defined on the Middlesbrough Council PROW Map (MID/010/1) which runs along a local road. 9.7km southwest of the site.	No views from this location due to screening immediately around the viewpoint as well as the distance from the site which is 9.7km to the north east. Representative Viewpoint. Not included within assessment.	VP1, fig. 7.1
VP2: Permissive Bridleway off Fishponds Road, B1269.	VP is situated on a bridleway which travels adjacent to the B1269. Clear views across the intervening landscape. 5.2km west of the site.	Representative of views for users of the bridleway. The development will be visible from this location. Representative Viewpoint. Included within assessment.	VP2, fig. 7.1
VP3: Kirkleatham Lane, A1042	VP situated on a new access splay off Kirkleatham Lane, adjacent to a gap in vegetation. 5km to the east of the site.	Represents users of Kirkleatham Lane. The development will be visible from this location. Representative Viewpoint. Included within assessment.	VP3, fig. 7.1
VP4: Amenity Green Space, Howcroft Avenue, Dormanstown	VP situated within a Primary Open Space and Green Wedge to the west of Howcroft Avenue. Also allocated as a Restoration Landscape. 4km to the east of the site.	Viewpoint represents users of the open space and residents on the west edge of Dormanstown. Views are partially screened and interrupted by vegetation and existing industrial infrastructure. Representative Viewpoint. Included within assessment.	VP4, fig. 7.1
VP5: Bridleway off Hobson Avenue	VP situated on a Bridleway to the west of Hobson Avenue, within a Green Wedge and Restoration Landscape. 3.9km to the east of the site.	Viewpoint represent users of the bridleway through the Green Wedge. Views screened by vegetation and localised topography. Representative Viewpoint. Included within assessment.	VP5, fig. 7.1

Viewpoint (VP)	Distance and direction from proposed development	Summary	Viewpoint and figure number
VP6: Tees Dock Road	VP situated on a footway adjacent to the carriageway of Tees Dock Road which is elevated as it passes over the railway line. 1.4km to the northeast of the site.	Development will be visible within the industrial landscape facing south-west along the railway line. Representative Viewpoint. Included within assessment.	VP6, fig. 7.1
VP7a: Access point to Teesdale Way (also known as the Black Path) Footpath	VP situated on a slightly elevated access gantry between Tees Dock Road and the Teesdale Way Footpath. 1.1km to the northeast of the site.	Represents user of the recreational route. Development will be visible within the industrial landscape facing south-west along the railway line. Representative Viewpoint. Included within assessment.	VP7a, fig. 7.1
VP7b: Teesdale Way Footpath	VP situated on the Teesdale Way Recreational Route immediately adjacent to the north site boundary. 0.15km immediately north of the site.	Represents user of the recreational route. Development will be visible from the route which is located immediately adjacent to the site boundary. Representative Viewpoint. Included within assessment.	VP7b, fig. 7.1
VP8: Eston Road, Grangetown	VP situated on the footway adjacent to Eston Road facing across the brownfield area of Grangetown Prairie. 0.5km southwest of the site.	Represents users of Eston Road. Development will be clearly visible from this location. Representative Viewpoint. Included within assessment.	VP8, fig. 7.1
VP9: River Tees Viewpoint	VP situated at the crest of the River Tees Viewpoint area. 2.4km to the west of the site.	Represents receptors visiting the viewpoint. Development will be visible through gaps in vegetation. Specific Viewpoint. Included within assessment.	VP9, fig. 7.1
VP10: Footway adjacent to A66 Bolckow Road/Whitworth Road, Grangetown	VP situated on the footway adjacent to the A66 Bolckow Road/Whitworth Road. 0.7km immediately to the southwest of the site.	Development will be visible from this location between existing buildings within an industrial landscape. Representative Viewpoint. Included within assessment.	VP10, fig. 7.1
VP11: Junction of Normanby	VP situated on the footway adjacent to the junction of Normanby Road/Poplar	View represents residential areas within South Bank. Development will be visible from this location between gaps in built	VP11, fig. 7.1

Viewpoint (VP)	Distance and direction from proposed development	Summary	Viewpoint and figure number
Road/Poplar Grove	Grove. 1.7 km to the southwest of the site.	form. Representative Viewpoint. Included within assessment.	
VP12: A1085 Trunk Road from the bridge over Church Lane	VP situated on the elevated footway adjacent to the A1085 Trunk Road, from the road bridge over Church Lane. 1.2km to the south of the site.	Viewpoint represents road users of the A1085. Development will be visible from this elevated location on a road bridge within a residential area. Representative Viewpoint. Included within assessment.	VP12, fig. 7.1
VP13: Local footpath through Eston Recreation Area, off Church Lane.	VP is on pedestrian route across Eston Recreation Area, a designated Primary Open Space between Church Lane and the A1085.1.65km to the south of the site.	Viewpoint represents the users of the green space. Filtered views of the development through trees. Representative Viewpoint. Included within assessment.	VP13, fig. 7.1
VP14: B1380, High Street, Lackenby.	VP is in an elevated location on the grass verge adjacent to the B1380 High Street in Eston. 3km to the southeast of the site.	Viewpoint represents the users of the road. The development will be visible from this elevated location. Representative Viewpoint. Included within assessment.	VP14, fig. 7.1
VP15: NCN Route 1, Lackenby	VP is from a section of National Cycle Network Route 1, adjacent to the B1380, High Street carriageway in Eston. 3km to the southeast of the site.	Viewpoint represents the users of cycle route. The development will be visible from this elevated location. Representative Viewpoint. Included within assessment.	VP15, fig. 7.1
VP16: Bridleway within Eston Hills, off Lazenby Bank Road.	VP situated on a public bridleway accessed from Lazenby Bank Road, within the Eston Hills Historic Landscape and within the Lazenby Bank Nature Reserve. The Eston Hills is also designated as a Sensitive Landscape Area. Bridleway forms the west boundary of Wilton Conservation Area. 3.8km to the southeast of the site.	Viewpoint represents users of the bridleway and visitors to the nature reserve and Eston Hills. The bridleway also forms the west boundary of Wilton Conservation Area. The development will be visible from this location. Representative Viewpoint. Included within assessment.	VP16, fig. 7.1

Viewpoint (VP)	Distance and direction from proposed development	Summary	Viewpoint and figure number
VP17: Tees Link National Trail footpath 122/21/3 Eston Hills.	VP situated on a public footpath within the Eston Hills Historic Landscape. The Eston Hills is also designated as a Sensitive Landscape Area. 4.5km to the southeast of the site.	Viewpoint from a section of a public footpath. Represents pedestrian receptors using the footpath network. The development will visible from this location. Representative Viewpoint. Included within assessment.	VP17, fig. 7.1
VP18: OS Triangulation point, Eston Nab.	VP situated at Eston Nab, a designated viewpoint from an elevated location with 360 degree panoramic views. 3.8km to the southeast.	Viewpoint from the local footpath network and designated viewpoint within the Eston Hills. Represents pedestrian receptors using the footpath network. The development will be discernible from this location. Specific Viewpoint. Included within assessment.	VP18, fig. 7.1
VP19: A1185, Seal Sands Road, Stockton-on-Tees.	VP from a vehicle layby on the A1185, Seal Sands Road, in an elevated location as it travels over a local access road. 7km to the northwest of the site.	Viewpoint represents users of the A1185. The development will discernible from this location. Representative Viewpoint. Included within assessment.	VP19, fig. 7.1
VP20a: Section of the England Coast Path (ECP) National Trail, Stockton-on-Tees.	VP situated on the ECP National Trail, adjacent to the A178, Seaton Carew Road on the north side of the River Tees. 3.8km to the northwest.	Viewpoint from a section of this National Trail. Represents receptors using the multipurpose trail. The development will discernible from this location. Representative Viewpoint. Included within assessment.	VP20a, fig. 7.1
VP20b: Section of the England Coast Path.	VP situated on a section of the England Coast Path (ECP) within the Teesmouth National Nature Reserve at Seaton Carew. 6.8km to the north of the site.	Viewpoint from this National Trail within a nationally designated area. Represents receptors using the multipurpose trail. The development will be well screened and limited views discernible from this location. Representative Viewpoint. Not included within assessment.	VP20b, fig. 7.1

Viewpoint (VP)	Distance and direction from proposed development	Summary	Viewpoint and figure number
VP21: Viewpoint within Cowpen Bewley Woodland Park, Stockton-on-Tees.	VP situated on a high point with elevated views within the Cowpen Bewley Woodland Park, a designated Open Space and Local Wildlife Site, 7.4km to the northwest of the site.	Viewpoint from a valued designated open space. Receptors will be pedestrians and visitors to the woodland park. The development will discernible from this location. Representative Viewpoint. Included within assessment.	VP21, fig. 7.1

7.6.3 Visual Effects

This section provides a summary of the residual visual effects arising from the proposed facility during construction and operational phases of the development having taken account of the mitigation measures described.

The assessment comprises a consideration of the following:

- Analysis of ZTVs to provide a general overview of the visibility of the facility from different directions and distances within the study area;
- Viewpoint analysis to assess the potential visual effects at selected viewpoints; and
- Impacts on visual amenity: the effects on the overall visual amenity within the study area.

The visibility of the stack and the facility buildings were modelled separately within the ZTVs to enable a more precise understanding of the contribution of the 2 main components of the facility to the overall impact of the development upon the character and visual amenity of the study area.

Whilst the ZTVs indicate that the buildings and stack would have a similar theoretical visibility, the stack is predicted to occupy the greater vertical angle in views, suggesting that this feature would be the most prominent aspect of the development. However, whilst this may prove to be the case for low lying viewpoints where the stack would extend above the existing skyline and the buildings may be visible against an industrial backdrop, or indeed screened by intervening built form or vegetation, this does not account for the overall massing effect of the building, when viewed from more elevated locations, such as within the Eston Hills, or from Cowpen Bewley Country Park.

In order to better understand the actual visibility of the proposed development key receptor locations were visited and the findings recorded below. The visual assessment of the selected viewpoints is shown in full on Figure 7.1, Volume 2 and Viewpoint Assessment Tables in Appendix D.

7.6.4 Visual Assessment Summary

The visual baseline assessment included above and in Figure 7.1 identifies the nature and value of the existing visual amenity and highlights the complex and contrasting visual conditions within the Study Area, from elevated views within the Eston Hills, to industrial views of large scale and derelict works units. The visual assessment considers impacts within a 15 km study area, using a generated Zone of Theoretical Visibility (ZTV) to illustrate where the two most prominent elements of the Project (the 80m height stack, and the 50m height buildings) are theoretically visible. The ZTV for the stack is more extensive due to it being the highest element of the Project. However, it is considered that the main building will be the most visually dominant element in close range views due to its overall mass (width and height).

The presence of large-scale industrial areas including building large in both mass and height, and wide spread vertical infrastructure, including pylons, chimney stacks, flues and wind turbines has long influenced the visual amenity of the 15km Study Area, and is an accepted and historic element of it. As a result, receptors have a reduced sensitivity to the type of change proposed and changes will be experienced within the existing context of the large scale industrial landscape of the River Tees corridor. As a result, the visual amenity can accommodate this proposal without wide spread significant effects arising.

There will be an isolated number of residual significant visual impacts to some sensitive receptors within close proximity to the Facility Site, namely the Teesdale Way and Eston Road, concentrated within 2km from the site boundaries, with some up to 5km away. There are a number of other significant residual impacts on views from more sensitive

locations, such as within the Eston Hills and from the surrounding rights of way network. The significant impacts on visual amenity resulting from the proposed development are as follows:

- **Slight to Moderate adverse** effect on the view from VP7 the Teesdale Way access point.
- **Moderate adverse** effect on the view from VP8 the Teesdale Way.
- **Slight to Moderate adverse** effect on the view from VP9 Eston Road.
- **Slight to Moderate adverse** effect on the views from VP12 the Junction of Normanby Road/Poplar Grove.
- **Slight to Moderate adverse** effect on the views from VP14 Local footpath just off Church Lane, Lackenby
- **Slight to Moderate adverse** effect on the view from VP16 NCN Route 1, adjacent to the B1380.
- **Slight to Moderate adverse** effect on the view from VP17 the Bridleway at Lazenby Bank within the Eston Hills.
- **Slight to Moderate adverse** effect on the view from VP18 the Tees Link footpath within the Eston Hills
- **Slight to Moderate adverse** effect on the view VP19 from Eston Nab.

7.7 Mitigation

This landscape and visual assessment chapter has been produced to support the outline planning application for the proposed ERF and at the time of writing no detailed design was available for the project. As such it is important to note that assessment has been judged on the worst case scenario, taking into account the minimum expected mitigation that can be assumed to be applied to the project. For the purposes of this chapter the mitigation that has been taken into account at this stage of the proposed project includes the following:

- Design and construction of a modern, purpose built, industrial ERF facility in line with the outline design parameters;
- Grassland mitigation areas as shown on Figure 6.5 (Volume 2), providing biodiversity gain and setting the facility in context;
- On completion of the construction of the facility, the building and its immediate surroundings will be maintained by the occupier to an appropriate and acceptable standard in line with any approved planning permission.

The overall approach for the design of the facility should be to create a modern industrial character consistent with its role - the use of sustainable energy generation technology - its visible location and its context.

The site should also be considered as a driver for high quality 'clean' and sustainable uses at the site and be a catalyst for positive contemporary change and renewable technology within Teesport.

The vision for the site should be one of a contemporary functional, modern, industrial facility set in a green environment, with the potential for use of green roofs and walls on the smaller ancillary buildings, sustainable cladding where possible and an external environment which promotes brownfield biodiversity and regeneration of green infrastructure within this large industrial environment.

These suggestions combined with consideration of colour, lighting, materials and interpretation of heritage assists could combine to provide an opportunity for a landmark building of positivity on a site well known for its decline.

The selection of the proposed site for the facility has been well considered and documented within this environmental statement and is in line with national and regional policy. It also reflects the local policy position and the aspirations of the South Tees Regeneration Masterplan. There is limited opportunity for substantial mitigation of potential landscape and visual impacts due to the nature and scale of the development, however a number of measures should be considered further during the detailed design stage. These are outlined below.

- Landscape design: Whilst there is little opportunity to mitigate potential views of the stack and buildings due to the size of these elements it may be possible to reduce low level sources of impact (e.g. vehicle movements) whilst helping to reduce the apparent scale of the building by means of earth mounding and site layout. At the detail design stage landscape design should also consider providing an attractive setting for the development and improve the amenity of visitors to the site and in particular along the north site boundary adjacent to the Teesdale Way Recreational Route and railway line.
- Building design: The height and mass of the proposed facility should be reduced as much as possible through detailed design by careful arrangement of plant with the consideration of adjacent landuses where possible. All plant components should be contained within the buildings, thereby achieving a simpler, more unified design that is less complicated and results in a simpler external appearance. The design of the buildings could reflect the form of the nearby Eston Hills. Consideration of the façade materials, and finish of the detailed design should also be carefully considered, with the proposed use of contrasting colours and materials on the roof and facades of the building which could also help to break up the mass of the building and give the building a high-quality appearance. The consideration of recessive colours on the upper elevations and roof of the facility should be considered to reduce the prominence of the building when it is seen above the skyline, where possible. Consideration of the lighting design for the facility should also be subject to detailed design.

7.8 Mitigation

The scale of the Project will have an influence on the landscape resource and visual amenity of the surrounding area. There will be an isolated number of significant visual impacts to some sensitive visual receptors within close proximity to the proposed development, concentrated within 2km from the site boundaries, with some up to almost 5km away. The Landscape and Visual Impact Assessment (LVIA), in Chapter 7 of the Environmental Statement, considers the likely effects of the Project upon the existing landscape character and visual amenity of a 5km and 15km Study Area respectively.

The LVIA considers impacts within a 15km Study Area for the visual assessment and a 5km focussed Study Area for the landscape assessment, using a generated Zone of Theoretical Visibility (ZTV) to illustrate from where the two most prominent elements of the Project (the 80m height stack, and the 50m height building) are theoretically visible. The ZTV for the stack is more extensive in terms of distance visible from the site, due to it being the highest element of the facility. However, it is considered that the main building (boiler house) will be the most visually dominant element due to its overall mass (width and height). From a number of isolated close-range receptors, such as the Teesdale Way and local road network, the building will form a significant new element within the view. It is therefore recommended that the design of the building be developed through the detailed design stages of the planning application in order to reduce adverse effects where possible. Parameters for the design of the building are stated within the Design and Access Statement which should guide the detailed design development.

The assessment concludes that the Project is in keeping with the existing industrial character of the River Tees Estuary. The towns of Middlesbrough and Redcar have a history of large-scale industrial development, particularly along and around this stretch of the River Tees, with some of the residential areas concerned emerging as a result of historic industrial steel works and in order to provide accommodation for workers and their families (such as at Dormanstown). Those residential areas closest to the site - Dormanstown, Grangetown, Eston and South Bank - have also been influenced by historic trends in the pattern, scale and development of this industrial landscape, co-existing alongside large-scale industrial elements in close proximity for many decades.

The baseline landscape character of the site and its immediate surrounding area is one of a very large-scale, man-made industrial nature, with buildings large in both mass and height as well as including numerous types of vertical infrastructure, including pylons, chimneys stacks and cylindrical tanks. This existing character which has been present in this location over preceding decades has influenced the sensitivity of surrounding landscape and the overall local landscape character to industrial development. Therefore, there are no reported significant effects on landscape character and elements within the site or the surrounding area.

There are not likely to be any significant impacts on National, Regional or Local Landscape Character areas as a result of the Project. Due to the location of the site well within the industrial area, and surrounded on all sides by Teesport to the north, remaining building at the BOS (Basic Oxygen Steel) Plant to the east, Bolckow Industrial Estate to the south and South Tees Freight Park to the west, even though the proposed facility is large in scale, mass and height, the existing landscape character has the capacity and qualities to accommodate the proposed development. The most notable landscape change is that of the site itself, with the addition of the linear layout of the facility which requires it to be hard up against the railway line and Teesdale Way to the north of the site. This creates an opportunity for a high-quality external environment to be designed to set the building into context adjacent to these uses and to provide a contemporary and attractive environment with both landscape and biodiversity benefits.

With regard to impacts upon visual amenity, it is likely that the potential adverse visual impacts will be more significant than those for landscape. The proximity of the proposed development to residential areas at Grangetown, Eston and South Bank, combined with the size and scale of built elements of the facility are of principal concern, along with an isolated number of more distant views from public rights of way within elevated locations at Lackenby and within the Eston Hills. A detailed visual assessment has been carried out, with the assessment of over 20 Viewpoints assessed to determine a detailed understanding of likely visual impacts to visual amenity and identified receptors. Close range visual receptors such as users of the Teesdale Way and the local road network where gaps in the urban fabric allow views towards the site, are considered likely to experience the most significant impacts, with a number of residual visual impacts noted in close proximity to the site, and from high sensitivity receptors in elevated locations associated with the rights of way network and the Eston Hills.

7.8.1 Conclusions

Based on the findings of the preceding LVIA and in particular the limited number of significant residual effects predicted in relation to the development, and its compliance with current national, regional and local landscape policy, the proposed facility is considered to be appropriate in the current landscape and visual baseline condition in and around the application site.

Given the existing industrial context, the form and scale of buildings in the vicinity of the application site, and the restrictions on intervisibility the landscape character and visual amenity of the Study Area is considered capable of accommodating a carefully designed industrial facility that reflects the scale and form of other buildings nearby.

8 Hydrology, Hydrogeology, Geology and Contamination

8.1 Introduction

The chapter describes the existing environment in relation to hydrology and hydrogeology and assesses the potential impacts of the construction, operation and decommissioning of the ERF (the proposed development) on hydrology (surface water quality, levels and flows) and hydrogeology (groundwater quality and levels).

The geological descriptions within this section provide context for the sensitivity of the hydrogeology assessment only. Geology is not considered to be a sensitive receptor, as environmental designations and protected status do not apply to the site.

Land quality, in terms of the baseline condition of the soils and groundwater, and the potential interrelationship with human health, as well as other land quality considerations e.g. agricultural resource, is considered in this assessment.

This chapter first summarises relevant policy and legislation and describes the assessment methodology that has been adopted. The overall baseline conditions are described in Section 8.4, and how the scheme design has evolved (embedded mitigation) with respect to the protection of the water environment in Section 8.5. The results (Section 8.6) of the assessment of the potential (pre-mitigation) effects are then presented, along with details of environmental measures (additional mitigation, Section 8.7) to avoid, minimise, mitigate or compensate for any remaining adverse effects. The chapter concludes with a summary of residual effects (standalone and cumulative) and an evaluation of their significance (Section 8.8) following the incorporation of the proposed environmental measures into the scheme.

Surface water quality and flood risk is discussed in Chapter 9.

8.2 Legislative and Planning Policy Context

Table 8-1 lists the issues from the relevant planning policies guidance and policy guidance which have been considered in assessing potentially significant effects related to the water environment.

Table 8-1 Policy issues considered in preparing the water environment assessment

Policy Reference	Policy Issues
NPPF (revised, 2019)	
Paragraph 17	Achieving Sustainable Development principles (para 8c) include contributing to protecting and enhancing the natural environment and minimising pollution.
Section 14, Paragraph 150a	New development should be planned to avoid increased vulnerability to the range of impacts arising from climate change including flood risk and water supply. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure.
Section 14, Paragraphs 155-165	Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere. Major developments should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate.
Section 15, Paragraph 170e	New and existing development should not contribute to or be put at unacceptable risk from, or be adversely affected by, unacceptable levels of water pollution.
National Planning	Multiple benefits for people and the environment can be achievable

Policy Reference	Policy Issues
Practice Guidance (2019)	through good design and mitigation. For example, flood risk can be reduced and biodiversity and amenity improved by designing development that includes permeable surfaces and other sustainable drainage systems, removing artificial physical modifications (for example, weirs and concrete channels) and recreating natural features. Water quality can be improved by protecting and enhancing green infrastructure and further information on this can be found in the planning practice guidance on the Natural Environment. Good design and mitigation measures can be secured through site specific policies for allocated sites and through non-site-specific policies on water infrastructure and protecting the water environment. For example, they can be used to ensure that new development and mains water and wastewater infrastructure provision is aligned and to ensure new development is phased and not occupied until the necessary works relating to water and wastewater have been carried out. Local planning authorities can use planning conditions and / or obligations to secure mitigation and compensatory measures where the relevant tests are met. Planning obligations can be used to set out requirements relating to monitoring water quality, habitat creation and maintenance and the transfer of assets where this mitigates an impact on water quality. The guidance supports the NPPF.
Redcar & Cleveland Council (R&CC) Local Plan (May, 2018)	
Policy SD1: Sustainable development	Protect the quality and availability of water resources, and maximise the efficient use of water.
Policy SD7: Flood and water management	Flood risk will be taken into account at all stages in the planning process to avoid inappropriate development in areas at current or future risk.

The legislation relevant to the assessment of effects of the proposed development on the water environment is summarised in Table 8-2.

Table 8-2 Legislation relevant to the assessment of the water environment

Legislation	Description
The European Water Framework Directive (WFD) (Council Directive 2000/60/EC)	This is focused on delivering an integrated approach to the protection and sustainable use of the water environment on a river basin scale. One of the primary objectives of the Directive is for water bodies to achieve 'good status' which, for surface water bodies, requires both good ecological status and good chemical status to be achieved. For groundwater bodies, good status is achieved when both quantitative status and chemical status are at least good. The WFD requires that there should be no deterioration in the classification of water bodies (whether at good ecological status or lower), and this will apply to the consideration of effects from the construction or operation of development.
Water Act 2003	This Act was a revision of the Water Resources Act (1991) which stated that it is an offence to cause or knowingly permit polluting, noxious, poisonous or any solid waste matter to enter controlled waters. The Act sets out regulatory controls for water abstraction, discharge to water bodies, water impoundment and protection of water resources. Elements of the Water Resources Act 1991 have now also been superseded by the Environmental Permitting (England and Wales) Regulations 2010.
Environmental Permitting (England and Wales)	This provides a consolidated system for environmental permits and exemptions for activities which include

Legislation	Description
Regulations 2010	discharges to surface waters. It also sets out the powers, functions and duties of the regulators.
Groundwater Regulations 1998	These require the prevention of List I substances (such as mercury, cadmium, polyaromatic hydrocarbons) entering groundwater and the control of List II substances (such as heavy metals, nutrients, phenols) to avoid pollution of groundwater. Within the context of the WFD, the groundwater daughter directive was brought into force in January 2009, which will seek to prevent deterioration in groundwater quality.
The Land Drainage Act 1991 & 1994	This places responsibility for maintaining flows in watercourses on landowners and gives Local Authorities powers to serve a notice on landowners to ensure works are carried out to maintain flow of watercourses.
Floods and Water Management Act 2010	This sets out the Government's proposals to improve flood risk management, water quality and ensure water supplies are more secure. In December 2009, the Flood Risk Regulations were published, which transpose the EU Floods Directive into UK law and these cover the flood issues from the Floods and Water Management Bill.

Other policy, regulatory and best practice guidance of relevance to this assessment includes the following:

- Environment Agency (EA) Principles and Practice for the Protection of Groundwater (GP3);
- EA Pollution Prevention Guidance (PPG) Notes[1]:
    - PPG 1 General guide to the prevention of water pollution;
    - PPG 2 Above Ground Oil Storage Tanks;
    - PPG 3 Use and design of oil separators in surface water drainage systems;
    - PPG 4 Disposal of sewage where no mains available;
    - PPG 5 Works in, near or liable to affect watercourses;
    - PPG 6 Working at construction and demolition sites;
    - PPG 7 The safe operation of refuelling facilities;
    - PPG 8 Safe storage and disposal of used oils; and
    - PPG 13 Vehicle washing and cleaning: prevent pollution;
    - PPG 21 Pollution incident response planning; and
    - PPG 22 Dealing with spills.
- Construction Industry Research and Information Association (CIRIA) Report C532: Control of Water Pollution from Construction Sites;
- CIRIA Report C502: Environmental Good Practice on Site;
- CIRIA Report 515: Groundwater Control – design and practice;
- CIRIA Report C697: The SuDS manual;

[1] It is noted that the PPG notes are now withdrawn but are nonetheless applied in the absence of direct replacement guidance notes.

- BS6031: 2009 Code of Practice for Earth Works;
- Good Practice Guide for Handling Soils (MAFF, 2000);
- Local and Regional Land Drainage Byelaws;
- Redcar and Cleveland Strategic Flood Risk Assessment (R&CC, 2016); and
- River Tees Catchment Flood Management Plan (EA, 2009).

8.3 Assessment Methodology and Assessment Criteria

EIA Methodology is summarised in Chapter 5. The methodology for the hydrology assessment of potential impacts follows the generic EIA methodology guided by IEMA (2016) and current government guidance[2], and is based on the following principles:

- The type of effect (long-term, short-term, or intermittent; positive, negative or neutral);
- The probability of effect occurring;
- Receptor sensitivity (see Table 8-3); and
- The magnitude (severity) of the effect (Table 8-4)

Table 8-3 Receptor sensitivity

Sensitivity	Criteria	Examples
Very High	Feature with a high quality and rarity at an international scale, with little potential for substitution. Medium to high flood risk. Human health	Conditions supporting sites with international conservation designations (SAC, SPA, Ramsar sites), where the designation is based specifically on aquatic features. Land use types defined in the SPP as essential civil infrastructure such as hospitals, fire stations, emergency depots etc. Unacceptable exposure to soil-derived contaminants
High	Feature with a high yield and / or quality and rarity at a national scale, with a limited potential for substitution. Low to medium flood risk.	Highly productive aquifers and surface water resources typically used for public water supplies. Public water supplies. Conditions supporting a SSSI. Sites with freshwater fish protected areas. Water quality of receptor water body: Supporting WFD element type (e.g. Priority Substances) classified as 'High', ''Good' or Pass'. Land use types defined in SPP as schools, care homes, ground-based electrical and telecommunications

[2] https://www.gov.uk/guidance/environmental-impact-assessment

Sensitivity	Criteria	Examples
		equipment.
Medium	Feature with a medium yield and/or quality at a regional scale, or good quality at a local scale, with some potential for substitution. Low flood risk.	Medium productivity aquifer and surface water resources typically used for smaller public water supplies or industrial water supplies. Industrial water supplies. Conditions supporting local nature conservation interest (e.g. National Nature Reserve [NNR]), where the interest features are water-dependent. Water quality of receptor water body: Supporting WFD element classified as at least 'Good' in all cases. Other property types, including dwellings.
Low	Feature with variable yield and/or quality at a local scale, with potential for substitution. Negligible flood risk.	Low productivity aquifer and surface water resources typically used for private water supplies or not utilised. Private water supplies; livestock supplies; springs; ponds/lagoons; non-statutory groundwater-dependent conservation sites. Water quality of receptor water body: Supporting WFD element type classified as less than 'Good' in any situation (any supporting element). Undeveloped or agricultural land from a flood risk point of view.
Very Low	Feature with poor yield and / or quality at a local scale, with good potential for substitution.	Unproductive strata. Water quality of receptor water body: Supporting WFD element type classified as 'Poor' or 'Bad', with severely restricted ecosystems and pollution. Small surface water bodies such as drainage ditches and ephemeral ponds that are too small to be classified under WFD and have limited ecological potential due to being artificial or heavily-modified.

Table 8-4 Overview of magnitude of change

Magnitude	Criteria	Examples
Major	Results in complete loss of receptor or major impact on feature, of sufficient magnitude to affect its use / integrity, and which may be irrecoverable or slow to recover. Acute (short term) risks to human health.	Major reduction in groundwater levels, flow or quality, reducing use and water body status. Major reduction in groundwater levels or water quality leading to a marked deterioration in conditions that support GWDTE features. Deterioration in river flow regime, morphology or water quality, leading to sustained, permanent or long-term breach of relevant SSSI conservation objectives (COs), or downgrading of WFD status (deterioration in current thresholds as defined by current WFD status, including supporting WFD elements). Complete loss of resource or severely reduced resource availability to other water users. Change in flood risk resulting in potential loss of life or damage to nationally critical infrastructure.
Moderate	Results in some loss of receptor, or noticeable impact on feature, of sufficient magnitude to affect its use / integrity in some circumstances. Has limited potential to recover.	Moderate reduction in groundwater levels, flow or quality, reducing use and water body status in some circumstances. Moderate reduction in groundwater levels or water quality leading to some deterioration in conditions that support GWDTE features. Deterioration in river flow regime, morphology or water quality, leading to periodic, short-term and reversible breaches of relevant SSSI conservation objectives, or downgrading of WFD status (deterioration in current thresholds as defined by current WFD status, including supporting WFD elements). Water quality status may impact upon potential future thresholds in relation to objective WFD status – potential for prevention of waterbody reaching its future WFD objectives. Minor reduction in resource availability for other water users. Change in flood risk resulting in

Magnitude	Criteria	Examples
	Chronic (long-term) risk to human health.	potential for major damage to property and infrastructure.
Minor	Results in minor impact on feature, with insufficient magnitude to affect its use / integrity in most circumstances. May be fully recoverable.	Measurable reduction in groundwater levels, flow or quality, but with limited consequences in terms of use and water body status. Measurable reduction in groundwater levels or water quality, leading to a minimal change in conditions that support GWDTE features. Measurable deterioration in river flow regime, morphology or water quality, but remaining generally within SSSI COs, and with no change of WFD status (of overall status or supporting element status) or compromise of Environmental Quality Standards (EQSs). No change in resource availability for other water users. Increase in flood hazard in areas with no flood risk receptors e.g. increased flooding of agricultural land. Change in flood risk resulting in potential for minor damage to property and infrastructure.
No change	No perceptible change in the baseline situation.	n/a

In terms of the EIA Regulations, it is only those impacts that are likely to have significant positive and/or negative environmental effects that require detailed assessment. As the EIA Regulations guide the assessor to focus on effects that are likely to be significant, the outcome of the assessment of a given effect on a particular receptor in its simplest form would be that it is significant or not significant. However, there may be instances where it is appropriate to further sub-divide the category of 'Not Significant', for example by use of the terms 'Slight' and 'Negligible' in terms of the level of effect. The use of the category of 'Slight' may for example be used in acknowledgement that there are instances whereby there may be an effect, albeit that this is not likely to be significant - and this approach may better facilitate assessment of cumulative effects where cumulatively several slight effects could be significant. With this consideration in mind, Table 8-5 illustrates a matrix, which has been used for guidance in the assessment of significance.

Having defined a level of effect, professional judgement, in combination with guidance and standards are then applied to identify which of those levels of effect are then considered to be equivalent to significant effects when discussed in terms of the EIA Regulations.

Table 8-5 Assessment of significant

Magnitude of change	Receptor Very High	Sensitivity High	Medium	Low	Very Low
Major	Large	Large	Large	Moderate	Slight
Moderate	Large	Large	Moderate	Slight	Negligible
Minor	Moderate	Moderate	Slight	Negligible	Negligible
No change	Negligible	Negligible	Negligible	Negligible	Negligible

Key:
Shaded Cell = Significant in terms of EIA Regulations.

Unshaded cell = Not significant in terms of EIA Regulations.

Effects that are predicted to be moderate or greater are considered to be significant for the purpose of this assessment. From consideration of the Scoping Opinions and baseline characterisation, a sensitivity classification has been allocated to each identified water environment receptor, and these are set out in Table 8-5. The receptor sensitivity allocated is based upon the definitions set out within Table 8-6 and utilising professional judgement.

Table 8-6 Sensitivity of water environment and human health receptors

Receptor	Rationale	Sensitivity
Surface water		
River Tees estuary	Under the EA's Catchment Explorer, whilst the Tees estuary is classified as being of 'Poor' ecological potential, chemical status and overall status, the whole estuary area holds an international designation. Therefore, the sensitivity of these watercourses is considered to be very high.	Very high
Holme Beck Culvert and Knitting Wife Culvert	The course of the small surface water body, Holme Beck, has been altered historically such that it now flows into the Cleveland Channel. These watercourses/culverts are too small to be classified under WFD as it has limited ecological potential. As such, the sensitivity of these watercourses is considered to be very low.	Very low
Cleveland and Lackenby Channels	These channels are interconnected, and therefore taken together as one receptor. In effect, they are now part of the re-routed Holme Beck, with limited ecological potential. As such, the sensitivity of these water bodies is considered to be very low.	Very low
Unnamed pond north of the site	This small unclassified pond is also likely to have poor water quality and is therefore regarded as being of very low sensitivity.	Very low
Discharges	The discharges under consideration are consented for sewage/trade effluents and those discharge to surface water or groundwater are taken together for the purposes of this assessment. On the basis that they are likely to be of poor water quality, they are therefore regarding as being of very low sensitivity.	Very low
Groundwater		
Mercia Mudstone	The site sits on a solid geology aquifer of low-moderate groundwater potential. Although the current overall status of the WFD groundwater body which dominates the site is 'Poor', the overall groundwater resource only yields limited amounts of groundwater, as a Secondary B aquifer, and is therefore regarded as of low	Low

Receptor	Rationale	Sensitivity
	sensitivity.	
Superficial aquifer (Made Ground, Glacio-lacustrine deposits, Tidal Flats and Glacial Till)	The site sits on superficial deposits classified as a Secondary (Undifferentiated) Aquifer. Due to the Poor aquifer status, lack of resource potential, and presence of known contaminants at the site, and lack of local use for abstraction, it is therefore regarded as being of low sensitivity.	Low
Other		
Human health	This would include site workers during construction and operation of the site, including occupants of adjacent facilities.	Very high

The FRA and Outline Drainage Strategy (Volume 3) concluded that there does not appear to be any significant risk of flooding to the development site. As such, flood risk is scoped out of further assessment.

Due to the likely extent of dilution occurring within the River Tees at the locations of the tidal abstraction, some distance downstream from the site, it is therefore scoped out of further assessment.

Previous intrusive and site history has confirmed that, the site of the proposed scheme is generally devoid of natural surface soil resources, and that significant deposits of Made Ground are present across the entire site and surrounding landholding. Laboratory testing of soil samples from these investigations has confirmed that soils are non-natural and largely comprise slag-based materials from historic iron and steel making activities which were used for land reclamation. Therefore, due to the historic industrial nature of the site and absence of natural surface soils, soils are not an agricultural resource and are not considered to be a sensitive receptor in this respect. Therefore, a soils impact assessment has not been carried out.

8.4 Baseline Conditions

8.4.1 Data Gathering Methodology

The assessment in relation to the water environment is predominantly desk-based. The most up to date information available on publicly accessible websites and mapping has been used to determine the existing baseline conditions on the site, and in the immediate surrounding area. This has allowed identification of sensitive receptors in both the surface water and groundwater environment, which will need consideration during the design of the site.

In addition, the assessment is supported by the collection and interpretation of data and information requested from the EA and the Environmental Health department at R&CC. They both provided hydrological information for a 2 km radius around the site. The request included groundwater abstractions, surface water abstractions, water quality data, discharges and private water supply records. The key data and sources of information collected are listed in Table 8-7.

Table 8-7 Sources of information used for the Hydrology, Hydrogeology and Geology

Source	Data
Ordnance Survey mapping at 1:50,000 and 1:25,000 scales:www.multimap.com	Topography: elevation, relief.
Cranfield University's National Soils Resources Institute Soilscapes website: http://www.landis.org.uk/soilscapes/	Soil type and land use.
Magic Map: http://www.magic.gov.uk/MagicMap.asp Natural England website: https://designatedsites.naturalengland.org.uk/	Nature Conservation Sites: Special Areas of Conservation (SACs). Special Protection Areas (SPAs). Sites of Special Scientific Interest (SSSI).
The National River Flow Archive: www.nwl.ac.uk/ih/nrfa/index.htm	Climate: rainfall.
EA: http://www.environment-agency.gov.uk/maps/ EA: http://environment.data.gov.uk/catchment-planning/ The National River Flow Archive: www.nwl.ac.uk/ih/nrfa/index.htm	Surface Water. Surface water courses and flood risk Water quality. River flows.
British Geological Survey GeoIndex: http://www.bgs.ac.uk/geoindex/ Enviros, 2007. Corus Cleveland Prairie Teesside Site Phase 1 Environmental Review. Graphite Resources Ltd. Wardell, 2007. Ground Contamination. Graphite Resources Ltd.	Solid and drift geology. Site geology and historic land use.
Data requested from the EA. https://data.gov.uk/dataset/f3684ee9-4c81-4ccd-a658-7f8d9dc70706/environment-agency-register-licence-abstracts https://data.gov.uk/dataset/55b8eaa8-60df-48a8-929a-060891b7a109/consented-discharges-to-controlled-waters-with-conditions http://www.environment-agency.gov.uk/maps/ EA Source Protection Zones and 2009 River Basin Management Plans (Groundwater): http://www.environment-agency.gov.uk/maps/	Groundwater levels. Groundwater vulnerability. Groundwater quality. Abstractions and discharges.
Data requested from R&CBC.	Private water supplies

The assessment also draws on information provided in previous reports and site investigations which have been completed for this site, and details of these are provided in the table above.

In addition, a site walkover was undertaken on 9th August 2019, to view the site and any existing hydrological features.

8.4.2 Consultation

Consultee responses within the Scoping Opinion were received with relevance to the water environment. Those relevant to the water environment are summarised in Table 8-88. Full details of the information provided in the scoping report and the responses received are provided in Section 4.

Table 8-8 Summary of relevant consultee scoping responses and ES response

Consultee	Comment/concern	ES response
EA	The ES should include a WFD assessment. Any discharges to the Tees Estuary will need to assess the impact to protected areas, and to the objectives of the WFD. An abstraction licence will be needed for either surface water or groundwater abstraction.	A WFD assessment is included Volume 3. Potential effects from Site discharges will all be directed to mains sewage. There are no proposed water abstractions for the Site.
Natural England	No specific issues outside of standard regulatory guidelines. The ES should identify how the development's effects on the natural environment will be influenced by climate change. The ES should consider cumulative impacts.	This chapter is completed in accordance with EIA Regulations. The effects of climate change on the water environment are discussed in this chapter, and within the FRA and Outline Drainage Strategy (Volume 3). Cumulative impacts on the water environment are outlined in Section 0.
Northumbrian Water	The ES should consider management of foul and surface water from the development.	An FRA and Outline Drainage Strategy is included in Volume 3.
R&CBC	The following policies within the R&CBC Local Plan should be considered within the preparation of the EA, with relevance to the water environment: • SD1 Sustainable Development • SD7 Flood and Water Management. A site-specific FRA should accompany the application in accordance with Policy SD7. An appropriate assessment with regards to contaminated land should be carried.	These policies are adhered to within this Chapter, and their relevance cited for context in Table 8.1. An FRA is included within Volume 3. Land contamination is discussed in this chapter.

8.4.3 Location and Topography

The application site is located on the former South Tees Eco Park and extends to an area of approximately 10 hectares (Figure 8.1; Volume 2). The site is centred on Ordnance Survey National Grid Reference (NGR) 454400 521300. Site topography is illustrated in Figure 8.2; Volume 2). Within the site, the highest elevations are found in the south western corner, at ~11 mAOD. Elevations gently slope to the north, with the lowest elevations at ~7.6 mAOD.

8.4.4 Climate

The Flood Estimation Handbook (FEH) gives the Standard Percentage Runoff (SPR) near the site as being 36%. The SPR is the percentage of rainfall responsible for the short-term increase in river flow during and/or following a rainfall event.

The Baseflow Index (BFI) for the area is 0.33-0.38. This is the proportion of total streamflow made up of baseflow (mostly groundwater input). This suggests that around a third of the flow of the local watercourses is made up of groundwater baseflow.

The FEH also includes long-term average rainfall data for catchments in the UK. For the catchment in which the site is located, the Standard Annual Average Rainfall (SAAR) is 625 mm/yr.

The EA gauging station identified from the UK Hydrometric Register (2008) closest to the project area is located on the Leven at Leven Bridge[3], ~14 km southwest of the site, and gives the BFI as 0.42 and an average rainfall of 726 mm (1961-1990).

In summary, the area experiences less rainfall than the national average (885 mm), with low runoff rates and a small proportion of groundwater inputs making up river flow.

8.4.5 Surface Water Bodies

The major water body in the local area is the River Tees, which lies 1.8 km to the north of the site, with a width of approximately 300 m. The site is located within the tidal range of the river, with the tidal limit defined by the Tees Barrage at Stockton, located approximately 8.5 km to the south, upstream of the site. The tidal water level in the Tees has been monitored at a gauging station 2 km northeast of the site[4] (Figure 8.1; Volume 2). The levels observed are between approximately -2.6 and 3.15 mAOD (with the 'normal level' in average weather conditions being -2.3 and 2.89 mAOD). As this reach of the Tees is tidal the water level fluctuates on a roughly 12-hour cycle.

The flow in the River Tees is monitored further upstream beyond the Tees Barrage, although flow data are not relevant to the site, given the presence of the barrage and the tidal influence at the site, as well as the difference in geology between the site and the locations of the flow gauges.

In addition to the Tees estuary, there are several small surface water bodies within or close to the site, including ponds, lagoons, drainage channels and culverts. These are considered to be ephemeral, although there are wetland species (e.g. common reed) recorded. The water bodies are likely to be the result of localised poor drainage. The former course of Holme Beck runs immediately to the west of the site, in a north/northwest direction, and comprising the linear topographic low. The watercourse is now culverted and diverted to lie north of the site boundary, being culverted to the east to join the Cleveland Channel which flows into the Lackenby Channel. These two channels appear as lagoons, which drain out to the Tees at Teesport. To the east of the site, the Knitting Wife culvert also drains into the Cleveland Channel, and a storm drain connects these culverts upgradient of the site (FRA and Outline Drainage Strategy, Volume 3).

There are three unmapped small ponds located to the north, south east and south of the site, with no obvious inlets or outlets (Figure 6.3, Volume 2).

Given the protracted history of activities in the area, it is possible that other culverted structures may be present.

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[3] https://nrfa.ceh.ac.uk/data/station/peakflow/25005

[4] https://riverlevels.uk/north-yorkshire-tees-dock-tidal

8.4.6 Flood Risk

A Flood Risk Assessment (FRA) and Outline Drainage Strategy is provided in Volume 3. Chapter 9 deals with Flood Risk and Drainage

The site close to the River Tees estuary but nonetheless has low risk for surface water flooding (FRA; Volume 3). In addition, the site is not located within or adjacent to areas of reservoir flooding or flood defences. Groundwater flooding risk is also low (FRA and Outline Drainage Strategy; Volume 3) and only likely as a contributing factor to other sources of flooding, influencing the duration and extent of flooding, due to the drainage provided by the glacio-lacustrine deposits underlying the site.

8.4.7 Geology and Soils

Whilst the underlying geology is not considered to be a receptor, the geological environment controls the behaviour and quality of the groundwater and potential pathways to receptors and is, therefore, described as part of the baseline conditions at the site.

The BGS Geoindex indicates that the superficial deposits across the site comprise glaciolacustrine deposits of clay and silt. Borehole records from the BGS online mapping close to the site indicate that silty clays have indicative thicknesses of 7->10 m.

To the north, deposits comprise Tidal Flat deposits of sand, silt and clay (Figure 8.3; Volume 2) overlain by Made Ground from historic land reclamation during development of the iron and steel making industry along the Tees corridor. The nearest borehole record from the BGS online mapping (NZ52SW131/D at NGR 454866 521300, to the east of the site) indicates that slag lies within the topsoil, and overlies laminated brown silty clays (Tidal Flat deposits), which extend beneath this to ~6 m below ground level (mbgl) over Boulder Clay, to rock head at approximately 10 mbgl.

Historical data indicate that the boundary between the Glaciolacustrine and Tidal Flat deposits lies further north than that indicated by the BGS (CH2M, 2017).

The UK Soil Observatory viewer indicates that the Soilscapes Mapping for England Wales category for the site is for seasonally wet loamy and clayey soils with naturally high groundwater.

The bedrock geology of the site comprises mudstones of the Mercia Mudstone Group, with the Penarth Mudstone Group and the Redcar Mudstone Formation to the south (Figure 8.4; Volume 2). The Mercia Mudstones overlie the Sherwood Sandstones which occur at some 400-500mbgl.

Intrusive investigations have been undertaken across the site, associated with historic phases of work on the site. This includes outputs of work undertaken in 2005 and summarised in the Phase 1 Environmental Review carried out for the site by Enviros (2007). A more detailed summary of the ground conditions reported from this investigation is provided within their report.

The ground conditions generally concur with those in published data, although there is uncertainty whether the glaciolacustrine deposits are dominated more by Tidal Flat deposits. Nonetheless, limited Made Ground is indicated on the BGS online mapping, yet the site's extensive industrial history suggests Made Ground to be extensive.

A summary of the ground conditions, aggregated from these reports, is provided in Table 8.9.

Table 8-9 Summary of ground conditions (Enviros, 2007)

Unit	Depth (mbgl)
Made Ground	0-1.9
Upper Boulder Clay	0.3-2.6
Laminated Clay	1.7-4.8
Lower Boulder Clay	2.4-5.9
Rock	0.6-11.8

The area is identified as being of low geological hazard risk (shrink swell, running sands, landslide), and is not located within a Coal Mining Area.

8.4.8 Land Quality - Soils

This area was previously occupied by Cleveland Steel Works (1800s) and included blast furnaces, coke ovens, a Bessemer furnace, steel mills and associated plant. The existing Torpedo Ladle Workshop was formerly home to a series of open-hearth furnaces. Former activities have left a legacy of contamination, buried structures, utilities and chambers across the site. The former coke ovens location, to the western side of the site, is likely to be the most heavily impacted area.

A summary of manmade features within the site is covered within the Enviros (2007) Phase 1 Environmental Review, and an evaluation made of geo-environmental conditions and contamination. In summary, the 2005 data showed that the most elevated hydrocarbons on site occurred on the western side of the coke ovens. Due to the presence of loose furnace brick infill and concrete bases, it was not possible to determine whether this contamination was present further east of the coke ovens.

8.4.9 Hydrogeology and Groundwater Vulnerability

The bedrock mudstone is classified as a Secondary B Aquifer, defined by the EA as predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers. The superficial geology is classified as Secondary (undifferentiated) Aquifer, which has been assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the lithology.

Groundwater levels have been reported between 1.52 and 2.5 mbgl (Enviros, 2007), with perched groundwater levels occurring within the laminated clay, above the Glacial Till. Due to the variability of permeability across the site, perched water is not considered to be laterally continuous. It is inferred that, overall, groundwater flows westwards towards the Tees Estuary, although local flow directions may vary. This is attributed to the variations in composition of the Made Ground and Tidal Flat deposits, and variations in the permeability of the underlying superficial deposits. In addition, although unlikely at this location, tidal water level variations may influence the water table under the site.

The conceptual understanding of the overall groundwater functioning of the site is for direct recharge through the Made Ground, mainly high permeability granular material comprising slag deposits. Below this, groundwater within the glacio-lacustrine/Tidal Flat deposits are likely to comprise a perched water table above Glacial Till overlying the mudstone. Although the perched water tables are not likely to be laterally continuous across the site and may vary in elevation, it is nonetheless likely to be in

hydraulic connectivity with the River Tees where these water tables lie within Made Ground.

Groundwater vulnerability in the east of the site is classed as 'Minor Aquifer High'. The high permeability of drift cover here makes the mudstone bedrock highly vulnerable to pollutants. The classification reflects the likelihood of a pollutant discharged at ground level reaching groundwater (expressed as high, intermediate or low vulnerability). The potential for groundwater pollution is greatest where the classification is 'high'.

8.4.10 Groundwater Quality

The groundwater quality of the Tees Mercia Mudstone and Redcar Mudstone groundwater body (ID GB40302G701300) has been assessed in 2016 as having a WFD status of 'Poor' in the Northumbrian River Basin Management Plan (RBMP). This appears to be due to the general chemical status in relation to the ironstone mining history of the area and due to risk of nitrate contamination[5].

Source Protection Zones (SPZs) (inner, outer and total catchment) are defined around abstraction boreholes that are used for public water supply (see below), to help monitor the risk of contamination from any activities that might cause pollution in the area. The closer the activity, the greater the risk is likely to be. The zones are used in conjunction with the EA's Groundwater Protection Policy (GP3) to set up pollution prevention measures and monitor the activities of potential polluters near public water supply boreholes. The site does not lie within a defined SPZ, nor is within 5 km of one.

The site investigation carried out by Enviros (2007) did not undertake groundwater monitoring. Recommendations for a Phase 2 intrusive investigation were made, including characterisation of groundwater, although no further site investigations are known to have taken place.

8.4.11 Abstractions and Discharges

Available information from the EA indicates that there are six[6] abstractions within 5 km of the site and are shown on Figure 8.5 (Volume 2). Of these, the groundwater abstractions are all located on the north side of the River Tees and, due to the hydraulic barrier formed by the River Tees, it is unlikely that any of these abstractions have their catchment within the site of the proposed development.

Similarly, the nearest surface water abstraction lies on the north side of the River Tees, and to the west of the site, and is unlikely to have its catchment within the site of the proposed development.

The remaining abstraction is tidal and lies on the south bank of the River Tees, downgradient of the site. The abstraction on the south bank of the River Tees is for power station cooling.

Discharge data provided by the EA indicate that there are numerous active consented permits within the vicinity of the site and are shown on Figure 8.5 (Volume 2). None of the discharges lie within the site. All the discharge purposes are for sewage or trade effluent, issued to ground/infiltration, surface water or tidal water receiving water bodies.

Although these discharges are deemed to be active consented, it is possible that many are now out of use, given that only five of the thirty were issued in the last ten years. Of those discharges closest to the site boundary i.e. northwest of the site, none were issued within the last ten years.

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[5] http://environment.data.gov.uk/catchment-planning/OperationalCatchment/1228/Summary

6 Pending an updated dataset from the EA

On the basis of the above information, of the consented discharges shown on Figure 8.1 (Volume 2), only the five freshwater (Tees & Hartlepool Port Authority) / estuary (Northumbrian Water pumping station) discharges northwest of the site, and the estuary discharge north of the site (PD Teesport) are deemed to be potentially impacted by the proposed development.

None of the other discharge receiving waterbody locations are likely to have their flows or water quality altered by the proposed development.

R&CC confirmed that there are no abstractions for private water supply within 2 km of the site. Whilst every effort has been made to locate private water supplies, there is the potential for unrecorded private supplies to be present.

8.4.12 Nature Conservation Sites

There are no sites designated for geological importance within the footprint of the proposed development.

Baseline ecology is presented in Chapter 8.

8.4.13 Predicted Future Baseline

Hydrological systems are in a state of constant flux. The two main influences on the future hydrological and hydrogeological regime of the site and surrounding area are climate change and local land use change, which have the potential to change the river flow regime (through changes in rainfall patterns as a result of climate change) and ground permeability (through changes in land use).

As a result of climate change, it is predicted that winters will become generally wetter and summers generally drier. The NPPF provides recommended climate change sensitivities for rainfall intensity and river flows[7] (see Table 8.10). Potential climate change sensitivities can be used to guide the design of SuDS and derive appropriate design levels. The applicable increases are dependent on the development's expected lifetime, as shown in Table 8-.

Table 8-10 Climate change allowances

Parameter	Allowance category	2015-2039	2040-2069	2070-2115
Peak rainfall intensity (UK)	Higher central	10%	20%	40%
	Central	5%	10%	20%
Peak river flow (Northumbria)	Upper end	20%	30%	50%
	Higher central	15%	20%	25%
	Central	10%	15%	20%

Additional climate change projections are given by the UK Climate Projections (UKCP18)[8]. In UKCP18, the probabilistic projections provide local low, central and high changes across the UK, corresponding to 10%, 50% and 90% probability levels. These local values can be averaged over the UK to give a range of average precipitation changes between the 10% and 90% probability levels. By 2070, in the high emission scenario, this range amounts to -47% to +2% in summer, and -1% to +35% in winter

[7] https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#table-1

[8] https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-headline-findings-2.pdf

(where a negative change indicates less precipitation and a positive change indicates more precipitation).

This pattern of decreased summer rainfall and increased winter rainfall is likely to result in greater seasonality of flows and water levels, with greater susceptibility to both drought and extreme flood events. An increased frequency of flooding has the potential to trigger morphological changes in watercourses.

Climate change projections have been considered further in the FRA and Outline Drainage Strategy (Volume 3).

In the absence of the proposed development it is likely that the land use and management of the site and its immediate surrounds would remain the same as recorded in the current baseline. Changes to the water environment would therefore not be anticipated.

Development of the site identified in Chapter 3 would be unlikely to result in any changes to the water environment which would alter baseline conditions provided that they implement standard measures to avoid flood risk, manage surface water drainage and prevent pollution, and adhere to relevant policy and legislation.

8.5 Potential Impacts & Significant Effects – Construction

This section outlines the potential effects that would be anticipated to occur (from the proposed activities) on the water environment, prior to the implementation of any mitigation measures additional to those incorporated into the design.

The following types of potential effect (prior to mitigation) of the proposed development upon water environment interests have been identified:

- Potential adverse effects on drainage patterns, surface water flows and aquifer recharge, principally in relation to a change in runoff patterns and drainage, and associated with groundworks from site development and construction of a new quay; and;
- Potential pollution to watercourses and underlying aquifers through increased suspended sediment release on or adjacent to the proposed development. This may arise from runoff associated with construction activities e.g. through generation of silt borne run-off during groundworks, accidental spills and leaks from construction plant as well as accidental spillage from operational site activities.

The following assessment addresses these potential effects for each stage of construction, operation/maintenance and the subsequent decommissioning of the scheme.

8.5.1 Surface watercourses - flows

Surface water flows could be impacted during the excavation and placement of site won material. Current proposals involve excavation of site-won soils to depths of approximately 2 mbgl, processing and controlled re-placement in order to form a new ground surface. This could result in increased surface runoff from the site. Nonetheless, given that there is currently low runoff due to the presence of high permeability superficial material across the site, runoff rates during construction are unlikely to vary. As such, for the River Tees surface water body, which is of very high sensitivity, without design mitigation in place the minor magnitude of change which may be expected means that the level of effect would be moderate and, therefore, significant. Nonetheless, for other surface water receptors, a minor magnitude of change would also be subject to a level of effect that would be negligible, and not significant.

8.5.2 Surface watercourses – water quality

The potential for pollution of surface water is principally when high levels of suspended solids and/or leachates from Made Ground have the potential to enter local watercourses during earthworks. Due to the low-lying location of the site, being adjacent to Holme Beck, there is the potential that soils excavated during construction or mobilised contaminants could wash away during extreme weather events directly into the adjacent surface water features.

Given that fuels, oils and chemicals would be stored on-site during certain phrases of works (e.g. for re-fuelling of plant and equipment), spillages and leakages could occur. The potential spillages and leakages are likely to be localised. However, depending on location, they may present a risk to surface water quality. This is likely to result a minor magnitude of change given the on-site management protocols that would be adopted to deal with such incidents during construction works. Even for the on-site very low sensitivity receptor of Holme Beck, this would result in a negligible level of effect of pollution which would be deemed to be not significant.

During the placement of the new surface water drainage system, oil-water interceptors would be placed at any outfalls from the site. This would provide the opportunity to isolate the system, should spillage of polluting chemicals occur. Foul water will be collected via a separate system and gravitated to the main sewer with an appropriate consent.

The placement of imported materials across the site e.g. aggregate (in order to provide site gradients for drainage) also has the potential to impact on water quality. However, the landside impacts e.g. for Holme Beck/Cleveland and Lackenby Channels/unnamed pond could be of moderate magnitude of change. Nonetheless, for these very low sensitivity receptors, this would result in a negligible effect, which is not significant.

8.5.3 Discharges – flows

Identified discharges flows could be impacted during the excavation and placement of site won material if they are unable to maintain their current flow path within the receiving water body. However, given the low runoff due to the presence of high permeability superficial material across the site, runoff rates during construction are unlikely to be impeded. In addition, the large flows within the estuary are likely to be several orders of magnitude greater such that these discharges are unlikely to be affected by the proposed development and can be discounted from any further assessment.

As such, for the very low sensitivity freshwater river discharges, given the design mitigation in place, the minor magnitude of change would mean that the level of effect would be negligible and, therefore, not significant.

8.5.4 Discharges – water quality

The potential for pollution of surface water is principally when high levels of suspended solids and/or leachates from Made Ground have the potential to enter local watercourses during earthworks. Due to the low-lying location of the site, being adjacent to Holme Beck, there is the potential that soils excavated during construction or mobilised contaminants could be transported during extreme weather events directly into the adjacent surface water features and which may affect existing consented discharges. .

Given that fuels, oils and chemicals would be stored on-site during certain phrases of works (e.g. for re-fuelling of plant and equipment), spillages and leakages could occur. The potential spillages and leakages are likely to be localised. However, depending on location, they may present a risk to surface water quality and existing consented discharges. This is likely to result a minor magnitude of change given the on-site

management protocols that would be adopted to deal with such incidents during construction works.

In addition, it is noted that the large flows within the estuary are likely to dilute discharges sufficiently that estuarine discharges are unlikely to be affected by the proposed development and can be discounted from further assessment.

Therefore, for the very low sensitivity freshwater river discharge receptors, this would result in a negligible level of effect of pollution which would be deemed to be not significant.

8.5.5 Groundwater aquifer - flows

For the anticipated construction activities, the ground surface would largely be expected to remain above the groundwater table, and it is unlikely that groundwater would be encountered as part of these works. In addition, given the groundwater here is not used as a resource, the magnitude of the effect of excavation on groundwater flow is deemed to be minor. Alongside a receptor sensitivity category for the superficial aquifer of very low, the level of effect is therefore negligible, and not significant.

8.5.6 Groundwater – water quality

Overall, due to the presence of Glacial Till underlying the tidal mudflats and Made Ground, the bedrock aquifer is considered to be in limited hydraulic continuity with the surface waters in the Tees estuary. Nonetheless, some continuity cannot be ruled out, and so potential impacts to the bedrock aquifer from pollution are deemed to be of minor magnitude. As such, the level of effect to this low sensitivity receptor is determined to be negligible, and not significant.

Excavations associated with the proposed development would be of a superficial nature and are not anticipated to extend downwards into the underlying aquifer. Also, the use of site won and imported soil-based material used during construction would comply with the agreed re-use criteria, which would be set out in site construction documentation, such as the CEMP.

During future piling activities associated with future site redevelopment, groundwater quality of the aquifer units may be affected where there is potential to generate viable pollutant linkage between the potentially contaminated shallow soils (Made Ground) and groundwater (perched or otherwise). This may impact on the aquifer units below and any surface waters to which they are hydraulically connected. However, the work would be undertaken in accordance with EA guidance[9] and a piling risk assessment for the site. Therefore, any effects on groundwater quality are likely to be of minor to moderate magnitude of change, and the level of effect would be deemed to be no greater than slight, and not significant.

Given that fuels, oils and chemicals would be stored on-site during certain phrases of works (e.g. re-fuelling of machinery), spillages and leakages could occur. The potential spillages and leakages are likely to be localised. However, depending on location, they may present a risk to groundwater quality. This is likely to result a minor magnitude of change given the on-site management protocols that would be adopted. For the low sensitivity aquifer receptors, this would result in a negligible level of effect of pollution which would be deemed to be not significant.

[9] EA, May 2001. Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention NC/99/73.

8.5.7 Human health

The presence of residual contamination within shallow soils and groundwater, identified across the site in historic ground investigations, may present a risk to human health, principally during the construction phase. The risks would be likely to include direct exposure to soil-derived contaminants in the form of dusts, vapours and from dermal contact. Effects on human health could be of moderate to major magnitude of change. For these very high sensitivity human health receptors, without mitigation this would result in a large level of effect, which would be deemed to be significant in EIA terms.

8.6 Potential Impacts & Significant Effects – Operation

8.6.1 Surface watercourses - flows

During the operation of the site, surface water flows would be managed by a new drainage system. As such, the magnitude of change for flow would be negligible and, even for the very high sensitivity River Tees, the level of effect would be slight, and not significant.

8.6.2 Surface watercourses – water quality

Surface water from the site would be collected and discharged through the proposed new drainage system during the operational stage (FRA and Outline Drainage Strategy; Volume 3). This would enable water to drain from the surface area of the proposed scheme without impacting on water quality within the Tees estuary.

During the operation of the new surface water drainage system, foul water will be collected via a separate system and discharged to the main sewer. As such, the magnitude of change for water quality for even the very high sensitivity River Tees would be negligible, so that the level of effect would be negligible, and not significant.

8.6.3 Discharges – flows

During the operation of the site, surface water flows would be managed by a new drainage system. As such, the magnitude of change for discharge (and their receiving water bodies) flows would be negligible and, for the very low sensitivity freshwater river discharges, the level of effect would be negligible, and not significant.

8.6.4 Discharges – water quality

Surface water from the site would be collected and discharged through the new drainage system that is proposed, during the operational stage. This would enable water to drain from the surface area of the proposed scheme without impacting on water quality for active discharges. As such the magnitude of change for water quality would be negligible and for the very low sensitivity freshwater river discharges, the level of effect would be negligible, and not significant.

8.6.5 Groundwater aquifer - flows

The collection of surface water from the site using the new drainage system that is proposed potentially limits the volume of direct recharge to the aquifer. However, the aquifer is not used as a resource for abstraction and is of limited potential. As such, the magnitude of change for groundwater flows impacts during operation is moderate. Nonetheless, for these low sensitivity groundwater receptors the level of effect is slight, and not significant.

8.6.6 Groundwater – water quality

The collection of surface water from the site using the new drainage system that is proposed minimises the potential for any contaminated surface runoff to reach the superficial or bedrock aquifer during the operational stage. In addition, control of re-

placement of material in the construction phase means that rainfall-infiltration through the Made Ground is unlikely to introduce potential contaminants to groundwater. As such, the magnitude of change for groundwater quality impacts during operation is negligible, and the level of effect on the low sensitivity groundwater receptors is negligible, and not significant.

8.6.7 Human health

The presence of residual contamination within shallow soils and groundwater, identified across the site in historic ground investigations, may present a risk to human health, additionally during the operation phase. Effects on human health could be of moderate magnitude of change. For these very high sensitivity human health receptors, without mitigation this would result in a large level of effect, which would be deemed to be significant in EIA terms.

8.6.8 Predicted Effects: Decommissioning

The planning application seeks a permanent rather than a time-limited planning permission for the proposed development. If it is decided that the site should be decommissioned, a decommissioning method statement would be prepared and agreed with the local authority at least six months prior to the commencement of the decommissioning. As such, decommissioning effects are not considered further here.

8.7 Mitigation Measures

All construction work has the potential to impact on the water environment, through spillages, mobilisation of contaminants and sediment by disturbance of contaminated ground or surface runoff. Full details on the activities proposed during the construction phase of the proposed scheme are provided in Section 3 but the key activities, which could result in the effects to the water environment, are summarised below in the context of the ES:

- Installation of drains;
- Land-raising operations;
- Earthworks; and
- Piling works.

These activities may have impacts to the groundwater body underlying the site. In addition, the installation of new land drains will ultimately discharge to the River Tees.

Environmental measures that have been incorporated into the proposed development are set out in Table 8-3. All environmental measures have been designed to protect the water environment and human health at the Site from any significant impact. This includes measures designed to safeguard against any deterioration in the overall WFD ecological status of the receiving water bodies, or in any of the contributing status elements.

Table 8-3 Rationale for incorporation of environmental measures

Receptor	Potential Impact	Design Mitigation
River Tees estuary Holme Beck tributary, Knitting Wife Culvert and the Cleveland and Lackenby Channels (flooding)	Increased risk of flooding from increased surface runoff reaching watercourses.	The development will incorporate a Drainage Strategy appropriate to the site to reduce runoff rates as set out in the FRA and Surface Water Drainage Strategy (Volume 3), whilst also taking into account potential changes in rainfall from climate change. The attenuation requirements on site will be met through the use of a proposed detention basin which will discharge via a flow control device to

Receptor	Potential Impact	Design Mitigation
		restrict outflow to the Holme Beck culvert.
River Tees estuary, Holme Beck tributary, Knitting Wife Culvert, Cleveland and Lackenby Channels, and discharges (surface water flows)	Increased runoff to watercourses and drains due to increased roadways and areas of hardstanding could affect channel morphology.	The potential effects of the scheme have been minimised by restricting runoff rate to that of pre-development runoff rate. Few impermeable surfaces are proposed. On-site management of surface runoff has been considered in the FRA and Outline Drainage Strategy (Volume 3). The drainage design takes account of climate change and such that water draining from the site into watercourses will not exceed existing runoff rates. The timing of excavation and re-placement of ground materials should be sensitive to avoiding poor weather conditions. The developer will need to comply with the requirements of the FRA in order that no impacts arise on flow volumes. Holme Beck is an Ordinary Watercourse, therefore, proposed discharge rates (if any) must be agreed with the LLFA.
	Change in water quality from increased sediments in surface runoff.	The proposed drainage system incorporates design features to remove silt and other suspended solids, as well as capture any spills/oil and grease, prior to discharge. The timing of excavation and re-placement of ground materials should be sensitive to avoiding poor weather conditions. Other pollution control measures advised in the FRA and Outline Drainage Strategy (Volume 3), such as bunding of potential sources of contamination, will also be implemented in order to prevent potential contamination incidents of the receiving watercourse.
	Change in water quality from a change in land use or drainage patterns at consented discharge locations.	The proposed drainage system within the site boundary means that no overall changes to local drainage patterns around discharge locations are anticipated.
	Potential pollution from silt and accidental spills or leaks.	A range of environmental measures will be implemented during construction to deliver adherence to the EA's PPG notes, CIRIA guidance into Construction Method Statements and other current best practice. These will be set out in a Construction Environmental Management Plan (CEMP). Measures to reduce the risk of silt pollution and contamination from chemicals/oils include: Minimising the amount of exposed ground and soil stockpiles from which water drains and the period of time such water drains; Storage of all chemicals and oils within areas of hard standing and installation of secondary containment, such as a bund wall, so that 110%

Receptor	Potential Impact	Design Mitigation
		of the stored capacity is provided for. Storage areas should be located at least 10m away from any surface watercourses and areas at risk of flooding; Plant and machinery used during the construction phase would be well maintained to minimise the risks of oil leaks or similar. Maintenance and re-fuelling of machinery would be undertaken offsite or within designated areas of temporary hardstanding. In these designated areas, contingency plans would be implemented so that the risks of spillages are minimised. Placing a drip tray beneath plant and machinery during re-fuelling and maintenance would contain small spillages; and Locating plant and wheel washing facilities in a designated area of hard standing at least 10m from any watercourse or surface water drain. Groundwater and surface water monitoring will be carried out associated with any site investigation programme carried out. This would continue throughout the construction phase and would include a contingency plan, detailing actions to be taken should a departure from the established baseline be identified. Relevant guidance and monitoring guidelines would be set out in the CEMP. An emergency response protocol will be developed by contractors and incorporated into the CEMP so that any accidental spillages are intercepted and that there are procedures for site staff to follow. Spill containment equipment (e.g. absorbent material) will be provided on site. Effluent from welfare facilities on the site will either be taken off site for disposal and treatment or routed to the local sewer network.
	Potential failure of wastewater infrastructure to cope with additional flows from the development resulting in a deterioration in the quality of surface waters and groundwater (affecting WFD chemical status).	Northumbrian Water would need to confirm capacity is available in their network to accommodate flows from the development.
Secondary Aquifers (groundwater recharge)	Groundwater recharge to the Secondary Aquifers may be reduced as a result of the increase in roadways,	While recharge rates across areas of hardstanding will lead to decreased infiltration, this receptor is not otherwise utilised as a water resource and does not need to be accommodated within the design.

Receptor	Potential Impact	Design Mitigation
	driveways and areas of hardstanding.	
Secondary Aquifers (groundwater quality)	Groundwater quality may be impacted by changes in pathways of soils during excavation and re-placement of materials.	As above, groundwater monitoring would be ongoing, to determine whether the potential for mobilisation of contaminants is likely, prior to excavation.
Surface waters and groundwater	Potential for mobilisation (e.g. leaching) of contaminants from soils encountered during construction phase.	Any surplus material is the property of the landowner / occupier who will consult with the EA as required before off-site disposal of any surplus materials which fall outside of acceptability criteria; and, Disposal of any surplus materials shall be undertaken in accordance with the Waste Management Licensing Regulations 1994 and Duty of Care requirements in accordance with the Environmental Protection Act 1990.
Human health	Potential for encountering contaminated soils during site re-development which could impact site workers, site visitors and those at nearby facilities.	In advance of site development, an updated Contaminated Land risk assessment should be undertaken, which may include additional ground investigation to characterise soil and groundwater conditions. Subsequently, a Remediation Strategy should be developed for the Site which would look to refine further baseline assessments, consider the risks associated with the identified contamination, and propose appropriate construction/ operational phase mitigation measures to reduce the potential for identified impacts to occur.

Whilst not considered a receptor, soils across the site are proposed to be excavated, processed, and re-used as part of the site construction. It is possible that potentially contaminated soils could be encountered during these activities. The potential for cross-contamination as a result of soil movements would be mitigated following the principles of the Definition of Waste Code of Practice, incorporating the development of a Materials Management Plan. Excavated soils would be chemically tested and screened against assessment criteria to demonstrate the soils are suitable for use prior to re-placement on site. This is also applicable to materials which may need to be imported on to the site. This would be set out in the Remediation Strategy.

The impact assessment has been carried out on the assumption that the above principles would be adopted through the construction, operation and decommissioning phases.

Where the presence of contaminated materials is known or suspected, testing of soil samples in advance of construction could be used to clarify the baseline conditions and potential contaminants in the soil. Subsequently, verification testing will be undertaken in order to establish contamination levels and thereby determine an appropriate methodology for dealing with materials suspected as being contaminated. A watching brief will also be maintained during site re-development works.

8.8 Residual Effects

Following site investigation and water environment monitoring of the development, and application of the appropriate mitigation following the mitigation hierarchy, no significant residual impacts are predicted during construction, operation or decommissioning of the project. Residual effects to the water environment and human health are summarised in Table 8-4.

Table 8-4 Summary of water environment and human health impacts

Water Environment Receptor	Impact	Receptor Sensitivity	Impact without Mitigation	Mitigation	Significance of Effects of Residual Impacts
During Construction					
Surface water					
River Tees estuary	Increased runoff	Very high	Moderate adverse	Implementation of Drainage Strategy to reduce runoff rates whilst taking into account potential changes in rainfall from climate change. Few impermeable surfaces are proposed. The timing of excavation and re-placement of ground materials should be sensitive to avoiding poor weather conditions. The developer will need to comply with the requirements of the FRA in order that no impacts arise on flow volumes.	No significant effect from residual impacts.
	Mobilisation of contaminants and sediment Spillages and leakages causing pollution		Moderate adverse	Implementation of Drainage Strategy to remove silt and other suspended solids, as well as capture any spills/oil and grease, prior to discharge. The timing of excavation and re-placement of ground materials should be sensitive to avoiding poor weather conditions. Placement of oil-water interceptors at drainage system outfall. Foul water directed to mains sewer. Implementation of appropriate pollution prevention measures e.g. CIRIA guidance: Control of water pollution from construction sites. Guidance for consultants and contractors (C532D).	No significant effect from residual impacts.

Water Environment Receptor	Impact	Receptor Sensitivity	Impact without Mitigation	Mitigation	Significance of Effects of Residual Impacts
Other surface water bodies (Holme Beck, Knitting Wife Culvert, Cleveland & Lackenby Channels, and unnamed ponds)	Increased runoff	Very low	Negligible adverse	Implementation of Drainage Strategy to reduce runoff rates whilst taking into account potential changes in rainfall from climate change. The drainage system means that no overall changes to local drainage patterns are anticipated. Few impermeable surfaces are proposed. The timing of excavation and re-placement of ground materials should be sensitive to avoiding poor weather conditions. The developer will need to comply with the requirements of the FRA in order that no impacts arise on flow volumes. Holme Beck is an Ordinary Watercourse, therefore, proposed discharge rates (if any) must be agreed with the LLFA.	No significant effect from residual impacts.
	Mobilisation of contaminants and sediment Spillages and leakages causing pollution		Negligible adverse	Implementation of Drainage Strategy to remove silt and other suspended solids, as well as capture any spills/oil and grease, prior to discharge. The timing of excavation and re-placement of ground materials should be sensitive to avoiding poor weather conditions. Placement of oil-water interceptors at drainage system outfall. Foul water directed to mains sewer. Implementation of appropriate pollution prevention measures e.g. CIRIA guidance: Control of water pollution from construction sites. Guidance for consultants and contractors (C532D).	No significant effect from residual impacts.
Groundwater					
Mercia Mudstone	Reduced infiltration	Low	Negligible adverse	Few impermeable surfaces are proposed.	No significant effect from residual impacts.

Water Environment Receptor	Impact	Receptor Sensitivity	Impact without Mitigation	Mitigation	Significance of Effects of Residual Impacts
	Pollution from spills Contaminant pathways activated		Slight adverse	Any surplus material is the property of the landowner / occupier who will consult with the EA as required before off-site disposal of any surplus materials which fall outside of acceptability criteria; and, Disposal of any surplus materials shall be undertaken in accordance with the Waste Management Licensing Regulations 1994 and Duty of Care requirements in accordance with the Environmental Protection Act 1990. Groundwater monitoring would be ongoing, to determine whether the potential for mobilisation of contaminants is likely, prior to excavation.	No significant effect from residual impacts.
Superficial aquifer	Reduced infiltration	Low	Negligible adverse	Few impermeable surfaces are proposed.	No significant effect from residual impacts.
	Pollution from spills Contaminant pathways activated			Any surplus material is the property of the landowner / occupier who will consult with the EA as required before off-site disposal of any surplus materials which fall outside of acceptability criteria; and, Disposal of any surplus materials shall be undertaken in accordance with the Waste Management Licensing Regulations 1994 and Duty of Care requirements in accordance with the Environmental Protection Act 1990. Groundwater monitoring would be ongoing, to determine whether the potential for mobilisation of contaminants is likely, prior to excavation.	No significant effect from residual impacts.
Other					

Water Environment Receptor	Impact	Receptor Sensitivity	Impact without Mitigation	Mitigation	Significance of Effects of Residual Impacts
Human health	Direct exposure to dusts, vapours and dermal contact	Very high	Large adverse	In advance of site development, an updated Contaminated Land risk assessment should be undertaken, which may include additional ground investigation to characterise soil and groundwater conditions. Subsequently, a Remediation Strategy should be developed for the Site which would look to refine further baseline assessments, consider the risks associated with the identified contamination, and propose appropriate construction/ operational phase mitigation measures to reduce the potential for identified impacts to occur.	No significant effect from residual impacts.
During Operation					
Surface Water Receptors					
River Tees estuary	Increased runoff	Very high	Slight adverse	It is expected that embedded mitigation measures will be in place to prevent impacts on the receptor from any ongoing increased runoff.	No significant effect from residual impacts.
	Spillages and leakages causing pollution		Negligible adverse	It is expected that embedded mitigation measures will be in place to prevent impacts on the receptor from an accidental release of compounds.	No significant effect from residual impacts.
Other surface water bodies (Holme Beck,	Increased runoff	Very low	Negligible adverse	It is expected that embedded mitigation measures will be in place to prevent impacts on the receptor from any ongoing increased runoff.	No significant effect from residual impacts.

Water Environment Receptor	Impact	Receptor Sensitivity	Impact without Mitigation	Mitigation	Significance of Effects of Residual Impacts
Knitting Wife Culvert, Cleveland & Lackenby Channels, and unnamed ponds)	Spillages and leakages causing pollution		Negligible adverse	It is expected that embedded mitigation measures will be in place to prevent impacts on the receptor from an accidental release of compounds.	No significant effect from residual impacts.
Groundwater					
Mercia Mudstone	Reduced infiltration	Low	Slight adverse	It is expected that embedded mitigation measures will be in place to prevent impacts on the receptor from any ongoing increased runoff.	No significant effect from residual impacts.
	Pollution from spills		Negligible adverse	It is expected that embedded mitigation measures will be in place to prevent impacts on the receptor from an accidental release of compounds.	No significant effect from residual impacts.
Superficial aquifer	Reduced infiltration	Low	Slight adverse	It is expected that embedded mitigation measures will be in place to prevent impacts on the receptor from any ongoing increased runoff.	No significant effect from residual impacts.
	Pollution from spills		Negligible adverse	It is expected that embedded mitigation measures will be in place to prevent impacts on the receptor from an accidental release of compounds.	No significant effect from residual impacts.
Other					
Human health	Direct exposure to dusts, vapours and dermal contact	Very high	Large adverse	It is expected that embedded mitigation measures will be in place to prevent impacts on the receptor, in line with the Remediation Strategy developed for the Site	No significant effect from residual impacts.

9 Flood Risk and Water Quality

9.1 Introduction

This section includes consideration of the Water Resources receptors within the proposed development. This links with Chapter 8, but focuses on Flood Risk and Water Quality. Water resources was scoped into EIA, particularly the flood risk and drainage impact. The Scoping Opinion identified 3 key aspects to consider within this chapter:

- The development needs to give due regard to the objectives of the Water Framework Directive. In considering the development further, we would expect a WFD Assessment to be submitted as part of a planning application. The WFD assessment should undertake an assessment of the proposed activity on the water environment.
- The Tees Estuary incorporates areas protected for conversation purposes. Therefore, any discharges to the Tees Estuary will need to assess the impact to the protected areas, and to the objectives of the WFD. The Applicant may need to undertake modelling and assessments which demonstrate the environmental impacts of any proposed discharges. In addition, best practice should be employed during the construction of the site to prevent leaks and spills of oils / fuels / chemicals, and mitigation of silty surface water.
- A site-specific FRA should accompany any application and should be in accordance with Policy SD7 Flood and Water Management. The LLFA would be happy to discuss any specific matters relating to flood risk, surface water management and drainage strategy.

Stand-alone Flood Risk Assessment (FRA), including Drainage Impact assessment (DIA) and Water Framework Directive Assessments have been prepared and are provided in Volume 3.

All Figures are provided in Volume 2.

9.2 Legislation, Policy and Guidance

Water resources are managed and protected under UK legislation and regulations consistent with European Community Directives. Where relevant, the assessment takes into account the legislative protection afforded to water resources, through relevant plans and national planning policies detailed below. The main legal framework is set by the following:

- Water Act 2003, as amended, which set out provisions for the control of pollution of water.
- Water Framework Directive (2000/60/EC) and the Water Environment (Water Framework Directive) (England and Wales) Regulations (SI 3242/2003) which introduced a new system for monitoring and classifying the quality of surface and ground waters.
- Land Drainage Act 1991, as amended.
- Water Industry Act 1991.
- Water Resources Act 1991.
- Environmental Permitting (England & Wales) Regulations 2016.
- Marine and Coastal Access Act 2009
- Control of Pollution (oil storage) (England) Regulations 2001.
- Environmental Damage (Prevention & Remediation) Regulations 2009.
- The EC Groundwater Directive (2006/118/EC) and the Groundwater Regulations 2010.

- Flood and Water Management Act 2010.

Further non-statutory guidance is provided in:

- Control of Water Pollution from Construction Sites – A Guide to Good Practice (CIRIA/C532);
- Engineering in the Water Environment. First edition, March 2009. Good Practice Guide: Temporary Construction Methods. SEPA
- Culvert design and operation guide CIRIA 2019;
- Engineering in the Water Environment: Good Practice Guide. River Crossings. Second Edition. November 2010. SEPA

National Planning Guidance

National policy relating to flood risk is now included within the National Planning Policy Framework (NPPF) which came into force in April 2012. This replaces Planning Policy Statement 25 Flood Risk and Development (2010). The principles in NPPF remain the same. There is no other national policy relating to aspects of the water environment. The NPPF was revised in July 2018. This was updated on 19 February 2019.

Local Policies

The Redcar and Cleveland Local Plan was adopted in May 2018 and sets out the vision and overall development strategy for the Council's area and how it will be achieved for the plan period until 2032.

The policies that are relevant to the proposed development are set out below:

SD7: Flood and Water Management states that flood risk will be taken into account at all stages in the planning process to avoid inappropriate development in areas at current or future risk. In addition, all development proposals will be expected to be designed to mitigate and adapt to climate change. The policy also sets out criteria where flood risk assessments will be required to demonstrate that development is not at risk from flooding and that it does not increase flood risk elsewhere in the following circumstances.

The South Teesside Development Corporation (STDC) is currently developing strategy documents for land within its portfolio. This includes Flooding and Drainage Risk.

9.3 Assessment Methodology

For the purposes of this assessment water resources include: water quantity, surface water quality, groundwater (quantity and quality) and flood and drainage risk issues. This section assesses the water environment at the site and those hydraulically linked features in the surrounding environs.

Given the scope of the assessment (based on construction activities only) the nature and characteristics of impacts are expressed as:

- Adverse – detrimental or negative impacts on an environmental resource or receptor;
- Beneficial – advantageous or positive impact on an environmental resource or receptor.

The general approach of the impact assessment to determine the **significance** of impacts follows the methodology described in Section 5. However, the value or sensitivity of the Water Environment receptors is described in Table 9-1.

Table 9-1 Criteria for Estimating the Importance/Sensitivity of Water Environmental Receptors

Value	Criteria
High	• A surface water resource of pristine or near pristine water quality, where water quality is not significantly affected by anthropogenic factors, and where water quality does not affect the diversity of species of flora and fauna. Includes sites with international, European and national nature conservation designations with water-dependent ecosystems. • A groundwater aquifer constituting a valuable resource because of high quality and yield, extensive exploitation for supply, or designated sites of nature conservation area dependent on groundwater. • A floodplain or flood storage area necessary to protect highly vulnerable development and valued resources from flooding.
Medium	• A surface water resource with a measurable degradation in its water quality as a result of anthropogenic factors, where the resulting water quality has only limited effect on the species diversity of flora and fauna in the water resource. Includes non-statutory sites of regional or local importance designated for water dependent ecosystems. • A groundwater aquifer of limited value because its quality does not allow potable or other quality-sensitive uses (but which may be used for agricultural or industrial purposes) and where exploitation is not extensive, or where local areas of nature conservation are known to be sensitive to groundwater quality. • A floodplain or flood storage area protecting development and resources which are classified to be of medium vulnerability.
Low	• A surface water resource with poor water quality resulting from human factors, where the species diversity of flora and fauna is greatly affected by significant water quality degradation. • A groundwater aquifer of low water quality and/or very low permeability that make exploitation of the aquifer unfeasible, or where changes to groundwater are not expected to have an impact on local ecology. • A floodplain or flood storage area with limited or no flood protection value (i.e. flood risk is low in terms of people, property and the environment).
Negligible	• A water body not included in the above categories.

The significance of the effect on the receptor and receptor's attributes (such as water quality) during both construction and operation can be established by considering the value of the receptor (Table 9-1) and the magnitude of the impact. There are no receptor specific criteria for identifying the magnitude for the Water Environment, therefore the methodology described in Section 5 has been followed.

9.4 Baseline Conditions

9.4.1 Flood Risk

Grangetown Prairie is located approximately 1.5 kilometres south east of the Tees Estuary. indicates that Holme Beck culvert flows northward at the western bound of the site and outfalls into Cleveland Channel which in turn, outfalls into the tidal Tees Estuary. Knitting Wife Culvert (Knitting Wife Beck upstream) is located 450 metres east of the site and also outfalls into Cleveland Channel.

Water courses are shown on Figure 9-1.

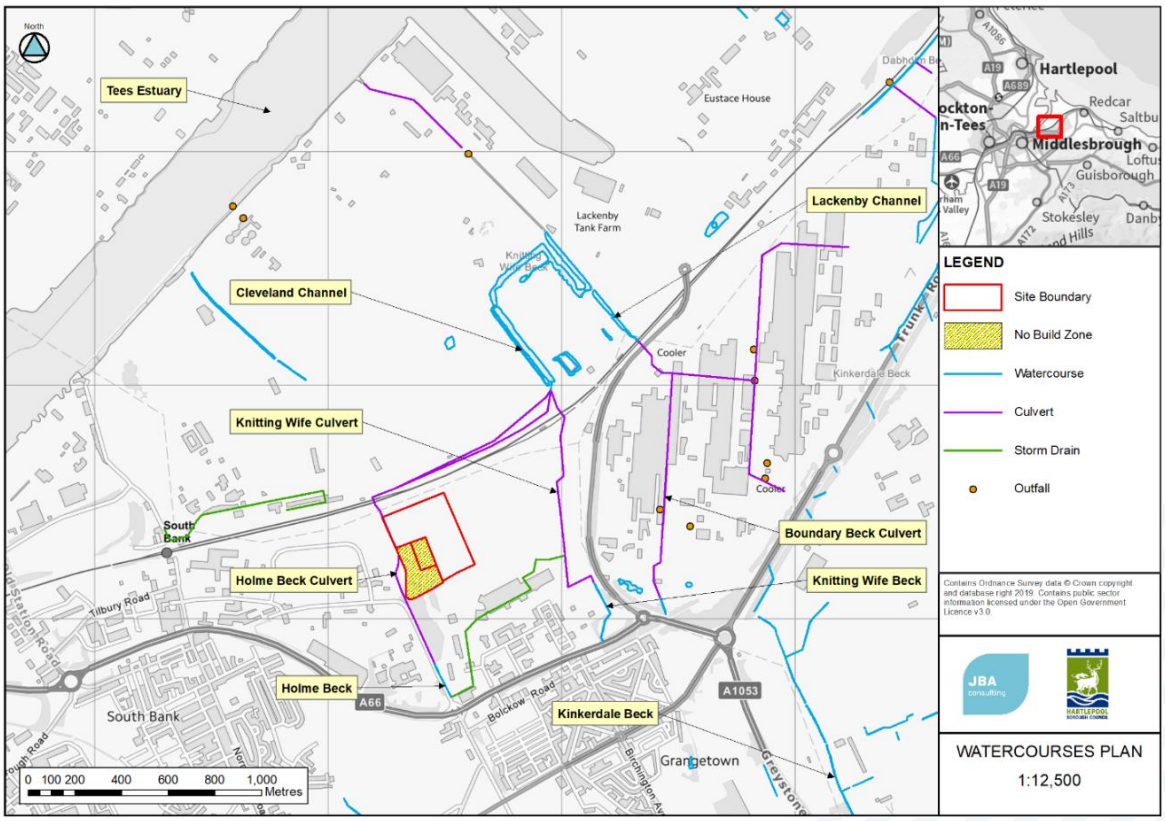

Figure 9-1 – Watercourses at Grangetown Prairie

Based on Environment Agency defined Flood Zones (Figure 9-2), 100% of the proposed facility site is located in Flood Zone 1. It is noted that these Flood Zones are based on modelled undefended fluvial and tidal flood extents and do not consider future climate change implications.

It is noted that tidal flood levels are predicted to increase with climate change, in accordance with Environment Agency defined flood risk assessments: climate change allowances[10], the predicted cumulative sea level rise 1990 to 2115 is 0.99 m for the North East. Based on LiDAR data, the lowest elevation of Area A is considered to be 7.4mAOD and the bank level at the Tees Estuary is 4.08mAOD, therefore, climate change sea levels will not exceed existing ground levels at the site. Further to this, the highest tidal river level on record at Tees Dock is 4.09mAOD (correct as of 26th November 2019) – a difference of greater than three metres compared to existing ground levels at the site.

[10] Flood risk assessments: climate change allowances - GOV.UK

Local Flood Zone 2/3 extents are contained within the estuarine River Tees channel to the north of the site and within the Normanby Beck river corridor two kilometres south west of the site (not shown on Figure 9-2), therefore, the site is not considered to be at risk of fluvial and tidal flooding during present day flood events. JFlow mapping in the subsequent section of this report assumes that Holme Beck Culvert is fully blocked and does not indicate any significant overland flow routes or interactions as a result.

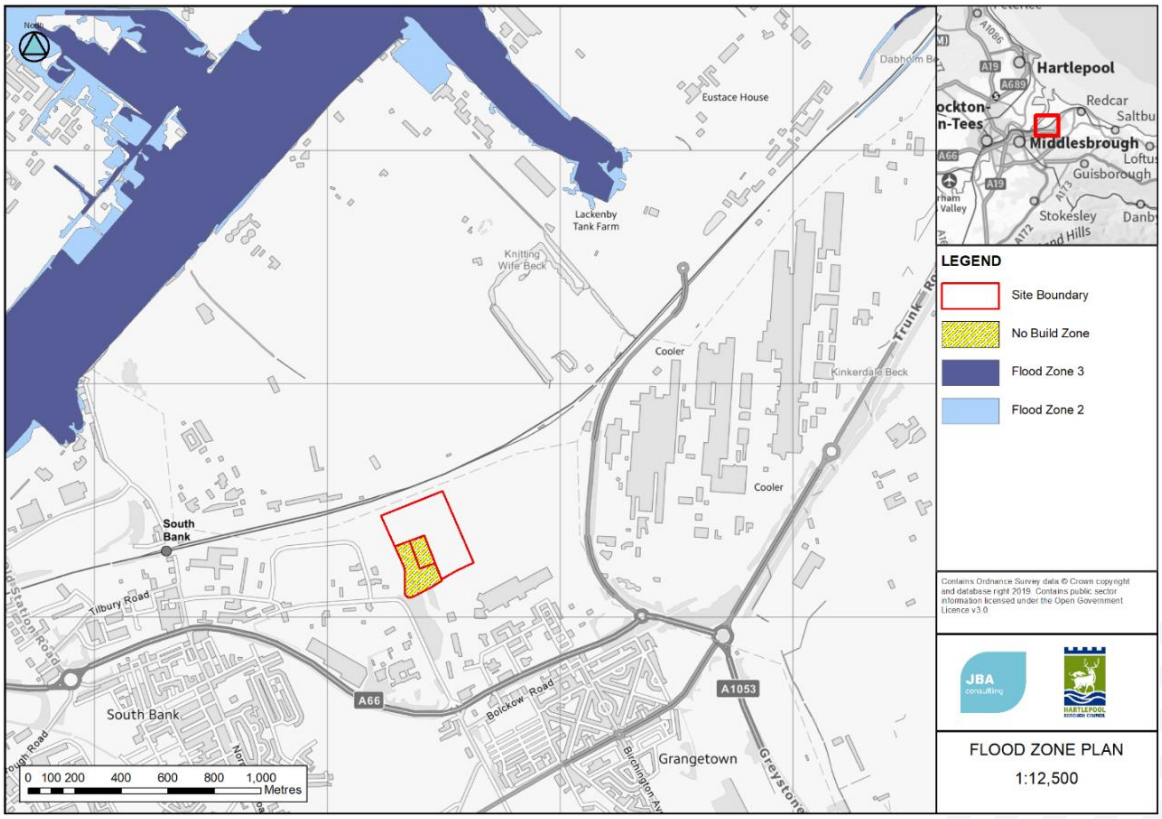

Figure 9-2 - Environment Agency defined Flood Zones

In accordance with National Planning Policy Framework (NPPF)[11], the proposed facility is considered to be essential infrastructure, therefore, development is appropriate in Flood Zone 1.

The proposed development is located outside of the predicted maximum extent of flood risk from reservoirs (Environment Long Term Flood Risk Map for England).

The Grangetown Prairie is not located within an EA Flood Warning Area.

Environment Agency defined Risk of Flooding Surface Water (RoFSW) mapping (as presented in Figure 9-3) indicates that the proposed development is at low risk of surface water flooding. It is noted that there is no significant flow route indicated in Holme Beck upstream of the site as this is upstream of the Grangetown Prairie catchment.

[11] National Planning Policy Framework - GOV.UK

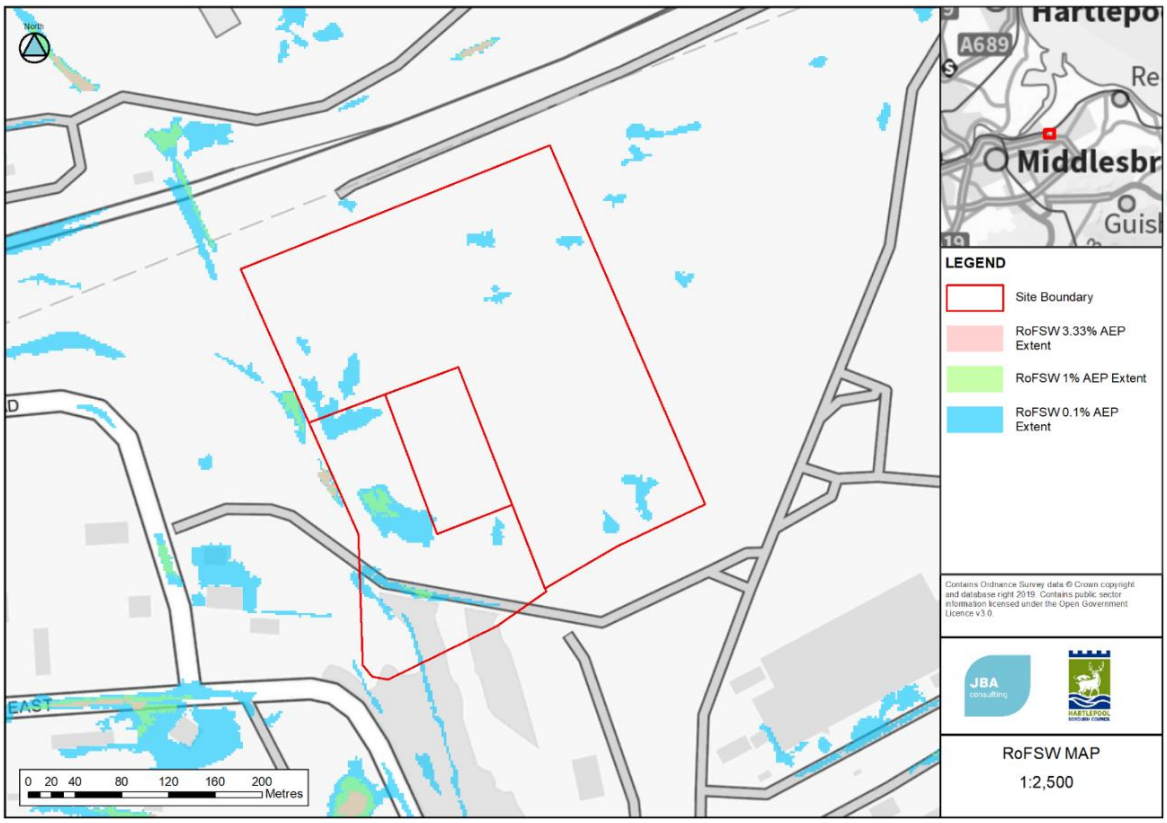

Figure 9-3 - Risk of Flooding from Surface Water Suitability

RoFSW mapping indicates localised areas of ponding in Area C in the 1% AEP event, becoming more significant (but remains localised) in the 0.1% AEP event.

It is understood that the proposed development is to be bunded at the perimeter of the site, therefore, JFlow modelling has been undertaken to quantify offsite flows (if any) that will need to be managed as part of development proposals and ensure that flood risk following development is not increased elsewhere.

Based on topographical catchment analysis it is understood that the site at Grangetown Prairie drains to Cleveland Channel, overland and/or via the existing culverted watercourses (Holme Beck and Knitting Wife Beck).

9.4.2 Water Framework Directive

The Water Framework Directive (WFD) came into force in 2000 and is the most substantial piece of EU water legislation to date. All new activities in the water environment will need to take the Directive into account. The Directive imposes legal requirements to protect and improve the water environment.

A WFD Assessment has been completed for this proposal and is provided in Volume 3. This WFD assessment aims to determine the effects of the proposed facility on ecological, hydromorphological and chemical quality and identify any potential impacts that could cause deterioration in the current status of the water body or could hinder the water body from meeting its WFD objectives in the future.

The site is located 1km south of the Tees Transitional water body (GB510302509900), 1.2km west of Tees Estuary (S Bank) River (GB103025072320), 6km south west of Tees Coastal Water (GB650301500005) and within the Tees Mercia Mudstone and Redcar Mudstone Groundwater water body (GB40302G701300). Morton West Beck Catchment (trib of Tidal Tees) River (GB103025072210) is upstream of the water bodies

described above, 3km west at its nearest point. Current WFD Status for the Water bodies is provided in Table 9-2.

Table 9—2: Current WFD Status

Water body ID	Name of water body	Hydromorphological designation	Current Overall Status/ Potential	Overall Status Objective
GB510302509900	Tees	Heavily modified Transitional water body	Moderate	Moderate in 2015
GB103025072320	Tees Estuary (S Bank)	Heavily modified River	Moderate	Good by 2027
GB40302G701300	Tees Mercia Mudstone and Redcar Mudstone	Groundwater water body	Poor	Poor in 2015
GB650301500005	Tees Coastal Water	Heavily modified Coastal water body	Moderate	Good by 2027
GB103025072210	Morton West Beck Catchment (trib of Tidal Tees)	Heavily modified River	Moderate	Good by 2027

9.4.3 Surface Water Quality

Under the WFD, the EA has produced nine River Basin Management Plans (RBMPs) for England to manage water quality targets and river basin planning, with the Northumbrian River Basin Management Plan being relevant to the site.

As requested by the EA's consultation response, a WFD assessment is included in Volume and which includes more details regarding surface water quality. In summary, all of the water bodies have an overall classification of Moderate.

No data were received from the EA regarding pollution incidents within the vicinity of the site.

9.5 Assessment of Impacts During Construction

Construction works generally pose a risk to the water environment through excavation, fabrication of laying of concrete and storage of materials. The activities during construction that pose a risk to water quality include:

- Localised flooding from unattenuated surface water during rainfall;
- pollution from poor/inappropriate management of site drainage;
- import of non-native invasive species;
- exposure of bare ground, earth movement, stockpiling material, mobilising of sediment into surface water receptors through runoff from the site;
- wheel washing run-off, or muddy run-off from construction access tracks within the site;
- pollution due to vandalism of stores or plant;
- poor/inappropriate storage of materials and chemicals/fuels and wastes such as on permeable surfaces, adjacent to watercourses or without sufficient bunding capacity;
- accidental spillages of fuels and polluting materials such as concrete; and

- creation of preferential pathways via piling operations, drainage schemes and services corridors.

9.6 Assessment of Impacts During Operation

9.6.1 Flood Risk

JFlow modelling of the wider catchment at the site was undertaken to delineate surface water flow routes and quantify associated flow rates and volumes. Further, interactions with the development layout were considered to inform the management of offsite surface water flows.

In accordance with flood risk assessments: climate change allowances, 20% and 40% uplifts were applied to rainfall intensity to simulate the total potential change anticipated for the '2080s' (2070 to 2115). 1% Annual Exceedance Probability (AEP) plus 40% climate change (CC) surface water flood depths have been modelled and are presented in Figure 9-4. 1% AEP + 40% CC (6 hour storm) flood outlines indicate that surface water flooding is comprised of highly localised ponding to shallow depths below 0.30 metres with localised areas of 0.30-0.60 metres. Further, modelling outputs indicate that there are no clear offsite impacts that need to be managed.

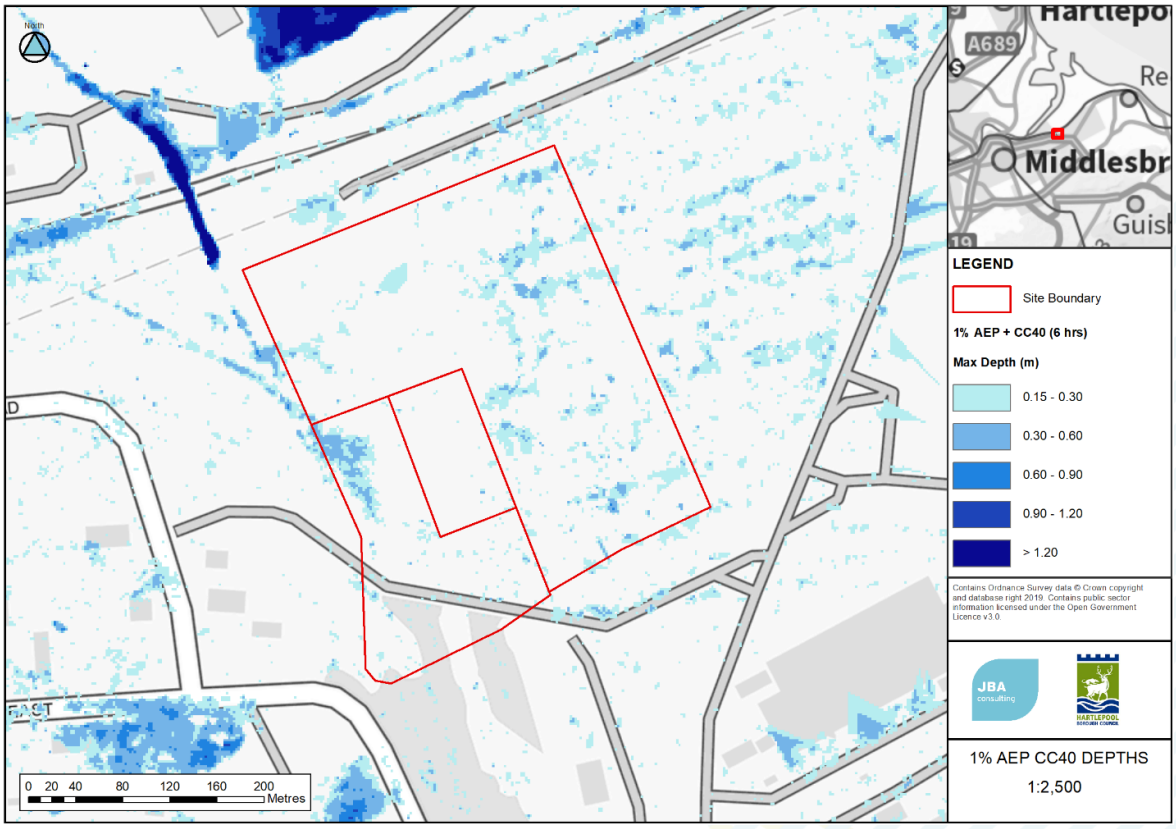

Figure 9-4 1% AEP + 40% climate change (6 hour storm duration): maximum surface water flood depths

Figure 9-4 indicates that there are no clear offsite impacts that need to be managed, however, development proposals must consider intercepting defined areas of localised ponding in addition to managing surface water runoff associated with the proposed development. It is considered that surface water flooding appears highly localised due to the relatively flat topography at Grangetown Prairie.

It is understood that the proposed development will be bunded at its perimeter. Based on this updated surface water modelling, this is not considered to require further

consideration regarding offsite surface water flows providing that site drainage is well maintained and the bunding is not designed to contain surface water to any significant depth.

9.6.2 Water Framework Directive

Table 9-3 discusses each of the receptors identified as being potentially at risk in the scoping assessment. Mitigation measures are recommended to mitigate the effects of the proposed works. It should be noted that these mitigation measures differ to the Mitigation Measures identified for any Heavily Modified water body.

Decommissioning impacts would be comparable with those identified at the Construction stage.

Table 9-3: Impacts and mitigation measures

WFD Quality Element	Pathway (direct/ indirect/ none)	Potential Impact/ Mitigation measures
Biological:		
Fish	Direct and Indirect	The potential for discharge into the Tees Estuary may result in pollution, dependent on the nature of the discharged materials. Deposition of these materials may also cover fish gravels. Discharges into the environment must be through connections to mains sewage. If this is not possible, an appropriate Environmental Permit must be obtained from the EA. Pollution prevention measures shall be implemented during construction works to prevent excessive sediment input and mitigate impacts in the event of oil or fluid leaks. A fish guard must be installed to prevent entrapment within the abstraction pipe(s). Discharge and abstraction points shall be minimised wherever possible to decrease the levels of disturbance to these biological elements.
Invertebrates	Direct and Indirect	
Macrophytes and phytobenthos	Direct and Indirect	
Phytoplankton	Direct and Indirect	
Other aquatic flora	Direct and Indirect	
Benthic invertebrate fauna	Direct and Indirect	
WFD Quality Element	Pathway (direct/ indirect/ none)	Potential Impact/ Mitigation measures

Hydromorphological:		
Depth variation	Direct	Discharge and abstraction processes will impact depth variation of the Tees Estuary, depending on timings and the scale of these processes. A Water Resources licence will be required, which regulates levels of water abstraction.
Quantity, structure and substrate of the estuary, river and coastal bed	Direct and Indirect	There will be direct impacts to the structure and substrate of the Tees Estuary bed as a result of deposition of discharged materials. There will also be indirect impacts to the river and coastal water body as discharged materials are carried into these water bodies. Discharges into the environment must be through connections to mains sewage. If this is not possible, an appropriate Environmental Permit must be obtained from the EA. Pollution prevention measures shall be implemented during construction works to prevent excessive sediment input and mitigate impacts in the event of oil or fluid leaks.
Structure of the intertidal zone	Direct and Indirect	There will be direct impacts to the structure of the Tees Estuary's intertidal zone as a result of deposition of discharged materials. There will also be indirect impacts to coastal intertidal zone as discharged materials are carried into these water bodies. Discharges into the environment must be through connections to mains sewage. If this is not possible, an appropriate Environmental Permit must be obtained from the EA. Pollution prevention measures shall be implemented during construction works to prevent excessive sediment input and mitigate impacts in the event of oil or fluid leaks.
Freshwater flow	Direct and Indirect	Discharge and abstraction processes will impact freshwater flow into the Tees Estuary, depending on timings and the scale of these processes, and subsequently into the river and coastal water body. A Water Resources licence will be required, which regulates levels of water abstraction. Discharges into the environment must be through connections to mains sewage. If this is not possible, an appropriate Environmental Permit must be obtained from the EA. Pollution prevention measures shall be implemented during construction works to prevent excessive sediment input and mitigate impacts in the event of oil or fluid leaks.
Hydrology: Quantity and dynamics of water flow	Indirect	Discharge and abstraction processes into the Tees Estuary may indirectly impact quantity and dynamics of water flow into the river. A Water Resources licence will be required, which regulates levels of water abstraction. Discharges into the environment must be through connections to mains sewage. If this is not possible, an appropriate Environmental Permit must be obtained from the EA. Pollution prevention measures shall be implemented during construction works to prevent excessive sediment input and mitigate impacts in the event of oil or fluid leaks.

Hydromorphological:		
Morphology: River depth and width variation	Indirect	Discharge and abstraction processes into the Tees Estuary may indirectly impact river depth and width variation. A Water Resources licence will be required, which regulates levels of water abstraction. Discharges into the environment must be through connections to mains sewage. If this is not possible, an appropriate Environmental Permit must be obtained from the EA. Pollution prevention measures shall be implemented during construction works to prevent excessive sediment input and mitigate impacts in the event of oil or fluid leaks.

Physico-chemical:		
Transparency Thermal conditions Oxygenation conditions Salinity Acidification status Nutrient conditions Specific Pollutants Pollution by all priority substances identified as being discharged into the body of water Pollution by other substances identified as being discharged in significant quantities into the body of water	Direct and Indirect	The potential for discharge into the Tees Estuary may result in direct pollution and indirect pollution to the Tees Estuary (S Bank) River and Tees Coastal water body, dependent on the nature of the discharged materials. Discharges into the environment must be through connections to mains sewage. If this is not possible, an appropriate Environmental Permit must be obtained from the EA. Pollution prevention measures shall be implemented during construction works to prevent excessive sediment input and mitigate impacts in the event of oil or fluid leaks.
Teesmouth and Cleveland Coast SPA, pSPA, Ramsar, pRamsar and SSSI	Direct and Indirect	There is potential for direct and indirect impacts to these designated sites as a result of the potential abstraction and discharge processes linked to the Tees Estuary. This may damage coastal and freshwater habitats utilised by water birds through pollution and potential alteration of the intertidal zones. A Habitats Regulations Assessment (HRA) must be undertaken to determine the impacts to the SPA, pSPA, Ramsar and pRamsar sites. A Water Resources licence will be required, which regulates levels of water abstraction. Discharges into the environment must be through connections to mains sewage. If this is not possible, an appropriate Environmental Permit must be obtained from the EA. Pollution prevention measures shall be implemented during construction works to prevent excessive sediment input and mitigate impacts in the event of oil or fluid leaks. Best practice biosecurity must be followed to prevent the risk of introducing invasive or damaging biological agents.

Physico-chemical:		
Bathing Waters	Indirect	The Bathing Waters may be indirectly impacted by discharges into the Tees Estuary which have the potential to reach these areas. Discharges into the environment must be through connections to mains sewage. If this is not possible, an appropriate Environmental Permit must be obtained from the EA. Pollution prevention measures shall be implemented during construction works to prevent excessive sediment input and mitigate impacts in the event of oil or fluid leaks.
Tees Mercia Mudstone and Redcar Mudstone DrWPA	Direct	The DrWPA may be directly impacted by abstraction and discharge processes (during construction and / or operation of the facility). Pollution prevention measures shall be implemented during construction works to prevent excessive sediment input and mitigate impacts in the event of oil or fluid leaks.

9.7 Mitigation Measures

The development is not located within an EA Flood Warning Area. It is considered that safe access and egress is achievable via the proposed new internal network of roads which all lie within Flood Zone 1. However, an Emergency Plan should consider and avoid areas designated to contain onsite surface water exceedance flows.

In accordance with Tees Valley SuDS requirements, surface water runoff from development should be limited to the greenfield QBAR runoff rate for all return periods up to and including the 1% AEP rainfall event. QBAR for this site was calculated to be 100 l/s using the ICP SuDS method (as specified by Tees Valley SuDS requirements for sites less than 50ha).

Based on the surface water discharge rate of 100 l/s (QBAR for this site defines the attenuation requirements for proposed development. It is assumed that discharging to Holme Beck at the greenfield QBAR runoff rate is acceptable to the Lead Local Flood Authority (LLFA).

In accordance with Tees Valley SuDS requirements, there should be sufficient storage within the system to accommodate a 3.33% AEP storm event. In this instance, this is 4,823m3 which could be provided by a 0.322ha detention basin (see Figure 9-5) with a 1.5 metre depth (excluding freeboard) located within Area C, a designated Biodiversity Area.

It is recommended that exceedance flows are contained within bunded areas of hardstanding or within kerb lines. Based on the FRA, 4285m^3 of exceedance storage should be provided to meet Tees Valley SuDS requirements for the safe storage of the 1% AEP event plus 30% climate change.

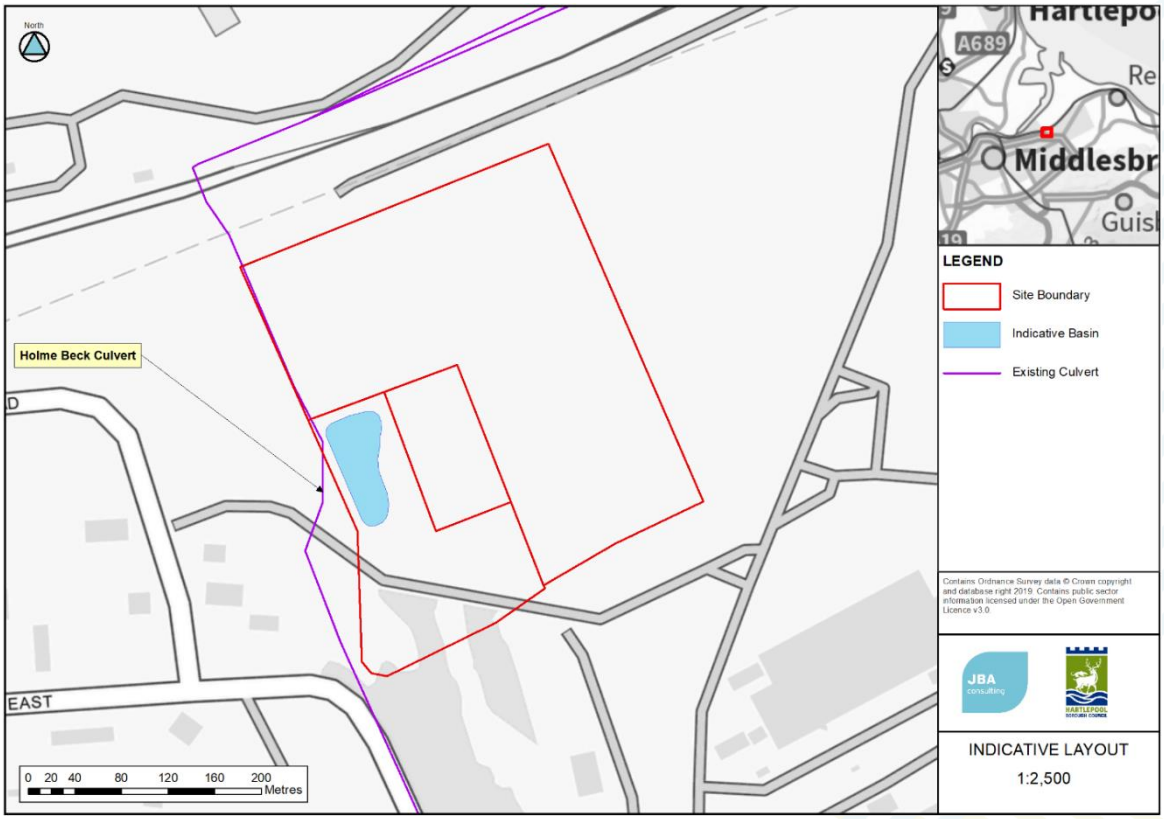

Figure 9-5 Indicative Drainage Layout

In accordance with Tees Valley SuDS requirements, the proposed detention basin should be designed with:

- Measures to intercept silt at source wherever possible or in a forebay where surface water runoff enters the basin;
- Measures to reduce the risk of erosion but if entry is uncontrolled through a point inlet then an erosion control structure will be necessary to manage the flow;
- A 2:1 to 5:1 length to width ratio to provide maximum opportunities for settlement at the inlet and filtration of surface water runoff;
- A gentle fall to the outlet of about 1 in 100 to encourage surface sheet flow by gravity;
- A controlled outfall at or just below ground level is usual to ensure drain down unless preceded by a micro-pool. This ensures a generally dry surface when it is not raining. A micro-pool enhances treatment, avoids a muddy area at the outlet and provides biodiversity interest;
- 1 in 4 maximum side slopes to the basin, with clear access for maintenance; and
- An overflow to allow for design exceedance or outlet blockage.

Further to this, the document defines that good practice for health and safety is to include for a minimum freeboard of 150mm in design.

Tees Valley SuDS requirements define that surface water runoff from roads and hard standing should pass through a filtering structure like under-drained swales, bioretention and permeable pavement to enhance trapping of potential contamination. However, this is not considered appropriate for the proposed development based on known contaminants at the site.

It is recommended that the proposed drainage layout includes for a fuel/oil interceptor based on the nature of the development as the site will require frequent deliveries of waste, therefore, potential for HGVs.

It is recommended that both processed and pre-processed waste should be located within bunded areas or raised above existing ground levels to avoid mobilisation of contaminants during higher rainfall events.

Overall the impacts to the biological, hydromorphological and physico-chemical elements of the water bodies can all be mitigated against using the same measures:

- Completion of an HRA, implementing the resulting conclusions and recommendations
- Discharge through connection to mains sewage or obtain an appropriate Environmental Permit from the EA
- Abstraction from a Surface Water (including the Tees Estuary) obtaining a Water Resource licence

The following measures are specific to mitigate impacts to biological elements:

Installation of a fish guard to prevent entrapment within the abstraction pipe(s)

Minimise discharge and abstraction points wherever possible to limit disturbance

9.8 Residual Impacts

Following detailed surveys of the development and application of the appropriate mitigation following the mitigation hierarchy, no significant residual impacts are predicted during construction, operation or decommissioning of the project.

9.9 Summary

The proposed facility is considered to be essential infrastructure under the NPPF, therefore, development is appropriate at this location as it is located in Flood Zone 1.

The proposed development is considered to be at low risk of surface water flooding. JFlow modelling of the wider catchment at the site was undertaken to delineate surface water flow routes, quantify associated flow rates and volumes, and confirm interactions with the development layout. JFlow modelling indicates…

Surface water runoff must be attenuated at the greenfield QBAR rate (in accordance with Tees Valley SuDS requirements). If Holme Beck is used LLFA must be consulted as this is an ordinary Watercourse. The condition of any culverts must be reviewed.

With the implementation of appropriate mitigation there are no significant adverse impacts that could impact the WFD status of the water bodies.

Flood Risk and Water Quality impacts are summarised Table 9-4.

9-4 Summary Table

Water Resource	Impact	Importance of Feature	Impact without Mitigation	Mitigation	Significance of Effects of Residual Impacts
Construction Activities					
Non Designated local water bodies	Earth moving / plant activity – decrease in water quality	Low	Minor Adverse	• Application of Site Good Practice. • Preparation and communication of the Construction Environmental Management Plan (CEMP) • Application of CIRIA'S Environmental good practice on site (fourth edition) (C741).	
Wear Magnesian Limestone groundwater body (ID GB40301G701700	Piling - Contamination of Groundwater	High	Minor - moderate Adverse	• No soakaways proposed drainage. • SI will inform design and earthworks.	Not significant
Surface Water	Increased flood risk	High		• All culverts will be designed following CIRIA's Culvert design and operation guide (2010) and SEPAs Engineering in the water environment: good practice guide. River crossings. Second edition, November 2010. • Three flood attenuation basins will be required for surface water. • All ponds will require flow controls to limit discharge into the adjacent ditches. • Discharge levels will need to be defined during Design and Build and it is assumed that flow control structures will be effectively monitored and maintained.	
Operation					
Surface water	Contamination from run-off and / or spillage	Low	Minor Adverse	• All operational areas will be bunded and discharge through interceptors. • Surface Water Drainage solution shall follow the Hierarchy of Preference contained within Revised Part H of the Building Regulations 2010 (Soakaway,	Not significant

Water Resource	Impact	Importance of Feature	Impact without Mitigation	Mitigation	Significance of Effects of Residual Impacts
				Watercourse, Sewer)	
Groundwater	Contamination from excavation / infiltration	Low	Minor - moderate Adverse	• No soakaways proposed for road drainage.	Not significant
Abstraction from a Surface Water (including the Tees Estuary) or any underground strata	Adverse impact on migratory fish and eels and water resources	Medium	Minor - moderate Adverse	• Protection for migratory fish and eels, and limitations to any the abstraction periods. could take place. • Obtaining Water Resources Licence	

10 Archaeology and Cultural Heritage

10.1 Introduction

This chapter sets out the cultural heritage significance of the site, and to assess the impact that the proposed works would have on that significance. The assessment is in line with Paragraph 189 of the National Planning Policy Framework which states:

'In determining applications, local planning authorities should require an applicant to describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail should be proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance.'

The significance of a heritage asset is defined as:

'*The value of a heritage asset to this and future generations because of its heritage interest. The interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting. For World Heritage Sites, the cultural value described within each site's Statement of Outstanding Universal Value forms part of its significance*.' (NPPF Glossary).

Within the context of this chapter cultural heritage should be taken to mean the above and below ground archaeological resource, built heritage and historic landscape.

Technical Reports are provided in Volume 3.

10.2 Legislation, Policy and Guidance

Planning (Listed Building and Conservation Areas) Act 1990

The Planning (Listed Building and Conservation Areas) Act 1990 provides statutory protection for built heritage. In considering whether to grant planning permission for a development that affects a Listed Building or its setting, Sections 16 and 66 of the Act require authorities to have special regards to the desirability of preserving the Listed Building or its setting or any features of special architectural or historic interest that it possesses. Section 72 of the Act states that special attention shall be paid to the desirability of preserving or enhancing the character or appearance of Conservation Areas.

National Planning Policy Framework (2019)

The National Planning Policy Framework sets out the vision for sustainable development based on interdependent economic, social and environmental roles, of which protecting and enhancing the historic environmental is one element. Section 16 outlines policies for the protection and enhancement of the historic environment in plan-making and decision taking. Decisions affecting heritage assets should be undertaken based on an understanding of the significance of any heritage asset affected by development, based on a proportionate evidence base. Where sites include archaeological potential field evaluation may also be required (para 189).

For designated assets, or assets of demonstrable equivalent significance, substantial harm or loss to heritage assets and their settings should be wholly exceptional for assets of the highest significance (including World Heritage Sites, scheduled monuments, protected wrecks, registered battlefields, Grade I and II* registered parks and gardens, grade I and II* listed buildings) and exceptional for other designated assets (including grade II listed buildings and grade II registered parks and gardens) (para 194). Harm to these assets must be weighed against the public benefit of development (para 195).

For non-designated heritage assets, a balanced judgement regarding the scale of harm or loss to the asset and its significance must be made (para 197). Where development results in loss or harm to a heritage asset, developers will be required to record and advance understanding of the significance of the asset (para 199).

Local Planning Policy

The Redcar and Cleveland Borough Council Local Plan was adopted in May 2018 and covers the period until 2032. The following policies within the Local Plan are relevant to this application and relevant extracts are reproduced below.

Policy HE 1 – Conservation Areas states that development within or otherwise affecting the setting of a conservation area will only be permitted where it preserves or enhances the character or appearance of the conservation area.

Policy HE 2 – Heritage Assets outlines that development affecting the setting of a designated heritage asset will only be permitted where it preserves or enhances it significance as a heritage asset and protects its immediate setting. It also states that non-designated heritage assets of archaeological interest that are demonstrably of equivalent significance to scheduled monuments will be considered subject to the policies for designated heritage assets.

Policy HE 3 – Archaeological Sites and Monuments states:

Development that would adversely affect archaeological sites or monuments that are designated heritage assets, or their settings, or archaeological sites of equivalent significance will only be approved in the most exceptional circumstances and in accordance with this policy and other heritage policies in this plan.

Development that may affect a known or possible archaeological site, whether designated or non-designated, will require the results of a desk-based assessment to be submitted as part of the planning application. An archaeological evaluation may also be required to identify the most appropriate course of action.

Development that affects a site where archaeology exists or where there is evidence that archaeological remains may exist will only be permitted if:

a. the harm or loss of significance is necessary to achieve public benefits that outweigh that harm or loss. Harm or loss may be avoided by preservation in situ or refusal; or

b. where in situ preservation is not required, appropriate satisfactory provision is in place for archaeological investigation, recording and reporting to take place before, or where necessary during, development. Where archaeological investigation, recording and reporting has taken place it will be necessary to publish the findings within an agreed timetable.

The Tees Valley Joint Minerals and Waste Development Plan was adopted by the five local authorities in the Tees Valley, including Redcar and Cleveland, in September 2011 and set out planning policies regarding minerals and waste developments until 2026. The Strategic Plan includes a strategic objective relevant to the development:

J. to ensure that minerals and waste developments protect and enhance the quality and diversity of public amenity and the natural, historic and cultural heritage of the Tees Valley.

10.3 Assessment Methodology

10.3.1 Sources Consulted

A desk-based assessment (DBA) was prepared by Tees Archaeology in accordance with the standards set down in the Chartered Institute for Archaeologists (CIfA) Standard and Guidance for Historic Environment Desk-Based Assessment (2017). Data searches were undertaken using a 1.5km radius study area (centred on NGR NZ 544 213) to identify heritage assets that could be affected by the development (Volume 3, see Figures 1-4,). The following were consulted as part of the process:

- The Historic Environment Record (HER) for Redcar and Cleveland;
- The online version of the National Record of the Historic Environment (NRHE);
- Written local histories and other published information held by Tees Archaeology (TA);
- Online map resource for geology and borehole information provided by the British Geological Survey;

- Ordnance Survey maps of the area; and
- Aerial photographs of the area.

10.3.2 Archaeological Site Visit

A site visit was made by Robin Daniels and Janice Adams of Tees Archaeology on 12th November 2019, with the assistance of Darren Edmends of the South Tees Development Corporation.

10.3.3 Impact Assessment Methodology

The assessment of effects has been carried out in accordance with the methodology outlined in Chapter 5. The criteria for assessing value and magnitude of impact have been drawn from Design Manual for Roads and Bridges (DMRB) and the assessment of cultural heritage significance and value has been informed by the articulation of heritage values in the English Heritage guidance document Conservation Principles (2008). Guidance from the Historic England Good Practice Advice in Planning document The Setting of Heritage Assets (2017) has also been used to inform the consideration of attributes that may contribute to the setting and significance of an asset (step 2 considered in assessing heritage value) and attributes of the development which may affect the setting (step 3 considered in assessing magnitude of impact).

Professional judgement is used in conjunction with these criteria to undertake the assessment of effects. The criteria for assessing value and magnitude of change are outlined below. The determination of significance of effect is undertaken using the matrix in Table 5.3.

Heritage significance can be articulated using the four heritage 'values' outlined in Conservation Principles (English Heritage, 2008):

- *Evidential value:* the potential of a place to yield evidence about past human activity. Sites of evidential value will include those which have archaeological interest.
- *Historical value:* the ways in which past people, events and aspects of life can be connected through a place to the present. Heritage assets can either illustrate, or be associated with, past people and events.
- *Aesthetic value:* the ways in which people draw sensory and intellectual stimulation from a place. Aesthetic value can arise from conscious design or fortuitously from the way the heritage asset has evolved.
- *Communal value:* the meanings of a place for the people who relate to it, or for whom it figures in their collective experience or memory.

Table 10-1 Criteria for assessing cultural heritage value

Value	Examples
Very High	World Heritage Sites Places of international importance due to their 'Outstanding Universal Value'.
High	Scheduled Monuments Grade I or II* Listed Buildings Grade I or II* Registered Parks and Gardens Battlefields Places or structures of national importance Non-designated heritage assets of equivalent national significance or potential to contribute significantly to national research objectives
Medium	Grade II Listed Buildings Grade II Registered Parks and Gardens Conservation Areas Non-designated assets of regional or high local significance with potential to contribute significantly to regional and local research objectives. This includes assets which have particular regional associations or may have important associations at a local level (e.g. they have significance to local population or embody something of the special identity of a locality).
Low	Locally Listed Buildings Non-designated assets which are relatively poorly preserved or have limited significance at a local level and low potential to add to local and regional research objectives.
Negligible	Assets that have very limited or no archaeological, historical or cultural significance.
Uncertain	Sites where there is evidence that a heritage asset may exist, but where there is insufficient information to determine its nature, extent and degree of survival given current knowledge.

Table 10-2 Criteria for assessing magnitude of impact on cultural heritage assets

Magnitude of Impact	Criteria
Major Negative	Causes total destruction or change to, most key elements of the asset that results in substantial loss of integrity and significance. Comprehensive change to the setting of the asset which this is a critical aspect of the assets significance. Any such change would not normally be reversible.
Moderate Negative	Causes change to, or loss of many key elements which result in a moderate loss of integrity and significance of the asset. Moderate changes to the setting of the asset where this makes an important contribution to the significance of the asset.
Minor Negative	Change to some elements which lead to a limited loss of integrity and significance of the asset. Change to the setting of the asset where this makes a limited contribution to the significance of the asset.
Negligible /	No appreciable change to the asset or its setting.

Magnitude of Impact	Criteria
No change	
Minor Positive	Change to some elements which leads to limited improvement in integrity and significance of the asset, or arrests decline. Change to the setting of the asset where this makes a limited contribution to the significance of the asset.
Moderate Positive	Causes change to many key elements which result in a moderate enhancement to integrity and significance of the asset or reverses decline. Moderate changes to the setting of the asset where this makes an important contribution to the significance of the asset.
Major Positive	Causes significant change to most key elements of the asset that results in substantial enhancement of significance. Comprehensive change to the setting of the asset which this is a critical aspect of the assets significance.

10.4 Baseline Conditions

The Historic Environment Desk Based Assessment provided in Volume 3 gives a detailed description of the historic environment for the study area, which is summarised in the following sections. The locations of heritage assets are shown on Figures in the Historic Environment Desk Based Assessment provided in Volume 3.

10.4.1 Designated Heritage Assets

The study area does not include any World Heritage Sites, Scheduled Monuments, Conservation Areas, Registered Parks and Gardens or Registered Battlefields.

The study area includes one Grade II* Listed Building, the Baptist Church and two Grade II Listed Buildings within the settlement of South Bank to the west of the Proposed Development Site on the edge of the study area and a further three Grade II Listed Buildings located immediately outside the study area within South Bank. These buildings are all associated with the 19th and 20th century development of South Bank as a community to serve the steelworks.

As the Proposed Development includes an emissions stack at 80m in height there is potential that designated heritage assets in a wider study area may have their settings affected. A review of the National Heritage List and Conservation Areas in the Redcar and Cleveland Local Authority area has identified several clusters of assets which are noted here. There are a cluster of eighteen Bronze Age barrows and an Iron Age hill fort on Wilton and Eston Moors approximately 4km south south east of the Proposed Development Site. There are also Conservation Areas with associated Listed Buildings at Wilton, Kirkleatham, Yearby and Coatham which are located 4km south-east, 5km east, 5.5km east and 6km north-east respectively.

10.4.2 Archaeological and Historical Background

Prehistory

Very little is known about the early prehistoric occupation of the area, although there is evidence for activity on the Eston Hills to the south and beneath the coastal peat beds that survive off Redcar to the east and the northern side of the Tees Estuary.

The topographic information from boreholes suggest that the northern boundary of the development site was at the southern edge of the river channel, there is no evidence of peat deposits in the area which might contain information about past environments and the impact of people on the environment (Volume 3, Figure 4,).

The Late Bronze Age and Iron Age was a period of population increase with farming settlements spreading across the area. An Iron Age farmstead has been partially

excavated 4.5km to the north east at Foxrush Farm and there is increasing evidence for occupation and activity around the northern edges of the estuary.

The south bank of the river was heavily re-claimed and altered from the mid-19th century and it is probable that this will have destroyed evidence of prehistoric activity in this area.

Roman

There is evidence of Roman activity in the Tees Valley including the fort and bridge site at Piercebridge and newly discovered forts at Dalton on Tees and Newsham. Additionally, military activity along the coast is evidenced by a string of fortlets or signal stations.

Higher status civilian activity is now attested by villas at Piercebridge, Darlington, Dalton on Tees and Ingleby Barwick, while many of the Iron Age Farmsteads continued in use into the Roman period and new settlements developed.

There is evidence of a Roman presence in the area of the site in the form of stray finds from the Middlesbrough area. It is possible that the area around the Transporter Bridge, which was the site of medieval settlement in Middlesborough, may have hosted Roman activity.

Early Medieval

Evidence of the early medieval period in the area is restricted to place-names and the presence of sculpture from the Anglo-Scandinavian period (9/10th centuries AD). Relevant place names which were first recorded in the Domesday and are a mix of Anglo-Saxon and Scandinavian elements include:

- Eston – settlement to the east (Anglo-Saxon)
- Normanby – settlement of the Norwegians (Scandinavian)
- Ormesby – Orm's farm (Scandinavian)
- Lackenby – Lochan's farm (Scandinavian)
- Lazenby – settlement of the freemen (Scandinavian)

There are pieces of Anglo-Scandinavian sculpture at Ormesby Church, which when considered with the place names, indicate a strong Scandinavian presence in the area.

Medieval

The earliest documentary information relating to the study area is the Domesday Book. In the medieval time the area was part of the parish of Ormesby and following the Norman conquest it was held by the Brus family, in addition land in the parish was held by Gisborough and Whitby Abbeys.

The settlements of this period occupied much the same location as at the present day, around the 30m contour line at the foot of the Eston Hills. To the north the fields ran down to the marshy edge of the River Tees. Field names recorded on the first edition Ordnance Survey map of 1857 give a clear indication of the characteristics of the land up to its reclamation for industrial purposes in the 19th century. 'Swangs' is a name for a bog, while 'The Pastures' refers to the primary use of the land for grazing and the salt marsh was very good grazing land.

Post-Medieval

The major change between the medieval landscape and the 19th century industrial landscape was the enclosure of the fields which probably took pace in the first decade of the 19th century as it did at Normanby, Wilton, Lackenby and Lazenby.

19th and 20th Centuries

In the 19th century, the area underwent development of intensive industrial activity, accompanied by the reclamation of land through the deposition of slag on the banks of the Tees. The settlements of Grangetown and South Bank (formerly 'Tees Tilery') were brought into existence in the latter half of the 19th century to provide the workforce for the new industries. Both can be seen as classic late 19th century industrial communities and whilst both have seen change a number of important buildings and typical house types and institutions survive.

The Proposed Development Site has been developed and redeveloped several times over the 19th and 20th centuries as the industries on the site changed and evolved. The development of the Proposed Development Site and the heritage assets within it are summarised here. Historic maps showing the evolution of the Proposed Development Site and study area are included in Technical Report, Volume 3.

The Middlesbrough to Redcar Railway was constructed in 1846 (HER5908) and ran along the southern bank of the River Tees on an embankment, creating a southern limit for the river. The railway line continues to operate and forms the northern boundary of the Proposed Development Site.

The discovery of iron ore in the Eston Hills in 1850 prompted further activity in the area the Eston branch railway (HER5626) was built in 1851 by Bolckow and Vaughan to serve their ironstone mines at Eston. The former line of this railway crosses the south-western corner of the Proposed Development Site.

Eston Iron Works (HER5631) was built in 1853 by Bolcklow and Vaughan to respond to the ability to access a nearby source of ore and using coal from the Durham coalfields. The works comprised a line of six furnaces within the Proposed Development Site. The construction of the Eston Iron Works marks the start of the iron and steel industry in this area and of the settlements that served them. There are no visible signs above ground of the ironworks, but it is possible that remains survive below ground level.

By the 1870s Bolckow and Vaughan were the leading firm on Teesside in developing steel production as opposed to iron and the Cleveland Works (HER5629) were constructed between 1874-76. The Cleveland Works were the first in Teesside at which steel was produced in bulk and initially used Bessemer conversion vessels; four of these were located on 3.7m high platforms in the north western part of the development area but their precise location is unknown. The Bessemer conversion vessels were served by a new set of three, 20m high, blast furnaces which were oriented north-south. The Cleveland Works replaced the original Eston Iron Works, which were demolished.

The original three furnaces of the Cleveland Works were replaced by two 'Bessemer' furnaces between 1911 and 1913. These were known as 'Yankee' furnaces in that they copied American practice, but the Bessemer name was taken from their proximity to the Bessemer converters. One of the furnaces was demolished after the First World War and a replacement (No.5) constructed in 1937, continuing in use until 1986. The other furnace (No 4) continued in use until 1993. Whilst all of the superstructures of these furnaces have gone the bases of the furnaces, which lie within the Proposed Development Site, are still visible. The bases of blast furnaces are present as significant raised mounds c. 2m high with their adjoining raised working surfaces and occupy an area roughly 100m north south and 50m east-west. There is visible detail in the sides of these mounds including a stone base (of probable 19th century date) and brick-built conduits, probably providing access for the blast.

The furnaces were served by a 'Hi Line' where the charge was run straight to the top off an elevated rail line, of which parts of the embankment and metal trestles survive. Blast stoves required to provide the hot gases needed to achieve the blast, later coke ovens, part of a rolling, mill, the laboratory, welfare facilities and cooling towers were also located within the Proposed Development Area.

In 1913 Bockow and Vaughan replaced the Bessemer converters with a set of open hearth steel making furnaces (North Steel Plant) and a South Steel Plant was constructed during the First World War. Both of these plants which are located in the east of the study area

were closed by 1928 due to the economic downturn after the end of the war. In 1929 Bolckow and Vaughan was bought by Dorman Long and as the economic situation improved prior to the Second World War rolling mills were established to the east of the Proposed Development Area.

The works had ceased production in the 1980s. From the late 1980s until the end of the 20th century buildings and structures were cleared from the site with the exception of the bases of the late 19th century Bessemer furnaces. The site is at present characterised by hard surfaces, usually concrete, but with occasional areas of tarmac and scrub regeneration. Rail lines are still visible embedded in the concrete in some areas and the bases of a number of operational structures are also visible. These include the brick foundations of buildings, concrete lined tanks and concrete bases for structures, as well as the blast furnace bases discussed above.

The 19th and 20th century industrial remains, particularly the Eston Iron Works and Cleveland Works, within the Proposed Development Site are considered to have high evidential value as they have potential to yield archaeological information about the industrial processes that took place on the site and the development of the iron and steel industries in this period. The Bessemer furnace bases preserve visible details of their construction and method of use and include at least one salamander (plug of iron). The buried archaeological remains associated with the Eston Iron Works and the railway may be of lesser evidential value as their demolition and subsequent redevelopment of the site in these areas may have truncated remains or compromised their survival and legibility.

The historical significance of both the Eston and Cleveland works is important within the regional context as sites where the production of iron and steel on a commercial basis was developed. The proximity of the industrial remains to the source of the ore they used was also a major contributing factor to the development of the ironstone mining industry in the Eston Hills and beyond, particularly the mines developed by Bolckow and Vaughan. There is considered to be a high historical value to the 19th and 20th century industrial remains.

The development of the iron and steel industry in this location led directly to the creation of the settlements of Grangetown and South Bank and many of the inhabitants worked at the site. The demolition of the visible structures of the site has severed its connection to the local communities and there is no access to the site. At present it is difficult for people to understand the remains that survive on the site, however there is a strong possibility that with improved access and interpretation, the local community could engage with the surviving blast furnaces as clear and understandable links to the past of their area. There is considered to be a medium communal value to the industrial heritage assets.

The extent of clearance within the Proposed Development Site has removed the industrial structures that once dominated the skyline in the area and provided a clear point of contact with the surrounding communities. The site is currently vacant, brownfield land and has been colonised by scrubby vegetation. The aesthetic significance of the site is low from that perspective however the remaining blast furnace bases have potential to allow an understanding the core processes that took place at the site and as such are intellectually stimulating.

Following the decommissioning of the blast furnaces in the 1990s English Heritage assessed their cultural heritage significance and concluded they are of national importance. The cultural heritage value of the blast furnaces is therefore considered to be high. The cultural heritage value of any further archaeological remains associated with the iron and steel works within the site will be dependent on the extent of their surviving evidential value, but are most likely to be of medium value.

10.4.3 Archaeological Potential

The Proposed Development Site was subject to extensive reclamation which raised the ground level significantly and then subsequently the creation and demolition of the iron and steel works. This will limit the potential for the survival of archaeological remains of pre-19th century date. The actual and potential survival of significant archaeological remains that provide evidence about the industrial processes that took place on the site is considered to be high. Table 10-3 outlines the archaeological potential on the site for each archaeological period graded from low to high.

Table 10-3: Archaeological Potential on proposed development site.

Period	Potential
Prehistoric	Low
Roman	Low
Early Medieval	Low
Medieval	Low
Post-Medieval	Low
19th and 20th Centuries	High

10.4.4 Future Baseline Conditions

The South Tees Development Corporation will undertake remediation of the Proposed Development Site to remove sub-surface structures to a depth of 2.5m and to mitigate the effects of ground contaminants within the site. The detailed design and locations for remediation works are subject to a programme of site investigation works to be completed in 2020. Zone B, identified as of nationally significant, will not under go this remediation. The area will be fenced and protected from plant movements.

The extent of potential impacts on archaeological remains across the Proposed Development Site will not be known until the detailed design for the remediation works are known, however it is probable that the remediation will result in the removal of sub-surface archaeological remains in any areas where intrusive remediation is undertaken. It is proposed by the South Tees Development Corporation that a detailed Geotechnical Investigation, with archaeological watching brief, will be completed to further develop the remediation works. Any archaeological investigation of archaeological remains would be undertaken either in advance of, or during the remediation works. The preliminary geotechnical site investigation works to inform the development of the remediation strategy will provide an opportunity for archaeological monitoring to determine the survival of below ground archaeological remains and to correlate recorded structures with historical maps and documentary records.

It is anticipated below ground archaeological remains will have been removed from the majority of the site, but until the detailed design for remediation is known there remains the potential for archaeological remains to still be present in parts of the site not subject to remediation activities.

10.5 Impacts during Construction

Embedded Mitigation

The area of the Proposed Development Site which contains the remains of the nationally significant blast furnace bases has been designated as a non-intervention area. Following the remediation works (protection and fencing) by STDC it is proposed that a retained area of over 2ha (Zone B) will be fenced and covered with a poor quality substrate and be allowed to develop as brownfield grassland.

This will benefit a range of butterfly and other invertebrates (See Section 6) and add to the areas of the proposed development plot identified for biodiversity enhancement. This embedded mitigation will allow the blast furnace bases to be preserved in situ. The

consolidation and preservation of the blast furnace bases will allow their evidential value to be conserved for the long term.

There are opportunities to improve the interpretation of the blast furnaces on the Proposed Development Site, delivering additional public benefit through allowing improved understanding and intellectual access to the remains. The blast furnace bases could interpreted on site through the use of information boards which describe and interpret the remains, placing them in the wider historical context of the iron and steel works in the region.

Impacts

The Listed Buildings within South Bank have a historic association with the Proposed Development Site, however, this does not affect how the assets are experienced within the urban setting as there is no visual connection with the Proposed Development Site. There will not be any impacts on the setting of the Listed Buildings within South Bank as a result of the Proposed Development during the construction period.

The Scheduled Monuments on Wilton and Eston Moors and the Conservation Areas at Wilton, Kirkleatham, Yearby and Coatham will not have their settings affected by the Proposed Development. Whilst there may be long distance views from these locations towards the Proposed Development Site these are not considered to make a significant contribution to the heritage significance of these assets. Where construction infrastructure such as cranes may be visible from these assets it will be seen in the context of other vertical industrial infrastructure surrounding the Proposed Development Site including stacks, tall buildings and transmission pylons. There are not considered to be any impacts on the setting of these designated assets as a result of the Proposed Development during the construction period.

The remediation works planned to be undertaken across the Proposed Development Site in advance of this application are considered likely to remove almost all archaeological remains. These remediation works are anticipated to encompass the whole Proposed Development Site, however this will not be confirmed until the detailed design for remediation is known. Within any areas of the site not subject to remediation there is potential for buried archaeological remains of medium cultural heritage value to be present. Where these coincide with the proposed buildings for the development there is potential that impacts on buried archaeological remains of medium value associated with the iron and steel industry may occur. Due to the extent of construction work required to create a suitable foundation level for the buildings and subsequent piling it is anticipated that any surviving archaeological remains would be completely removed by the construction works resulting in a major negative magnitude of impact. This would result in a moderate adverse significance of effect. This effect would be permanent and irreversible.

The Listed Buildings within South Bank, as discussed above, have a historic association with the Proposed Development Site, however, this does not affect how the assets are experienced within the urban setting as there is no visual connection with the Proposed Development Site. There will not be any impacts on the setting of the Listed Buildings within South Bank as a result of the Proposed Development during the operational period.

The Scheduled Monuments on Wilton and Eston Moors and the Conservation Areas at Wilton, Kirkleatham, Yearby and Coatham will not have their settings affected by the Proposed Development. Whilst there may be long distance views from these locations towards the Proposed Development Site these are not considered to make a significant contribution to the heritage significance of these assets. Where the emissions stack of the Proposed Development is visible from these assets it will be seen in the context of other vertical industrial infrastructure surrounding the Proposed Development Site including stacks, tall buildings and transmission pylons. There are not considered to be any impacts on the setting of these designated assets as a result of the Proposed Development during the operational period.

The remediation works planned to be undertaken across the Proposed Development Site in advance of this application are considered likely to remove almost all archaeological remains, with any further impacts on buried archaeological remains taking place during

the construction period. No further impacts are anticipated during the operational phase of the Proposed Development on archaeological remains.

The preservation in situ of the blast furnaces will secure their conservation in the long-term. The consolidation of the structural remains prior to their covering and seeding with grassland species will improve their structural integrity and survival. This will have the effect of conserving the evidential value the blast furnaces hold and arresting the decline in the condition of the asset. The implementation of interpretation of the blast furnaces within the wider site context will allow their heritage significance to be better revealed and understood, even without the remains being widely visible. The preservation in situ and interpretation is considered to result in a minor positive magnitude of impact on these archaeological remains of high cultural heritage value. This would result in a long term, minor-moderate beneficial significance of effect.

10.6 Impacts during Operation

No impacts are predicted during operation.

10.7 Mitigation Measures

The extent of remediation on the Proposed Development Site will not be fully known until further site investigation works have been undertaken. Within any areas of the site not subject to remediation there is potential for buried archaeological remains to be present. Within these areas the layout of the buildings and foundations should be compared with historic mapping and site investigation logs to determine whether archaeological remains associated with the iron and steel works are likely to be present. If it is determined that archaeological remains may be present a programme of archaeological investigation may be required in advance of, or during construction. Whilst the monitoring of piles would not be productive, the intrusive works associated with the removal of sub-surface obstructions, the installation of the pile mat and bases for the piling rigs may allow archaeological remains to be exposed and investigated. Any archaeological investigation should be undertaken in accordance with a Written Scheme of Investigation (WSI) agreed in advance with the Planning Authority's Archaeological Adviser and the Standards and Guidance from the Chartered Institute for Archaeologists.

This development will be implemented under the guidance of the Environmental Action Plan (EAP) and Site Heritage Plan. This plan will provide details on any long-term management issues (e.g. prohibiting deep excavation, additional building within Zone B and planting of deep-rooted vegetation).

10.8 Residual Impacts and Significance of Effect

The implementation of a programme of archaeological investigation and recording of any archaeological remains present on the site will allow aspects of their evidential value which would otherwise be lost to be recorded and interpreted. Through the deposition of the report with the Historic Environment Record and the archive with a suitable repository public benefits will accrue in the form of increased knowledge and understanding of the site. This programme of mitigation will result in a reduced loss of evidential value and therefore the residual magnitude of impact is considered to be moderate negative. This would result in a minor-moderate adverse significance of effect on these remains of medium cultural heritage value.

The residual impact and significance of effect on the blast furnaces are unchanged as a minor-moderate beneficial effect as there is no additional mitigation to be implemented as part of the application.

A summary of the residual effects of the Proposed Development is included in Table 10—4 below.

Table 10-4 Summary of Residual Effects on Cultural Heritage Assets

Cultural Heritage Resource	Impact	Importance of Feature	Impact without Mitigation	Mitigation	Significance of Effects of Residual Impacts
During Construction					
Archaeological remains associated with the iron and steel works	Removal of remains through preparation of the site and construction of foundations	Medium	Major negative	Implementation of a programme of archaeological recording and reporting prior to or during construction	The implementation of mitigation would lead to a moderate negative impact on the evidential value of the remains. This would result in a residual minor-moderate adverse significance of effect.
During Operation					
Remains of blast furnace bases	Preservation in situ of the bases through consolidation of the remains and then planting with grassland as part of habitat creation and public interpretation of the remains to place them within their wider context	High	Minor positive	No further mitigation required	The conservation, preservation in situ (as part of the proposed development / embedded mitigation) and interpretation of the blast furnace bases will lead to a minor positive impact on the remains through halting their deterioration and allowing their significance to be better understood. This would result in a minor-moderate beneficial residual significance of effect.

11 Socio-economic

11.1 Introduction

The socio-economic assessment aims to identify and assess the significance of potential impacts on the local population and community surrounding the scheme in Redcar & Cleveland, and in some cases further afield.

11.2 Legislation, Policy and Guidance

The Planning Policy Context for the scheme is detailed in the Design and Access / Planning Statement which accompanies the planning application, Appendix C.

Areas of planning policy most relevant to this socio-economic assessment predominantly aim to support the economic development of the area. The Redcar & Cleveland Local Plan (Redcar & Cleveland Borough Council (RCBC), 2018) sets out the planning policy within Redcar & Cleveland Local Authority. Policy LS4 is specific to the South Tees area, where the proposed development will lie. Of specific relevance to this socio-economic assessment of the development is the identification of the site is in the Local Plan as forming part of the allocation relating to economic growth (policy ED6) and within that area supporting development within the South Tees Development Corporation.

11.3 Assessment Methodology

A social impact assessment has been undertaken to assess the development proposals against the baseline presented. The assessment considers how the physical impacts of the proposed scheme, together with how the communities' knowledge or understanding of the scheme, may impact upon socio-economic behaviours, aspirations, and health and well-being.

Significance of effects is assessed in this chapter on the basis of magnitude, intensity or irreversibility of impacts versus the value, sensitivity or importance of the impacted environmental resource or receptor. Wherever applicable, the matrix of significance shown in Table 11-1 will be used to assist in the judgement of significance. This matrix-based approach helps to provide consistent significance terminology throughout the chapter and improves the judgement of significance scoring by pre-defining the relationship between impacts and effects. For consistency, the significance of all effects within this chapter will be described using these terms.

Table 11-1: Matrix of significance of effect scoring terms

		Magnitude, intensity or irreversibility of impact			
		Negligible or no change	Minor	Moderate	Major
Value, sensitivity or importance of resource or receptor	Low	Not significant or neutral	Slight	Slight or moderate	Moderate
	Medium		Slight or moderate	Moderate	Moderate or large
	High		Moderate	Moderate or large	Large

11.4 Baseline Conditions

The Tees Valley Authorities are seeking to deliver a sustainable waste treatment option that will provide a long-term sustainable solution for the region for residual waste treatment post 2025, when the contract with the existing provider ends.

11.4.1 Business Case

The need for of a long-term residual waste treatment solution for the region beyond 2020 was identified during the Options Appraisal process for the Tees Valley Joint Waste Management Strategy (JWMS), undertaken by the Tees Valley Councils in the preparation of the revised Draft JWMS (extended to 2035). As part of the Options Appraisal, refreshed aims and objectives were prioritised to include recovery of energy from waste. Subsequently options across the waste hierarchy were considered during the Options Appraisal process, including a new build energy recovery facility. Twenty combinations of the waste treatment options were considered. The outcome, was the following Preferred Option:

- adoption of prevention, reuse and recycling initiatives;
- the introduction of high recycling collections including separate food waste collections; and
- a new energy recovery facility with the ability to utilise the heat produced, through the development of Combined Heat and Power (CHP).

A comprehensive Outline Business Case (OBC) was developed by the Tees Valley Authorities considering several options with regards to long-term waste treatment including a new build facility. A site identification and selection process were undertaken to support the development of an OBC for the new energy recovery facility forming part of the preferred option. An appraisal took place of potential locations across the five Tees Valley Authorities' combined administrative area using a systematic, evidence-based analysis. The initial long list included 176 sites. Following screening the long list was reduced to 55 potential sites. Three Preferred Option sites for a new facility emerged. Site TV120 'South Tees Eco Park' (now known as Grangetown Prairie) is the preferred location for the proposed development. The site has Enterprise Zone status, on brownfield land, available for development located within an industrial area, with good existing transport links.

The site is allocated for strategic waste development within the Redcar Borough Council Local Plan, the Tees Valley Joint Minerals and Waste Development Plan Documents (The Minerals and Waste Core Strategy DPD and the Minerals and Waste Policies and Sites DPD), the South Tees Area Supplementary Planning Document (SPD) and STDC Regeneration Master Plan.

The site is well screened on most of its sides. The site was also granted planning permission in 2008 (planning application ref: R/2007/0994/FFM) for the erection of waste autoclave and community recycling facilities, four-storey office accommodation and associated infrastructure. The previous application gives an indication of the scale and massing of suitable development in this location.

11.4.2 Population Demographics

The proposed development lies within the Local Authority of Redcar & Cleveland, in South Teesside. In 2019 Redcar & Cleveland District has a population of approximately 135,600, within an overall population of approximately 2.65 million in the North-East of England (ONS, 2019). The population of Redcar & Cleveland District is older than both the North East and England averages. The District has a lower proportion of individuals under 50, and a higher proportion of individuals above 50, than either the North East or England as a whole (Table 11-1). This has been attributed to a long-term out-migration of young people in the District, who often leave to study or work

elsewhere in the UK and don't return (Tees Valley Combined Authority, 2017). Older residents tend to stay in the area. As a result, Redcar & Cleveland has a population growth rate significantly below the national average and a population that is ageing (Tees Valley Combined Authority, 2017). This effect is especially pronounced in rural areas of the District and is placing the viability of local centres under threat (Chandler, 2016).

Table 11-2: Age structures for Redcar & Cleveland, the North East and England

Area	0-19	20-34	35-50	50-65	>65
Redcar & Cleveland	30,100 (22.3%)	23,100 (17.0%)	22,500 (16.64%)	28,800 (21.3%)	30,700 (22.7%)
North East	592,500 (22.3%)	521,100 (19.6%)	469,700 (17.7%)	542,100 (20.4%)	530,000 (20.0%)
England	13,321,400 (23.6%)	11,110,800 (19.7%)	10,867,400 (19.3%)	10,691,900 (19.0%)	10,366,000 (18.4%)
Redcar & Cleveland	30,100 (22.3%)	23,100 (17.0%)	22,500 (16.64%)	28,800 (21.3%)	30,700 (22.7%)
North East	592,500 (22.3%)	521,100 (19.6%)	469,700 (17.7%)	542,100 (20.4%)	530,000 (20.0%)
England	13,321,400 (23.6%)	11,110,800 (19.7%)	10,867,400 (19.3%)	10,691,900 (19.0%)	10,366,000 (18.4%)

The proposed site to be developed lies on the South Bank of the River Tees, in a highly industrial area. The wider area is relatively deprived, with the majority falling within the most deprived 10% of England (Figure 11-1).

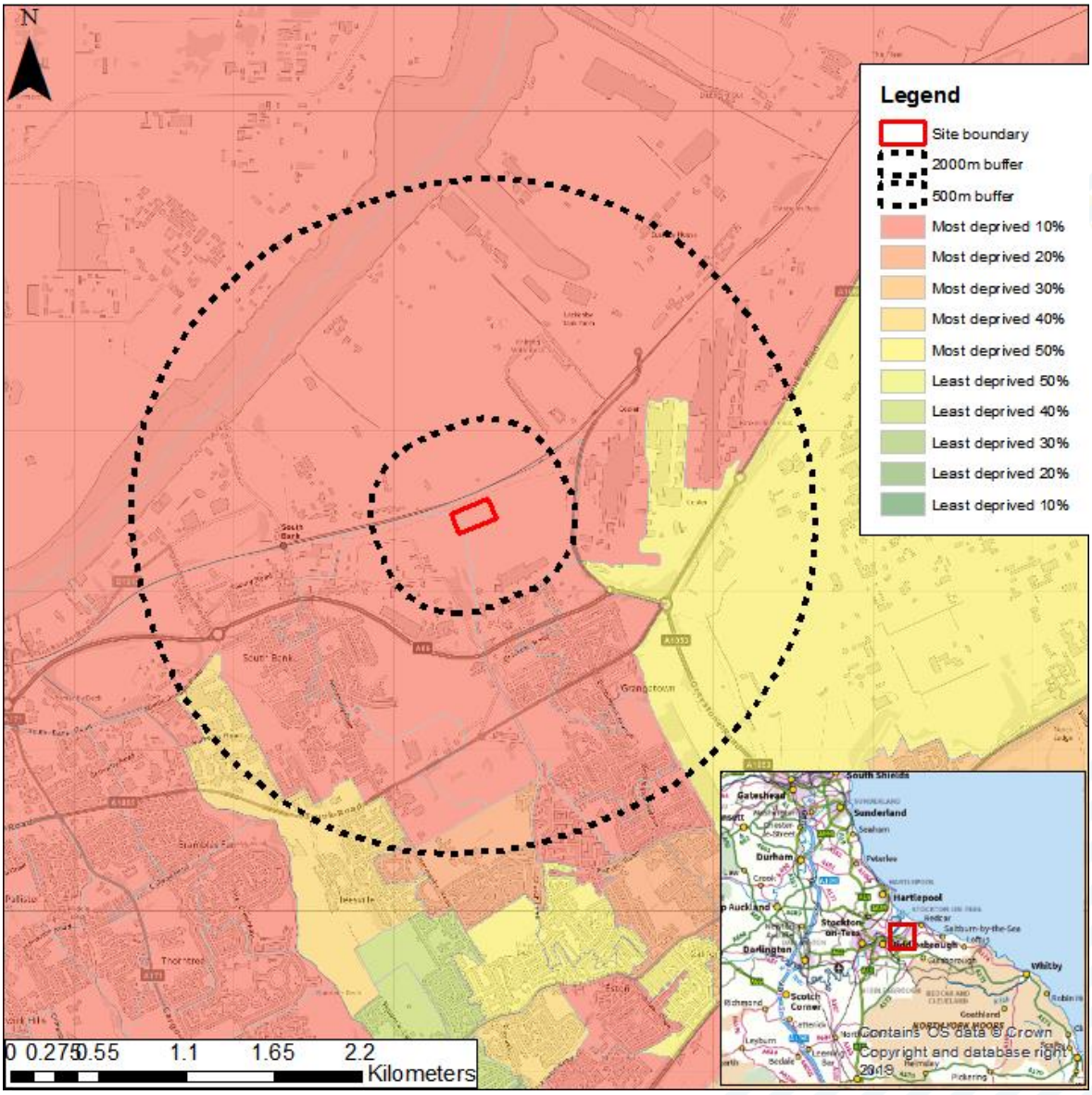

Figure 11-1: Deprivation levels in the area surrounding the proposed development (Source: ONS Indices of Multiple Deprivation 2011)

11.4.3 Economy, Employment and Income

Table 11-2 below shows key economic indicators for the Tees Valley combined authority (which consists of the local authority areas of Darlington, Hartlepool, Middlesbrough, Redcar & Cleveland and Stockton-on-Tees) (CentreforCities.org, 2019).

Table 11-3: Selection of key economic indicators for the Tees Valley Combined Authority

Indicator	Tees Valley	UK average
Population change (2016-17)	+0.2%	+0.6%
Business start-ups per 10,000 people (2017)	35.9	57.8
Gross Value Added (GVA) per worker (2017)	£48,800	£57,600
High level qualifications (2017)	30.1%	38.4%
Private to public sector jobs ratio (2017)	2.2	2.9
Change in real wages (2017-8)	-1.6%	+0.7%

Table 11-2 shows that the Tees Valley continues to fall behind other areas of the UK economically, despite a recent uptake in some areas. Wages are falling in real terms, GVA per worker is very low.

Employment in Redcar & Cleveland District has been heavily reliant on industrial port-based development surrounding the River Tees since the early 19th Century. The South Bank of the Tees was built up around the iron, steel and ship building industries, with many residents of the area employed in manufacturing and construction (Wilson, 2008). Since around 1950, these industries have begun to decline in the UK, subjecting the area to significant economic deprivation as employment levels fell. In the last ten years however, this trend has started to reverse as developments by the chemical and energy industries have occupied brownfield industrial land (Wilson, 2008), but issues surrounding unemployment and population decline remain.

Redcar & Cleveland has a working age population of approximately 74,400. 60.1% are employed, and 8.3% are self-employed. 31.6% are not economically active. The District has a significantly lower employment rate than either the wider North East or the UK (Figure 11-2) (Nomisweb, 2019).

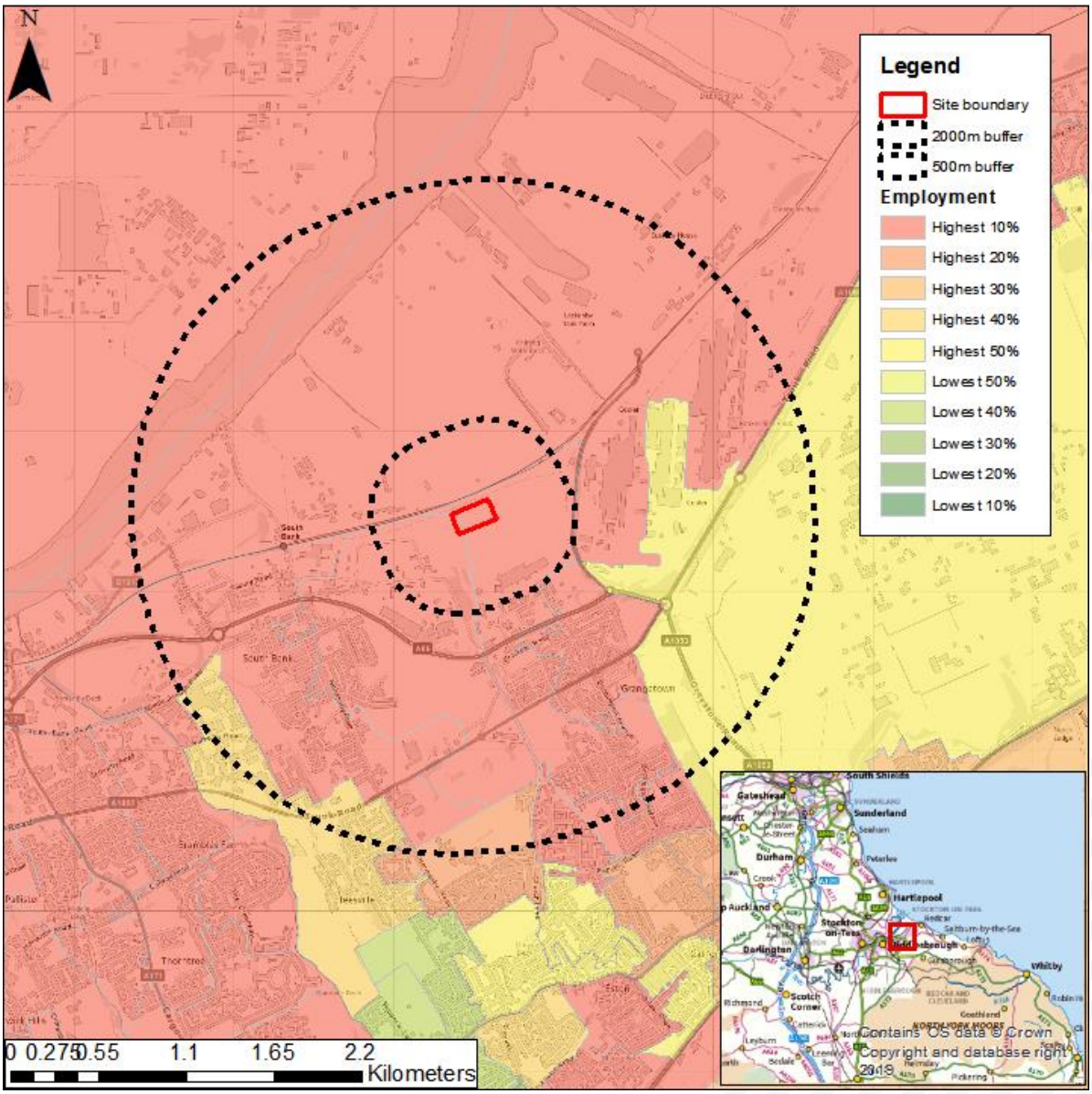

Figure 111-2: Proportion of working-age individuals involuntarily excluded from the labour market in the area surrounding the proposed development. Source: ONS Indices of Multiple Deprivation 2011

Redcar & Cleveland has a relatively high number of individuals working in skilled trade professions, care & leisure, and machine operation. There are relatively low numbers working in manager/senior, professional and associate professional roles (Nomisweb, 2019). The predominant industries for employment in Redcar & Cleveland are Retail & Vehicle Repair (15% of all jobs), Health & Social Work (13%) and Manufacturing (12%).

Mean earnings in Redcar & Cleveland are £23,287, one of the lowest of all local authorities in the UK. They are also falling, which is against the trend in the region and the UK. Between 2017 and 2018, mean salaries in the District fell by 0.7%. In the same period mean salaries in the North East rose by 2.2%, and mean salaries in the UK rose by 2.9%. (ONS, 2018).

11.4.4 Housing

It is estimated that there were approximately 64,600 'dwellings' in Redcar & Cleveland District in 2016. In this context, 'dwelling' means place of residence. Of these, 52% (33,600) were owned, either outright or with a mortgage, 14% (9,300) were privately rented and 22% (14,000) were rented from a housing association (Bullock, 2016).

Redcar & Cleveland District has a very high rate of dwelling vacancy. As of 2016, there were 3,200 empty dwellings in the District, approximately 5% of the total supply. This compares to an England average of just 2.7%. Vacancy rates are not ubiquitous throughout the District – Eston for example has lower levels of vacancy, whereas rates in the market town of Guisborough are almost 10%. Vacancy levels in Redcar town are approximately 5.0% (Bullock. 2016).

The average house price in Redcar & Cleveland District was £133,000 in the year ending September 2018, slightly below the North East average of £139,950. The nearby Districts of Stockton-on-Tees and Middlesbrough have house prices not substantially different to those in Redcar & Cleveland.

When average salaries in Redcar & Cleveland are compared to average house prices, Redcar & Cleveland District, and Middlesbrough and Stockton-on-Tees Districts, all have relatively low ratios. These three Districts have ratios of 5.2-5.5, compared to an average of 8.0 for England (ONS, 2019 (3)). This suggests housing is relatively affordable in the wider area. Because of this relative affordability, first-time buyers in the area tend to target 3-bedroom detached homes (Bullock, 2016). This is unusual for England, as in most areas a dwelling of this size and nature would be unaffordable for a substantial majority of first-time buyers.

The existing housing stock in Redcar & Cleveland does not however necessarily meet the needs of the local population. Due to its industrial history, the majority of housing are either ageing Victorian terraces in degrading condition or ex-social housing estates (Chandler, 2016). Redcar & Cleveland District Council have recognised this imbalance and are working to deliver a wider range of property types, to meet the needs and aspirations of the population, and work to better retain young adults in the area or attract new residents.

11.4.5 Tourism

The Tees Estuary also experiences tourism from individuals walking and wildlife watching. Both visitors and locals often come to the area to view wildlife in the Teesmouth and Cleveland Coast, including the family of seals that live in the Tees Estuary (RCBC, 2017).

Redcar & Cleveland District has a relatively modest tourist industry, concentrated in small areas. The District attracts approximately 1.8 million day visits a year and 106,000 overnight stays. Tourists and visitors spent £124 million in the District in 2012 (£144 million in 2018, adjusting for inflation). The majority of visitors to the District are attracted to the seaside resorts of Redcar and Saltburn-by-the-Sea (Dexbury & Woodfin, 2014). Redcar & Cleveland District is well-known on a national scale for being heavily industrial, especially around the south bank of the river Tees. This damages the reputation of the area from a visitor standpoint (Dexbury & Woodfin, 2014) and discourage individuals from visiting other areas of the District, including seaside towns, and the historic market town of Guisborough and the North York Moors National Park.

The neighbouring authority of the City of Middlesbrough also has a relatively modest tourist industry, with attractions including Middlesbrough Town Centre, the Transporter Bridge and Middlehaven (including the Riverside Stadium).

11.4.6 Crime

Crime rates in the wider Tees Valley are relatively high but concentrated in small areas. In the area immediately surrounding the development crime levels are approximately similar to the national average (See Figure 11-3). However, in the urban areas of Middlesbrough nearby, crime rates are among the highest 10-20% in the UK.

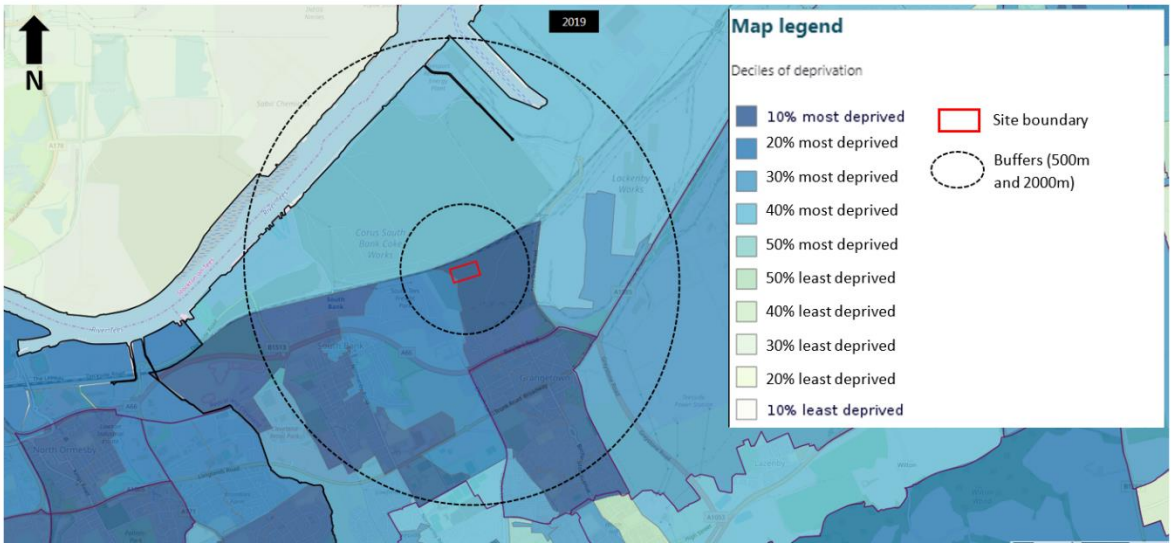

Figure 11-3: Crime rates in the area surrounding the proposed development. Source: http://dclgapps. communities.gov.uk/imd/iod_index.html# 2019 dataset

The proposed site, alongside the entirety of Redcar & Cleveland District, falls within the jurisdiction of Cleveland Police. Crime rates in the District were 92.16 per 1,000 people in the year to December 2018. This was below average for the Cleveland Police jurisdiction (109.48 per 1,000 people). Crime rates in the District have been rising since 2017 (data.police.uk, 2019). The most common crimes committed in Redcar Town (the designated area that the proposed development falls within) are anti-social behaviour (34%) and violence/sexual offences (25%). Burglary, theft and robbery, of biggest concern for the proposed development (alongside criminal damage and arson), comprise 12% of overall crime (data.police.uk, 2019). The site will be operational 24 hours per day, 365 days per year. There will be a constant presence on site, operating from an administration base within the proposed development plot.

11.4.7 Traffic & Commuting

Traffic levels in an area have the potential to significantly impact upon the quality of life of residents. Increased traffic levels can impact upon quality of life in the following ways;

By increasing congestion and therefore wasting time of motorists – thereby reducing regional economic health;

- An increase in time spent in stationary vehicles increases local air pollution;
- Economic impact to individuals that frequently drive on local routes from wear and tear on vehicles as a result of idling in traffic;
- Impacting on health of motorists by increasing stress levels;
- Increased congestion could inhibit emergency vehicles from reaching destinations; and
- An increase in the incidence of the Spillover effect; where drivers attempt to find alternative, less congested routes, possibly through much smaller roads,

affecting neighbourhood quality of life and in extreme cases also local house prices.

The proposed development, together with surrounding industrial area on the southern bank of the Tees, lies within Redcar & Cleveland 022D Lower Super Output Area (LSOA) and the Redcar & Cleveland 0003 Middle Layer Super Output Area (MSOA). Commuting data from the 2011 Census shows the following breakdown of where people commute from to this area:

- 52.5% of workers live within Redcar & Cleveland District;
- 22.6% of workers live in Middlesbrough Borough;
- 16.0% of Workers live in Stockton-on-Tees Borough;
- 8.9% of workers live elsewhere, in the areas of County Durham, Darlington, Hambleton, Hartlepool, Richmondshire and Scarborough (See Figure 1-4).

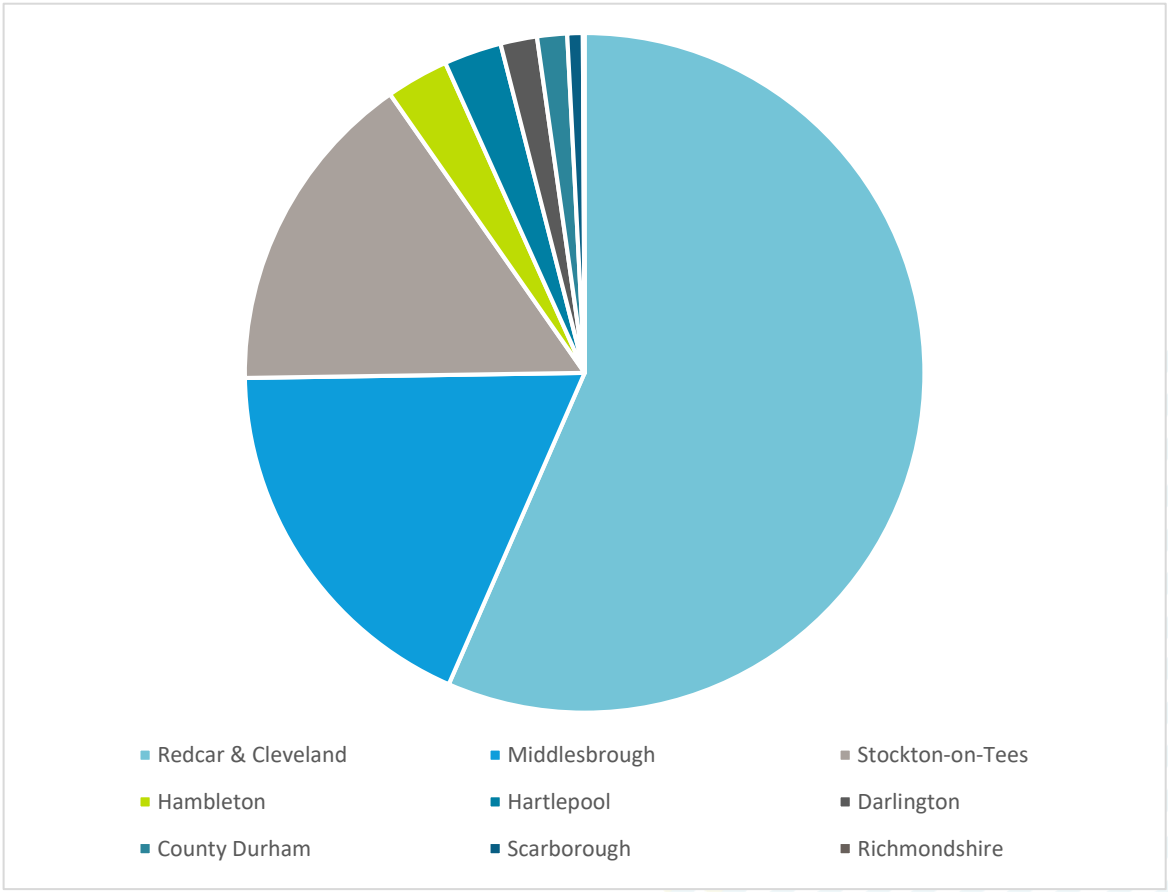

Figure 11-4: Pie chart showing home location of workers in Redcar & Cleveland 0003 MSOA

Private car is by far the most popular method of commuting for those who work in the area. 81.4% of people that work in Redcar & Cleveland drive their own car to work. 7% are passengers in a private car. 2.3% walk to work, 2.2% cycle, 1.6% take the bus and 0.1% commute by motorbike (ONS, 2011).

The site will use a new site access on the corner of Eston Road that will serve a new internal highway network for the Grangetown Prairie Plots. This access will be constructed as part of the enabling works for all development plots by STDC and not part of the current application.

The Construction period will be approximately 36 months, during which construction traffic is likely to peak during the initial 12 months. At the peak of construction activity, up to 40 HGVs will visit the site each day, but for the most part it will be fewer than this.

During construction staff numbers on site, may be as high as 300 at the peak, although numbers will vary dependent upon the activities being carried out.

The facility is designed to have the capacity to receive up to 450,000 tonnes of waste per annum. Waste deliveries to the expected to finish by approximately 1600 hours, thus removing operational trips on the highway network during the evening rush hour. Waste will be received from all Tees Valley Boroughs. The facility will receive waste 8-hour operation (7am -3pm) Monday to Friday and Saturday morning. It is likely that there will be peaks mid-morning and mid-afternoon, Monday to Friday and Saturday morning. The facility will function 365 days a year, with waste received 305 days per year.

Staffing will operate 24-hours over three shifts (08:00 – 16:00, 16:00 to 00:00 and 00:00 to 08:00).

All visitors will be required to report to reception within the facility. Dedicated pedestrian access to reception will be provided from the car park area.

11.4.8 Public Rights of Way

The Teesdale Way public footpath is a waymarked long distance walking route which follows the River Tees for much of its 98 mile course. The path lies to the north of the site and has a pipeline route between the path and the site boundary. The Teesdale Way forms part of The EIA Scoping Response from R&CBC (R&CBC, 2019) and states that *"There should be no interference with the availability and use of the PROW"*. Further within the Scoping Response, the Ramblers comment *"Provided that free and safe access to the nearby Teesdale Way is guaranteed throughout construction, the Ramblers have no objections to the proposal."*

11.4.9 Air Quality

Poor air quality is the single largest environmental risk to population health in the UK. Poor air quality contributes to cardiovascular disease, lung cancer and respiratory diseases. It increases hospital admissions, visits to accident and emergency departments and illnesses that impact everyday life (Defra, 2017). Studies have also shown that air quality may also have an impact on subjective, as well as objective, wellbeing. Studies have shown that individuals that live in areas with poor air quality report lower levels of life satisfaction, optimism and general happiness (Darçin, 2017).

The conclusions from annual Government reports regarding Redcar and Cleveland have consistently shown good air quality in areas where members of the public are regularly exposed to air pollution (R&CBC, 2019 Air Quality Annual Status Report). There is no requirement to declare an Air Quality Management Area (AQMA), however a commitment to improving air quality for the public continues, using a diffusion tube network since 2014 and via the upcoming South Tees Clean Air Quality Strategy with Middlesbrough Borough Council.

Redcar and Cleveland does not actively monitor PM2.5 emissions, however neighbouring authorities in Middlesbrough and Stockton-on-Tees are part of the national Automatic Urban and Rural Network (AURN) which allows calculation of likely levels within the Borough to be established.

Further information is provided within the Chapter 12

11.4.10 Noise

Noise pollution can have a significant adverse impact upon quality of life for individuals. Constant exposure to high noise environment can damage or impair an individual's hearing, impair sleep and make paying attention more difficult. It is known also to indirectly contribute to an increase in rates of cardiovascular disease, strokes and dementia in a population. One study estimated that noise pollution costs the UK economy up to £1.26 billion every year (EC, 2015).

The immediate area is highly industrialised.

A baseline Noise Assessment has been undertaken and provided in Volume 3.

11.5 Impacts

11.5.1 Employment

The proposed development is projected to create 42 full-time jobs once operational. The facility will be operational 24-hours per day, 365 days a year. The current perioded shift patterns for staff will follow:

08:00 – 16:00	24 staff
16:00 – 00:00	8 staff
00:00 – 08:00	8 staff

Employment during operation will provide a mix of administration, technical and skilled labour, including opportunities at apprentice level.

During construction job creation may be as high as 300 peak.

Based upon home locations of current workers in the area, the jobs created by the construction and operation of the development would be filled by residents of local Districts as shown in Table 11-4.

Table 11-4: Predicted home locations of new employees of the proposed scheme during the construction and operational stage

Home District	Proportion of employees currently commuting from this District	Number of new employees projected to travel in from this District during construction	Number of new employees projected to travel in from this District during operation
Redcar & Cleveland	52.2%	157	22
Middlesbrough	22.6%	68	9
Stockton-on-Tees	16.0%	48	7
Others	8.9%	27	4
	Total:	300	42

The projected increases as described in Table 11-4 would all constitute relative employment levels increases of 0.2% in Redcar & Cleveland, and less than 0.1% in all other local Districts. The numbers in Table 11-4 represent a hypothetical situation where all workers currently reside in the local area. However, highly specialist jobs

during construction and operation may require recruitment of people with specific skill sets from outside the immediate locality.

In addition to the direct employment gained by the development itself, there is likely to be an increase in local employment arising from indirect and induced effects of the development. Employment growth may arise locally through suppliers of materials and equipment to the site (supply chain). Additionally, it stands to reason that a substantial proportion of the additional income of the new staff members will be spent in Redcar or elsewhere in the District, generating or supporting further employment. This is called the multiplier effect. The impact of the multiplier effect depends on the size of the geographical area that is being considered, the business supply chain and the strength of income effects.

An increase in industry in the District would also make the District a more attractive place for other, similar prospective employers to establish sites. This development would therefore result in other developers establishing sites in the area, further increasing employment in the area.

It may also be the case that the proposed development creates opportunities for companies to establish in the local area and form part of a new supply chain. Producers in the supply chain would find it advantageous to establish sites local to the proposed development in order to cut transport costs, increasing competitiveness. This is likely to result in further increases in employment in the area.

It is anticipated that due to the factors outlined above, the proposed scheme would have a **slight to moderate positive effect** (as defined by Table 11-3) on local employment within Redcar & Cleveland District.

There would be negligible increases in employment in Middlesbrough and Stockton-on-Tees. However, the job increase in these Districts would likely not be evenly distributed around these two districts. For example, of the additional 9 jobs anticipated to be filled by residents of Middlesbrough, it is thought that most would be taken by residents of the North Ormesby and Berwick Hills areas of the city, as that is where the majority of commuters to Redcar & Cleveland currently live (ONS, 2011). In Stockton-on-Tees District, it is anticipated that most of the 7 projected additional jobs would be taken by residents of the Thornaby area (ONS, 2011). In these small areas, positive employment impacts arising from the scheme are likely to be more significant than on a District-wide scale. In these areas, the effect could be slight positive (as defined by Table 11-3).

11.5.2 Housing

The employment rate in Redcar & Cleveland District, and surrounding areas, is relatively low. Due to this, it is anticipated that during both the construction and operational phases of the proposed development, the majority of new employment would be filled by current residents of the local area, rather than filled by individuals that are moving to the local area in order to work at the new site.

The proposed scheme is not expected to place significant stress on local housing provision. The reasons for this are outlined below:

- The nature of the employment required for the proposed development means that is unlikely to have to source labour from outside the local area;
- The relative affordability of Redcar & Cleveland and the surrounding area suggests that, were the proposed development to attract individuals to move to the area, they are relatively likely to find adequate, affordable, accommodation;
- The high dwelling vacancy rate in Redcar & Cleveland suggests that the local housing market has the capacity to absorb a modest increase in demand, were one to arise;

- There are two large housing developments, totalling up to 1750 new homes, relatively close to the development, being proposed. This should more than counteract any additional pressure placed on the housing market as a result of inward migration due to the proposed development.

As a result of the above, it has been determined that any effect on the local housing market as a result of the proposed development is anticipated to be **not significant** (as defined by Table 11-3).

11.5.3 Tourism

The proposed development is located in a historically heavily industrialised area. As such, it is anticipated that the proposed development would not positively or negatively impact on desire of those from outside the region to visit.

From local areas frequented by tourist Redcar, Eston Nab and Saltholme, the structures would form a small part of the wider panoramic view of heavy industry which defines the urban/landscape setting of Teesside. It is likely the structure and stacks would be clearly visible and distinguishable due to their size but would not appear uncharacteristic within the wider industrial setting. Overall impacts on these attractions were assessed as being minor to neutral.

As impacts on the views from local visitor attractions are of such a low magnitude, it is not anticipated that any attraction would experience a decline in visitor satisfaction or in visitor numbers as a result of the development. The local tourism economy is not anticipated to be impacted in a positive or negative way. Impact on the tourism industry is anticipated to be **not significant** (as defined by Table 11-3).

11.5.4 Crime

The proposed development could become a target for local crime during the construction and operational phases, predominantly due to equipment on the site. Once operational, the site will operational 24 hours per day, 365 days per year. There will be a constant presence on site, operating from an administration base within the proposed development plot. Site security will make tours of the site to deter and detect intrusion. During construction 24 hour security will be in place to deter intruders.

The area already has relatively high rates of non-residential burglary and vandalism (Cleveland Police, 2019). This is due to a combination of factors: many industrial sites in the area contain expensive equipment and materials, and much of the surrounding residential development is relatively deprived and has a high crime rate. The 24 hour operation and security arrangements during both operation and construction are anticipated to **not to be significant** in terms of impact on crime levels in the area.

11.5.5 Traffic & Commuting

The site will use a new site access on the corner of Eston Road that will serve a new internal highway network for the Grangetown Prairie Plots. This access will be constructed as part of the enabling works for all development plots by STDC and not part of the current application.

The Construction period will be approximately 36 months, during which construction traffic is likely to peak during the initial 12 months. At the peak of construction activity, up to 40 HGVs will visit the site each day resulting in an additional 80 HGV trips. For the most part it is estimated that number of trips will be fewer than this. During construction staff numbers on site, may be as high as 300 at the peak, although numbers will vary dependent upon the activities being carried out. Construction will take place during normal daytime working hours (0800-1700). It is estimated that private car trips resulting from site workers arriving at and leaving the site will be predominantly 0700-0800 and 1700-1800, 5 days a week.

Once operational, the facility is designed to have the capacity to receive up to 450,000 tonnes of waste per annum. It will function 365 days a year, with waste received 305 days per year. The facility will receive waste during 8-hour operation (7am -3pm) Monday to Friday and Saturday morning. It is likely that there will be peaks mid-morning and mid-afternoon, Monday to Friday and Saturday morning. Waste deliveries to the expected to finish by approximately 1600 hours, thus removing operational trips on the highway network during the evening rush hour.

During 8-hour operation (7am -3pm) Monday to Friday there will be up to 122 HGV waste deliveries to site and 40 HGV residual waste removals from site. This equates to 324 HGV trips per day as a result of the operational site Monday to Friday. During Saturday morning operational hours (8am -2pm) there will be up to 60 HGV waste deliveries to site and 20 HGV residual waste removals from site. This equates to 160 HGV trips per day as a result of the operational site on Saturday mornings.

Staffing will operate 24-hours over three shifts (08:00 – 16:00, 16:00 to 00:00 and 00:00 to 08:00) with a total of 42 staff working daily Monday to Saturday, and 24 on Sunday. The shift working pattern means that commuting journeys are staggered over 24-hours. Peak commuting journeys are predicted to be between 0700-0900 Monday-Saturday with a total of 33 journeys, and the same between 1500-1700 Monday-Saturday.

The residential area considered to be most sensitive to changes in traffic flow is the Redcar & Cleveland ward of South Bank, specifically the residential areas surrounding the northern end of Normanby Road (grid reference NZ535206). This area is home to approximately 3,200 people (ONS, 2018). The roads through this area are anticipated to experience no more than 21% of all private vehicles accessing the site and no increase in HGV traffic. Based upon the existing traffic through this area, the potential severance effect is not considered significant.

Any increase in HGV traffic should be considered both alongside and separate to total traffic increases. This is because a significant increase in HGV traffic can impact upon pedestrian amenity and pedestrian fear, therefore having a potential impact upon quality of life for local residents and those who commute along similar routes either by bike or on foot. Predicted increases in traffic are discussed in greater detail in Chapter 16: Traffic and Transportation.

During the operational stage, the development would result in a maximum increase of 20 HGV movements per hour (delivery and residual waste removal), or approximately one every 3 minutes on average, between the hours of 07.00 and 16.00. Over the course of a day, this could constitute an additional 260 HGV movements along the A66.

11.5.6 Air Quality

An air quality assessment was undertaken as part of the scheme appraisal, Chapter 12

11.5.7 Noise

A baseline survey was undertaken and provide in Volume 3.

During construction noise and vibration will be managed through the Construction Environmental Management Plan. During operation, noise levels will be controlled by the relevant conditions of planning.

11.6 Mitigation Measures

11.6.1 Employment

Socio-economic impacts of the proposed development on local employment is likely to be positive and no mitigation is therefore required. It is recommended that when seeking employees for the operational stage of the scheme, the client use of the

Grangetown Training and Employment Hub, a local scheme operated through a partnership between Jobcentre Plus, R&CBC, Coast and Country Housing, Work Programme providers, training providers and individual projects. The scheme occupies a community centre in Grangetown and aims to get local residents into work. Many employers involved in local activity engage with the centre as it helps them deliver agreed targets they have to employ local labour as well as supporting them to fill vacancies with appropriately skilled workers.

11.6.2 Housing

Socio-economic impacts of the proposed development on local housing demand and supply is likely to not be significant and no mitigation is therefore required.

11.6.3 Tourism

Socio-economic impacts of the proposed development on tourism is likely to not be significant and no mitigation is therefore required.

11.6.4 Crime

The EIA Scoping Response (R&CBC, 2019) response from the Cleveland Police CPO/ALO states that the applicant can make contact for further discussion on crime prevention measures for the site. The following mitigation measures discussed are also considered appropriate for the development:

- Closed Circuit Television should be present and functioning throughout the site;
- Security fencing should be installed surrounding the entire site to minimise the risk of break-ins, vandalism and theft. This fencing should be at least 2.0m high and have anti-climb devices on the top of the fence, such as anti-climb rotator spikes. Two perimeter fences with a gap between them was also a recommended feature to make break-ins more difficult;
- The staff and visitor car park should have the same level of protection as the rest of the site;
- There should be a security team on-site on a permanent basis.

These measures will increase security on the site which is already to considered to have a reduced chance of being targeted due to the 24 hour operation and security presence.

11.6.5 Traffic & Commuting

The impacts arising from potential increases in traffic were concluded to be insignificant. The worst-case scenario of 20 additional HGV movements per hour along the A66 would not constitute a noticeable increase, leading to insignificant impacts on other road users. Traffic management procedures will be in place to phase deliveries and avoid peak areas.

The facility will process waste from residential and commercial properties within the Tees Valley area. Due to the proximity to the site and dispersed sources of origin throughout the region, transport by road is the most appropriate mode of transport of waste to site. The proximity of the site to the rail line may open up possibilities for waste deliveries to site (and residual waste removal from site) to be transported by rail in place of road, thereby reducing the road traffic impact. The proposed site's location on the South Bank of the River Tees, 6km upstream from the North Sea, provides opportunities for transport of material to and from site by shipping. Whilst this is unlikely to be feasible for waste deliveries due to the origin of waste within the Tees Valley area, opportunities may be present for the removal of residual waste depending on proposed destination of this material.

As well as removing freight transport from the local road network, shipping and rail are advantageous over road freight in the following ways:

- CO2 emission are significantly lower;
- Delivery times are generally more reliable; and
- Freight cost (£ kg-1 km-1) are significantly less than the road network.

The projected increase in commuter traffic along the A66 was deemed to be insignificant. However, it may still be advantageous for the proposed development to incorporate measures or infrastructure to reduce the necessity for prospective employees to travel via private car. Commuting via public transport, or cycling or walking, can be beneficial to the local air quality, reduce the District's contribution to climate change, and increase the health and wellbeing of employees. Measures to be adopted could include:

- Car share schemes;
- Electric car charging points;
- Secure cycle parking, showers and lockers;
- Cycle to Work scheme;
- Discounted public transport season tickets.
- An Environmental Rewards Scheme for employees. Many employers now offer financial incentives for their staff to commute via an environmentally friendly method e.g. cycling or via public transport. This could result in a reduction in private cars travelling to and from the site, lessening traffic impacts;

Any increase in HGV movements on the local road network could create an adverse impact on other users of that road network during the construction phase of the project. For the sake of this assessment, it is assumed that the volume of material brought to site cannot be reduced without hindering construction. Whilst traffic impacts are deemed to be insignificant, there are opportunities to further reduce residual impacts. The socio-economic impacts of the increased traffic could be minimised are stated below:

- Procurement of the materials required for construction could be planned carefully to minimise excess material and waste. This would both minimise transportation on site of materials and transportation off site of waste and excess materials;
- Materials could be sources as locally to the site as possible, to reduce overall distances of HGV travel (if HGV travel is required). Disposal points of waste materials could also be sourced as locally to the site as possible.
- Materials could be transported to the site via shipping or rail freight due to the immediate proximity of the site to the Tees Estuary and rail line. This could considerably reduce HGV traffic during construction. Additional advantages include lower transport emissions, lower costs and reliability of delivery times.
- For the volumes of material assumed to be needed for the construction, the only two viable methods of transportation are via the road network or shipping. As shipping (currently the preferred method) would lead to less severe adverse socio-economic impacts, no mitigation is suggested. It is not possible to eliminate all adverse impacts in this case, however traffic impacts against the baseline are not deemed to be significant.

11.6.6 Air Quality

Socio-economic impacts of the proposed development on air quality is likely to not be significant and no mitigation is therefore required.

11.6.7 Noise

Socio-economic impacts of the proposed development on noise is likely to not be significant and no mitigation is therefore required.

11.6.8 Construction Impact Mitigation Measures

In order to mitigate any socio-economic impacts arising from construction of the scheme, some or all of the following measures should be adopted:

- Informing, respecting and showing courtesy to those affected by the work;
- Minimising the impact of deliveries, parking and work on the public highway;
- Contributing to and supporting the local community and economy; and
- Working to create a positive and lasting impression

Site Construction Environmental Management Plan (CEMP) should be developed and maintained throughout operations, covering management of construction impacts such as noise, dust, waste, water run-off/pollution.

Assessment of the site under the Considerate Constructors Scheme (CCS) to maintain best practice site management in line with an industry recognised benchmark scheme.

11.7 Residual Impacts

The table below summarises the residual impacts of each socio-economic consideration, assuming implementation of the mitigation measures proposed.

Table 11-5: Summary of Impacts

Socio-economic consideration	Socio-economic Impact	Residual Impact After Mitigation	Comments
Employment	Slight positive	Slight positive	Employment opportunities created during construction and operation.
Housing	Not significant	Not significant	Housing provision in the local area deemed sufficient for workforce.
Tourism	Not significant	Not significant	Minimal local tourism. Existing industrial landscape.
Crime	Not significant	Not significant	24 hour operation and security likely to reduce likelihood of crime. Mitigation measures proposed for additional security.
Traffic & Commuting	Not significant	Not significant	Traffic Management Plan to be agreed for construction.
Air Quality	Not significant	Not significant	Air Quality managed through existing regulatory requirements and the operational permits / consents.
Noise	Not significant	Not significant	Construction noise managed through CEMP and through agreed future planning conditions

11.8 Summary

A social impact assessment has been undertaken to determine the likelihood of any socio-economic impacts upon the local community surrounding the proposed development, and the wider Tees Valley. The assessment focussed on potential impacts, positive and negative, on local employment, housing provision, the tourism industry, crime levels, traffic, air quality and noise.

12 Air Quality, Noise and Human Health

12.1 Introduction

This chapter provides an assessment of the likely impacts associated with Air Quality, Noise and any effects on Human Health. It comprises an assessment of effects predicted as a result of the operation of the Proposed Development and associated committed developments.

The current proposal is for an outline application however construction and likely operation effects have been considered assessed. Where potentially significant effects on ecological receptors have been identified, mitigation measures have been incorporated into the project design (as embedded design) or included as part of the construction or operational phases.

Scheme design and background details are provided in Section 1 to 3. All figures are provided in Volume 2.

A Baseline Noise Report is provided in Volume 3.

Further information is provided in the Air Quality Report provided to support the application.

12.2 Legislation, Policy and Guidance

The following documents provide the basis for the methodology and assessment criteria within this chapter.

Control of Pollution Act 1974

Section 60 of the Control of Pollution Act 1974 relates to the 'Control of Noise on Construction Sites' and Section 61 relates to 'Prior Consent for Work on Construction Sites'. These sections include the serving of notices and the formation of agreements specifying acceptable levels of noise, hours of operation, working methods (including use of specific plant) and noise mitigation.

The 2008 Ambient Air Quality Directive

This sets out legally binding limits for concentrations in outdoor air of major air pollutants that affect public health such as particulate matter (PM10 and PM2.5) and nitrogen dioxide (NO2). The UK also has national emission reduction commitments for overall UK emissions of 5 damaging air pollutants:

- fine particulate matter (PM2.5)
- ammonia (NH3)
- nitrogen oxides (NOx)
- sulphur dioxide (SO2)
- non-methane volatile organic compounds (NMVOCs)

As well as having direct effects on public health these pollutants can combine in the atmosphere to form ozone. A harmful greenhouse gas that can be transported great distances by weather systems. Odour and dust can also be a planning concern, for example, because of the effect on local amenity.

Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with relevant Limit Values. The potential impact of new development on air quality must be taken into account where the national assessment indicates that relevant limits have been exceeded or are near the limit, or where the need for emissions reductions has been identified.

The local air quality management (LAQM) regime requires every local authority to regularly review and assess air quality in their areas. If national objectives are not met,

or at risk of not being met, the local authority concerned must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan.

National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF) was published by the Department for Communities and Local Government (DCLG) in 2012 and has since been revised in July 2018 and again in February and June 2019. The NPPF sets out the Government's planning policies for England and how these are expected to be applied, with a presumption in favour of sustainable development a core element of the framework.

The National Planning Policy Framework (NPPF) is the means by which noise is considered within the planning system. The NPPF states (paragraphs 109 & 123):

- The planning system should contribute to and enhance the natural and local environment by […] preventing both new and existing development from contributing to, or being put at unacceptable risk from, or being adversely affected by, unacceptable levels of […] noise pollution. Planning policies and decisions should aim to […]:
- Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
- Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;
- Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and
- Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason…."

The National Planning Policy Framework (NPPF) 2019 sets out planning policy for England. It includes advice on when air quality should be a material consideration in development control decisions. Relevant sections are set out below:

Paragraph 170:"Planning policies and decisions should contribute to and enhance the natural and local environment by: 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 should, wherever possible, help to improve local environmental conditions such as air and water quality"

Paragraph 180: "Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development".

Paragraph 181: "Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality

Management Areas and Clean Air Zones is consistent with the local air quality action plan."

Paragraph 183: "The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities."

Paragraph 54: "Local planning authorities should consider whether otherwise unacceptable development could be made acceptable through the use of conditions or planning obligations. Planning obligations should only be used where it is not possible to address unacceptable impacts through a planning condition."

The NPPF is supported by Planning Practice Guidance (PPG). The PPG states that:

Paragraph 001 (Reference ID: 32-001-20140306): "Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with EU Limit Values. It is important that the potential impact of new development on air quality is taken into account in planning where the national assessment indicates that relevant limits have been exceeded or are near the limit."

Paragraph 005 (Reference ID: 32-005-20140306): "Whether or not air quality is relevant to a planning decision will depend on the Proposed Development and its location. Concerns could arise if the development is likely to generate an air quality impact in an area where air quality is known to be poor. They could also arise where the development is likely to adversely impact upon the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation (including that applicable to wildlife)."

The PPG also sets out the information that may be required in an air quality assessment, stating that:

Paragraph 007 (Reference ID: 32-007-20140306): "Assessments should be proportional to the nature and scale of development proposed and the level of concern about air quality, and because of this are likely to be locationally specific."

It also provides guidance on options for mitigating air quality impacts, and makes clear that:

Paragraph 008 (Reference ID: 32-008-20140306): "Mitigation options where necessary will be locationally specific, will depend on the Proposed Development and should be proportionate to the likely impact."

Other national guidance

Guidance on noise from developments is guided by BS 5228-1:2009 Code of Practice for noise and vibration control on construction and open sites- Part 1 (Noise). This code of practice provides guidance and recommendations for the methods of measuring construction noise and assessing its impact on those exposed. Methods are provided for calculation of noise from construction activities, including basic information regarding noise levels from a range of construction equipment.

Guidance is also provided for the identification of noise limits and trigger levels for noise from construction activity. Significance can be considered in relation to fixed limits for noise and vibration, or through considering the potential change in ambient noise levels due to construction noise.

In addition to noise, vibration is considered in BS 5228-1:2009 Code of Practice for noise and vibration control on construction and open sites- Part 2 (Vibration). Vibration caused by construction, even at very low levels, can be perceptible to people. While

vibration may be felt and be a source of nuisance, levels of vibration required to cause damage are considerably greater. In any community, some persons will be more perceptible to vibration than others.

The main requirements with respect to dust control from industrial or trade premises not regulated under the Environmental Permitting Regulations, which would include the Project construction site, are those provided in Section 80 of Part III of the Environmental Protection Act (1990). The Act defines nuisance as:

"any dust, steam, smell or other effluvia arising on industrial trade or business premises and being prejudicial to health or a nuisance."

Enforcement of the Act is currently through the local Environmental Health Department, whose officers are deemed to provide an independent evaluation of nuisance. If the local authority is satisfied that a statutory nuisance exists, or is likely to occur or happen again, it must serve an Abatement Notice under Part III of the Act requiring abatement and any necessary works to achieve it.

To operate, the site will require an environmental permit which will be issued by the Environment Agency. The purpose of the permit is to ensure the operation of the facility does not significantly deteriorate local air quality. This assessment has been produced to explicitly support the planning application. Permit applications are likely to require additional information and detail not required for planning applications.

The Proposed Facility consists of an EfW operation which will incinerate up to 450,000 tonnes of MSW per annum. Operation of the Proposed Facility is due to be 24 hours per day, 365 days per year, however, planned maintenance and shut down periods will mean the plant will typically operate for 90% of the hours in a year. Thus, the hourly fuel consumption is 450,000 tonnes / 7884 hours. The fuel is assumed to have a typical MSW composition as presented in Table XXX.

Local Planning Policy

The Redcar and Cleveland Local Plan was adopted in May 2018 and sets out the vision and overall development strategy for the Council's area and how it will be achieved for the plan period until 2032. Local planning policies relevant to the proposed development with regards are detailed in Table 6-1.

Table 12-1: Redcar and Cleveland Borough Council Local Plan Environmental Policy Objectives

Policy	Summary of Policy Objectives
SD4 – General Development Principles	Development proposals will be expected to: *minimise pollution including light and noise and vibration levels to meet or exceed acceptable limits*.
Site Location	The Council will ensure that new development will not result in unacceptable impacts on those living or working nearby, particularly by way of loss of privacy and the effects of light, noise, odours, pollution or other disturbances.

Redcar and Cleveland has taken forward a number of direct measures during the current reporting year of 2018 in pursuit of improving local air quality. Redcar and Cleveland has no formal air quality action plans as the declaration of an AQMA has not been undertaken.

The Redcar & Cleveland development plan consists of the Redcar & Cleveland Local Plan and the Tees Valley Joint Minerals and Waste Development Plan Documents. The Local Plan includes two policies which refer to pollution, including air pollution:

"Policy SD 4 - General Development Principles:

… n. minimise pollution including light and noise and vibration levels to meet or exceed acceptable limits"

"Policy LS 4 - South Tees Spatial Strategy:

… l. encourage clean and more efficient industry in the South Tees area to help reduce carbon dioxide emissions and risk of environmental pollution"

In addition to the local plan the Council has published a number of Supplementary Planning Documents and one of the Objectives of the South Tees Supplementary Planning Document is:

"8. Deliver redevelopment in a way that provides long term sustainability, reduces pollution, manages the water environment, protects the historic environment, contributes to habitat protection, safeguards biodiversity and enhances green infrastructure, open space and landscape character."

The development principle STDC1: Regeneration Priorities states:

"To reduce pollution, contribute to sustainable flood risk management and habitat protection and encourage biodiversity and long term sustainability;"

Air Quality Strategy and Local Air Quality Management

The Environment Act 1995 (Part IV) requires the Secretary of State to publish an air quality strategy and local authorities to review and assess the quality of air within their boundaries. The latter has become known as Local Air Quality Management (LAQM).

The Air Quality Strategy provides the policy framework for local air quality management and assessment in the UK. It sets out air quality standards and objectives for key air pollutants. These standards and objectives are designed to protect human health and the environment. The Strategy also sets out how the different sectors of industry, transport and local government, can contribute to achieving these air quality objectives (AQOs).

Local authorities are seen to play a particularly important role in the air quality management process and the technical guidance document, LAQM.TG16, produced by Defra, provides advice that local authorities should follow.

Local authorities are required to identify whether the AQOs have been, or will be, achieved at relevant locations, by the applicable date. If the AQOs are not achieved, the authority must declare an AQMA and should prepare an action plan within 12 months. An action plan must identify appropriate measures and policies that can be introduced in order to work towards achieving the objective(s).

The AQOs set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality (England) Regulations 2000, and the Air Quality (England) (Amendment) Regulations 2002.

EU limit values

The European Union has also set limit values for certain pollutants; these are legally binding and have been implemented into English legislation by The Air Quality Standards Regulations 2010.

The Industrial Emissions Directive (IED)

The Industrial Emissions Directive (IED, 2010/75/EU), a European Union Directive, compiled seven existing directives including the Waste Incineration Directive (WID) into a single directive. Chapter IV of the IED applies to incineration and co-incineration plants (which accept waste and other fuels such as biomass) which thermally treat waste as defined in the Waste Framework Directive. The IED defines requirements for

facilities classified as waste incinerators under the IED definition. The IED also defines emission limit values (ELVs) for emissions to air.

Protection of Nature Conservation Sites

Sites of nature conservation importance at a European, national and local level, are provided environmental protection from developments, including from emissions to air.

The Conservation of Habitats and Species Regulations 2017 (as amended) (known as the 'Habitats Regulations') transposes the Habitats Directive, a European Directive, into UK legislation. The Habitats Regulations require that a development proposal will not cause a likely significant effect or, where likely significant effects cannot be discounted, no adverse effect on the integrity of European sites. It requires an assessment to determine if significant effects (alone or in combination) are likely, followed by an 'appropriate assessment' by the competent authority, if necessary.

Similarly, the Countryside and Rights of Way (CRoW) Act 2000 provides protection to Sites of Special Scientific Interest (SSSIs) to ensure that developments are not likely to cause them damage.

Locally important sites (such as National Nature Reserves (NNR), Local Nature Reserves (LNR), Local Wildlife Sites (LWS) or Sites of Importance for Nature Conservation (SINCs) and Ancient Woodland (AW)) are also protected by legislation to ensure that developments do not cause significant pollution.

Environmental Permitting

The Environmental Permitting (England and Wales) Regulations (EPR) transpose the IED in UK legislation. The EPR are designed to ensure the competent authority regulates emissions, including emissions to air, from processes to minimise adverse impacts. The latest amendment was in 2018. In England, under the EPR the regulator is the Environment Agency (EA).

As part of a permit application, the operator must demonstrate that the facility is operating with regards to Best Available Techniques (BAT). The EU has produced a number of BAT Reference (BREF) documents which set out the techniques. In November 2019 the EU released a new BREF on Waste Incineration. The document includes BAT-Associated Emission Levels (BAT-AEL) that are more stringent than the IED ELV.

Local Air Quality Management

Redcar and Cleveland Council has a statutory duty to carry out a periodic review and assessment of air quality, reporting their findings in an Annual Status Report (ASR).

The conclusions from the ASR have consistently shown good air quality in areas where members of the public are regularly exposed to air pollution. Results are below the AQOs. There is no requirement to declare an Air Quality Management Area (AQMA), however the local authority has made a commitment to improving air quality for the public.

In early 2019 Middlesbrough Borough Council commenced work on developing the South Tees Clean Air Strategy with partners including Redcar and Cleveland Borough Council. The partnership will ensure air quality considerations are built into planning, transport and wider strategies, the procurement of council fleet vehicles, and corporate policies.

Guidance on the Assessment of Dust from Demolition and Construction

The Institute of Air Quality Management (IAQM) produced guidance on the assessment of dust from demolition and construction. This document provides a risk-based methodology for assessing construction impacts, including demolition and earthworks where appropriate.

Guidance on the Assessment of Operational Impact of New Developments

Guidance produced by Environmental Protection UK (EPUK), and IAQM in January 2017 entitled 'Land-Use Planning & Development Control: Planning for Air Quality, aims to ensure that air quality is properly accounted for in the development control process. The main foci of the guidance are; the assessment of the impact of traffic and combustion plant emissions and advice on how to describe air quality impacts and their significance.

A guide to the assessment of air quality impacts on designated nature conservation sites

The Institute of Air Quality Management (IAQM) have produced guidance to assist in the assessment of the air quality impacts of development on designated nature conservation sites. The guidance focuses on air quality assessments in support of Habitats Regulations Assessments (HRA), but also considers the approach for assessing the air quality impact on national or local designated nature conservation sites.

Environment Agency Guidance: Air emissions risk assessment for your environmental permit

The Environment Agency provides guidance on assessing the impacts of emissions released air from permitted sites. The guidance provides a methodology along with assessment thresholds for pollutants.

AQO Receptors - Human Health

The annual mean AQO applies at locations where members of the public might be regularly exposed, such as building façades of residential properties, schools, hospitals and care homes.

Places of work, such as factories or offices, are not considered places where members of the public might be regularly exposed and therefore the AQO's do not apply at these locations.

The 8-hour and 24-hour mean AQOs apply at locations where the annual mean AQOs apply and at hotels and gardens of residential properties.

The 15-minute and 1-hour mean AQOs apply at the annual mean locations of exposure and at hotels, residential gardens and any outdoor location where members of the public might reasonably be expected to spend one hour or longer, such as busy pavements, outdoor bus stations and locations with outdoor seating.

AQO Receptors – Ecological

Nationally (SSSIs, Areas of Special Scientific Interest (ASSIs), National Nature Reserves (NNRs)) and internationally (SAC, SPAs and Ramsar Sites) designated ecological sites are considered relevant receptors for the NOx annual mean critical level, 24-hour mean proxy critical level and annual mean critical loads. Locally designated sites (LNRs, LWSs, SINCs and areas of AW) are also considered sensitive receptors, however, they are less sensitive to changes and less weight is attributed to these sites. The IAQM guidance explains that:

"Under the Directive, assessment of compliance with the critical levels is strictly only required at locations more than 20 km from towns with more than 250,000 inhabitants or more than 5 km from other built-up areas, industrial installations or motorways. In practice, however, assessment against critical levels for vegetation is frequently undertaken to inform planning and permitting processes across the country, regardless of this definition."

Limit Value Receptors (heading level 3)

In accordance with Article 2(1), Annex III, Part A, paragraph 2 of Directive 2008/50/EC details locations where compliance with the limit values does not need to be assessed:

"Compliance with the limit values directed at the protection of human health shall not be assessed at the following locations:

a) Any locations situated within areas where members of the public do not have access and there is no fixed habitation;

b) In accordance with Article 2(1), on factory premises or at industrial installations to which all relevant provisions concerning health and safety at work apply; and

c) On the carriageway of roads; and on the central reservation of roads except where there is normally pedestrian access to the central reservation."

The government models compliance with the Directive at locations 4 m from the kerbside, 2 m high, more than 25 m from major road junctions and adjacent to at least 100 m of road length where the limit value applies.

Best Available Techniques (BAT)

A new Best Available Techniques (BAT) Reference Document (BREF) for Waste Incineration (BREFs) has been released.

For emissions to air, the BAT conclusions address a number of advanced primary and secondary techniques to reduce the emission of pollutants into air.

BAT-associated emission levels are set for mercury and other metals, nitrogen oxides, ammonia, hydrogen chloride, hydrogen fluoride, sulphur dioxide, volatile organic compounds, polychlorinated dioxins and furans, and dioxin-like polychlorinated biphenyls.

Important improvements are introduced in monitoring emissions to air, in particular regarding the continuous measurement of mercury and the long-term sampling of polychlorinated dioxins and furans (EU Science Hub, 2019).

12.3 Assessment Methodology

Assessment methodology follows the details provided in Chapter 5. For the sensitivity of people to the health effects of PM10 the IAQM recommends that there are three sensitivities based on whether or not the receptor is likely to be exposed to elevated concentrations over a 24-hour period.

Table 12-2: Sensitivity of people to the health effects of PM10

Magnitude	Description
High	Locations where members of the public are exposed over a time period relevant to the air quality objective for PM10 (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day). Indicative examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.
Medium	Locations where the people exposed are workers, and exposure is over a time period relevant to the air quality objective for PM10 (in the case of the 24- hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day). Indicative examples include office and shop workers but will generally not include workers occupationally exposed to PM10, as protection is covered by Health and Safety at Work legislation.

Magnitude	Description
Low	Locations where human exposure is transient. Indicative examples include public footpaths, playing fields, parks and shopping streets

Human Health (heading level 4)

Standard practice is to assess the impacts of a Proposed Facility on local air quality using the EPUK and IAQM guidance on Land-Use Planning & Development Control: Planning For Air Quality (EPUK/IAQM, 2017). This approach has been used in this assessment. The guidance provides example criteria and states the following in relation to the criteria:

"They are intended to function as a sensitive "trigger" for initiating an assessment in cases where there is a possibility of significant effects arising on local air quality. This possibility will, self-evidently, not be realised in many cases. The criteria should not be applied rigidly; in some instances, it may be appropriate to amend them on the basis of professional judgement, bearing in mind that the objective is to identify situations where there is a possibility of a significant effect on local air quality".

The second stage has screening criteria for assessment of the proposed centralised combustion plant (i.e. NOx emission rate, exhaust conditions and relevant locations of sensitive receptors). Where these criteria are exceeded, a detailed assessment is required, although the guidance advises that "the criteria provided are precautionary and should be treated as indicative", and "it may be appropriate to amend them on the basis of professional judgement".

12.4 Baseline

A baseline noise assessment was conducted in accordance with the guidance set out in BS 4142:2014.

Daytime, evening and night time measurements were undertaken between 5th and 6th December 2019 at 3 No nearby residential locations. The noise measurements established typical ambient and background noise levels at these locations.

The closest noise sensitive receptor locations are provided in Table 12.3

Table 12-3: Sensitivity of people to the health effects of PM10

Receptor	Location	Distance and Orientation from Site
1	21 Jones Road	660 SW
2	3 St James' Court	560 SSE
3	139 Bolkow Road	825 ESE

The results of the survey indicate that the locations selected are subject to a primary background being due traffic movement along the A66 and nearby local road networks. A summary of the survey data is provided in Table 12-4. All figures are provided ins dB.

Table 12-4: Summary of baseline noise surveys

Location	Period	LA max	LA eq	LA10	LA90
1	Average Daytime	72.4	57.8	59.0	53.0
	Average Evening	61.5	55.7	74.4	53.3
	Average Night time	62.8	52.5	55.4	46.0

Location	Period	LA max	LA eq	LA10	LA90
2	Average Daytime	70.0	59.2	62.2	54.5
	Average Evening	60.9	54.7	57.6	50.6
	Average Night time	70.1	60.3	63.0	52.4
3	Average Daytime	71.2	61.3	63.6	57.3
	Average Evening	55.5	51.4	52.9	49.8
	Average Night time	61.3	55.1	57.6	51.8

NB. The measurement indices noted above are defined as follows:

$LA_{eq, T}$ the "A" weighted equivalent continuous noise level of sample period T

$LA_{10, T}$ the "A" weighted level exceeded for 10% of sample period T

$LA_{90, T}$ the "A" weighted level exceeded for 90% of sample period T

$L_{AF_{max}}$ The "A" weighted maximum level during the sample period T

12.5 Impacts

The fuel is assumed to have a typical MSW composition as presented in Table 12-4.

The relevant parameters including calculated actual (A) and normalised (N) exhaust flow rates, for the Proposed Facility, are given in Table 12-5. These are based on the complete combustion of the fuel in 40% excess combustion air. At this stage it is not known if a condensing heat exchanger will be used in the flue system and therefore it is assumed that no water vapour is removed from the flue gas.

Table 12-4: Fuel Consumption

Parameter		As Received (ar)	Dry Basis (dry)	Dry Ash Free (daf)
%Mass	Carbon	31.39%	46.23%	62.89%
	Hydrogen	3.65%	5.38%	7.32%
	Nitrogen	0.1%	1.20%	1.63%
	Oxygen	12.94%	19.06%	25.93%
	Sulphur	0.26%	0.38%	0.52%
	Chlorine	0.86%	1.26%	1.71%
	Fluorine	<0.01%	<0.01%	<0.01%
	Ash	17.99%	26.49%	-
	Moisture Content	32.10%	-	-
	Total	100.00%	100.0%	100.00%
Net Calorific Value (LHV) (MJ/kg)		11.53	18.14	-
Gross Calorific Value (HHV) (MJ/kg)		13.11	19.31	26.27

Throughout this report, 'normalised' (N) is used to refer to conditions recorded in the absence of moisture, at 11% oxygen, and at 0 degrees Celsius. These are the reference conditions at which the relevant Industrial Emission Directive (IED) emissions limits are expressed.

Table 12-5: Consumption Parameters

Parameter	Value
Combustion Input	
Gross Fuel Consumption (kg/hr)	57,077
Net Input Fuel Rate ($MW_{thermal\ input}$)	182.8
Gross Input Fuel Rate ($MW_{thermal\ input}$)	207.9
Excess Air (%) [a]	40%
Combustion Air in (kg/h wet)	392,078
Combustion Products	
Exhaust Temperature (°C)	140
Exhaust Flow (kg/h) for Actual Flow	431,014
Molar Flow Rate (mol/s) for Actual Flow	4,204.2
Molecular Mass (g/mol) for Actual Flow	28.48
Exhaust Flow (Am^3/s) [b, c] for Actual Flow	142.5
Exhaust Velocity (Am/s) [b] for Actual Flow	15
Exhaust Flow (kg/h) for Normalised Flow [d]	391,768
Molar Flow Rate (mol/s) for Normalised Flow [d]	4,859.3
Exhaust Flow (Nm^3/s) [d, e] for Normalised Flow	80.7

[a] Derived from combustion air m^3/s.

[b] Actual flow conditions assumed to be 120 ºC, 5.3% O_2, wet (14.4% H_2O).

[c] Calculated from molar flow rate x 8.3145 x (T+273.13) / 101,325.

[d] Normalised to 0 ºC, 101.325 kPa, 11% O_2, dry.

[e] Calculated from normalised molar flow rate x 8.3145 x (273.13) / 101,325.

During the construction phase emissions of dust to air can occur. Emissions will vary substantially from day to day, depending on the level of activity and the specific operations being undertaken, along with the influence of the weather conditions. The scale of these impacts depends on the dust suppression and other mitigation measures applied.

Noise will be generated during the construction and operational phases of the project.

It is accepted that with any major development of this nature that some disturbance will be caused to those living and working nearby the proposed development site during the construction phase. However, disruption due to construction is considered to be localised and is temporary in nature. In general, only people living within 100-200m of the proposed construction works are likely to be impacted by construction noise.

Construction noise may be readily managed through agreements within the CEMP and or planning conditions.

12.6 Mitigation and Operational Standards

It is recommended that two specific noise climates are agreed with the LPA considered as part of a development proposal and conditioned:

- The construction stage and,
- The operational stage once the construction has been completed and commissioned.

The scheme CEMP will include management and monitoring requirements for noise during the construction stage. Basic compliance with include:

- Work to be carried out during daytime hours, avoiding early morning and night work.
- Vehicles only to run when required, avoiding idling. Diesel generators only to be used when operation is essential.
- Waste deliveries for the Facility would be restricted to specified delivery times i.e. 07:30 – 16:00 Weekdays and 07:30 – 13:00 Saturday.

Recommendations are provided in the Baseline Noise Assessment, Volume 3.

12.7 Residual Impacts

No residual significant effects are predicted as a result of the Project.

13 Traffic and Transportation

13.1 Introduction

This chapter assesses the effects of the proposed development on transport and access. In particular, it considers the anticipated effects of the proposed development on driver delay, severance, pedestrian delay, pedestrian amenity and accidents and safety.

The chapter describes the methods used to assess the impacts, the baseline conditions currently existing at the site and surroundings, the potential direct and indirect impacts of the proposed development, the mitigation measures required to prevent, reduce, or offset the impacts and the residual impacts. This chapter has been written by Fore Consulting Ltd.

A Transport Statement (TS) has been prepared by Fore Consulting Ltd under separate cover to demonstrate that the proposed development is acceptable in planning terms and deliverable, subject to appropriate mitigation.

This chapter should be read in conjunction with the TS, Volume 3.

All Figures are provided in Volume 2.

13.2 Legislation, Policy and Guidance

The National Planning Policy Framework (NPPF)1 was published by the Ministry of Housing, Communities and Local Government (DCLG) in February 2019. The NPPF sets out how the planning system will contribute to achieving sustainable development. In effect, this means planning is required to perform the following three specific roles:

- An economic role, contributing to building a strong, responsive and competitive economy.
- A social role, supporting strong, vibrant and healthy communities.
- An environmental role, protecting and enhancing the natural, built and historic environment.

The NPPF sets out a presumption in favour of sustainable development. This effectively means that development proposals that accord with the development plan should be approved without delay. Where the development plan is out-of-date or absent, proposals should be approved unless the adverse impacts would significantly and demonstrably outweigh the benefits when assessed against the NPPF, or specific policies in the NPPF indicate development should be restricted (for example, if the site is subject to certain environmental designations).

Paragraph 102 of the NPPF states that in order to promote sustainable transport, transport issues should be considered from the earliest stages of plan-making and development proposals, so that:

- *The potential impacts of development on transport networks can be addressed;*
- *Opportunities from existing or proposed transport infrastructure, and changing transport technology and usage, are realised – for example in relation to the scale, location or density of development that can be accommodated;*
- *Opportunities to promote walking, cycling and public transport use are identified and pursued;*
- *The environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains and;*
- *Patterns of movement, streets, parking and other transport considerations are integral to the design of schemes and contribute to making high quality places.*

It is stated in Paragraph 103 of the NPPF that in support of the above objectives, the planning system should:

"Actively manage patterns of growth…and significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes".

Paragraphs 105 and 106 of the NPPF consider parking provision at development sites, stating that:

"If setting local parking standards for residential and non-residential development, policies should take into account:

- *The accessibility of the development.*
- *The type, mix and use of development.*
- *The availability of and opportunities for public transport.*
- *Local car ownership levels.*
- *The need to ensure an adequate provision of spaces for charging plug-in and other ultra-low emission vehicles.*

"Maximum parking standards for residential and non-residential development should only be set where there is a clear and compelling justification that they are necessary for managing the local road network, or for optimising the density of development in city and town centres and other locations that are well served by public transport (in accordance with chapter 11 of this Framework). In town centres, local authorities should seek to improve the quality of parking so that it is convenient, safe and secure, alongside measures to promote accessibility for pedestrians and cyclists".

In considering applications for development, Paragraph 108 of the NPPF states it should be ensured that:

- *"Appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development and its location.*
- *Safe and suitable access to the site can be achieved for all users.*
- *Any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree".*

Paragraph 109 of the NPPF states that:

"Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe".

Within this context, Paragraph 110 of the NPPF states that applications for development should:

- *"Give priority first to pedestrian and cycle movements, both within the scheme and with neighbouring areas; and second – so far as possible – to facilitating access to high quality public transport, with layouts that maximise the catchment area for bus or other public transport services, and appropriate facilities that encourage public transport use.*
- *Address the needs of people with disabilities and reduced mobility in relation to all modes of transport.*
- *Create places that are safe, secure and attractive – which minimise the scope for conflicts between pedestrians, cyclists and vehicles, avoid unnecessary street clutter, and respond to local character and design standards*

- *Allow for the efficient delivery of goods, and access by service and emergency vehicles.*
- *Be designed to enable charging of plug-in and other ultra-low emission vehicles in safe, accessible and convenient locations".*

Finally, Paragraph 111 of the NPPF states that:

"All developments that will generate significant amounts of movement should be required to provide a travel plan, and the application should be supported by a transport statement or transport assessment so that the likely impacts of the proposal can be assessed".

Planning Practice Guidance

Planning Practice Guidance (PPG) was launched by the DCLG on 6 March 2014. It brings together many areas of English planning guidance into a new stream-lined format, which is linked to the NPPF. PPG replaces previous planning practice guidance documents. The guidance is a key material consideration in the decision making process, set within the overarching NPPF. PPG provides advice on when Transport Assessments and Transport Statements are required and what they should contain2:

"Transport Assessments are thorough assessments of the transport implications of development, and Transport Statements are a 'lighter-touch' evaluation to be used where this would be more proportionate to the potential impact of the development (i.e. in the case of developments with anticipated limited transport impacts)."

Furthermore, it states that:

"Transport Assessments and Statements can be used to establish whether the residual transport impacts of a proposed development are likely to be "severe", which may be a reason for refusal, in accordance with the National Planning Policy Framework."

And:

"The Transport Assessment or Transport Statement may propose mitigation measures where these are necessary to avoid unacceptable or "severe" impacts."

Local Planning Policy - Redcar and Cleveland Local Plan (Adopted May 2018)

The Redcar and Cleveland Local Plan sets out the vision and overall development strategy for the borough and how it will be achieved in the period up to 2032. The document provides the policy framework to deliver sustainable development across the borough.

Policy TA 1 (Transport and New Developments) of the Local Plan is relevant to the proposed development from a transport perspective. Policy TA 1 emphasises the promotion of sustainable travel at new developments to minimise environmental impacts and to support residents' health and wellbeing.

The Policy states that proposals will be supported that:

- *" improve transport choice and encourage travel to work and school by public transport, cycling and walking;*
- *minimise the distance people need to travel;*
- *where appropriate, contribute positively to wider demand management measures to address congestion, environmental and safety issues; and*
- *have regard to the number of cycle and car parking spaces as set out within the Tees Valley Design Guide and Specification for Residential and Industrial Estates."*

Redcar and Cleveland Local Transport Plan 2011-21

RCBC's third Local Transport Plan (LTP3)3 was adopted in March 2011 and sets out how the Council will seek to improve transport services and facilities in the coming years in order to address local issues and the key national aims of:

- Supporting Economic Growth.
- Reducing Carbon Emissions.
- Promoting Equality of Opportunity.
- Contributing to Better Safety, Security and Health.
- Improving Quality of Life and a Healthy Natural Environment.

Tees Valley Design Guide & Specification

The Tees Valley Design Guide & Specification4 ("the Design Guide") is intended to be used by architects, engineers, planners and developers in the preparation of schemes for new development. The Design Guide indicates the minimum standards of the Highway Authority to ensure adoption under Section 38 of the Highways Act 1980.

The Design Guide has been produced and is regularly updated by a working group from five local authorities, which includes RCBC. The standards and specifications are applicable to the five Councils subject to the local variations detailed at the beginning of the document.

13.3 Assessment Methodology

The methodology used in this assessment accords with that set out in the guidance produced by the Institute of Environmental Management and Assessment (IEMA), in their Guidelines for the Environmental Assessment of Road Traffic, which is hereafter referred to in this chapter as the "IEMA Guidelines."

The IEMA Guidelines advise the use of a "check-list" of potential effects covering noise, vibration, visual impact, severance, driver delay, pedestrian delay, pedestrian amenity, accidents and safety, hazardous loads, air pollution, dust and dirt, ecological impact, and heritage and conservation areas, where relevant. The guidelines acknowledge that for many developments some of the effects listed may not be relevant but suggests that reasons should be provided for any exclusions.

This chapter considers the likely effects that the traffic generated by the proposed development would have on severance, driver delay, pedestrian delay, pedestrian amenity, accidents and safety and hazardous loads. Due to the specialist skills required, other likely effects, such as noise, vibration, visual impact, ecological impact and heritage and conservation are dealt with in other chapters of this Environmental Impact Assessment (EIA).

13.3.1 Local Highway Network

In accordance with the IEMA Guidelines, the study area for this chapter has been defined by identifying any highway links or locations where it is felt that significant adverse impacts may potentially occur as a result of the proposed development.

The local highway network has been identified as comprising the highway links shown on Figure 13-1 and Table 13-1.

Table 13-1: Study Area – Highway Links

Highway Link ID	Name	Section
1	Middlesbrough Road East	Between the end of Eston Road and the junction with Puddlers Road
2	Puddlers Road	Between junction with Middlesbrough Road East and junction with Normanby Road
3	Normanby Road	Between junction with Puddlers Road and junction with A66
4	A66	Between junction with Normanby Road and junction with Eston Road
5	Normanby Road	Between junction with A66 and junction with Briggs Avenue
6	A66	Between junction with Normanby Road and junction with Old Station Road
7	Eston Road	Between junction with A66 and start of Middlesbrough Road East
8	A66	Between junction with Eston Road and junction with A1053
9	Church Lane	Between junction with A66 and junction with A1085 Trunk Road
10	A1085 Trunk Road / Broadway	Between junction with Church Lane and A1053
11	Normanby Road	Between junction with Briggs Avenue and junction with A1085 Trunk Road
12	A1085 Trunk Road	Between junction with Church Lane and junction with Normanby Road
13	Normanby Road	Between junction with A1085 Trunk Road and junction with The Avenue
14	A1085 Trunk Road / Longlands Road	Between junction with Normanby Road and junction with A171 Cargo Fleet Lane
15	A66	Between junction with B1272 and A172

In order to assess the potential effects of the proposed development on the local highway network, the following assessment scenarios have been considered within this chapter:

Scenario 1: Existing 2019 - This scenario represents the existing situation on the study highway network. The traffic demand has been identified from automatic traffic counter (ATC) surveys undertaken for a continuous one week period commencing 0000 hours on Thursday 28 November 2019 to record the volume and classification of existing traffic flows on the links identified in Table 13-1, excluding A66 link flows. Mainline flows on the A66 have been sourced from DfT sites 99799 and 99797.

Scenario 2: Base 2025 (Without Proposed Development) - This scenario represents a future year situation on the study highway network without the proposed development taking place. The traffic demand associated with relevant committed development in the local area has then been added (see below). The traffic demand has been derived by applying the average TEMPro growth factors for principle urban roads from the Redcar and Cleveland 022 and 009 MSOAs to the traffic demand in the Existing 2019 scenario. Note that the traffic demand for Link 15 has been derived by applying the TEMPro growth factor from the Middlesbrough 001 MSOA, this being the area where the link is located.

Scenario 3: Total 2025 (With Proposed Development) - This scenario represents a future year situation on the study highway network with the proposed development taking place.

The traffic demand has been derived by adding the traffic demand associated with the proposed development to the Base 2025 (Without Proposed Development) scenario. Traffic demand associated with the proposed development has been provided by HBC and a breakdown of the daily generations across a typical weekday, Saturday and Sunday are provided in the accompanying Transport Statement.

For the purpose of understanding the impacts of the proposed development, a 2025 future year has been considered. 2025 represents a review period of five years following the expected submission of the planning application. It is anticipated that the full site will be operational in 2025 and therefore it is considered that a 2025 future year provides a robust assessment of the potential impacts of the site, when considering the anticipated traffic growth on the study highway network. The impacts as a result of the proposed development are determined by comparing the Base 2025 (Without Proposed Development) scenario to the Total 2025 (With Proposed Development) scenario.

The assessments have been undertaken on a daily basis, since this best reflects the likely effects that the traffic generated by the proposed development would have on severance, driver delay, pedestrian delay, pedestrian amenity, accidents and safety and hazardous loads.

A scoping exercise has been undertaken with RCBC Highways to identify any potential developments within the vicinity of the site which may potentially result in cumulative or synergistic effects. RCBC Highways have confirmed that there are no such committed developments. However, the appointed planning consultants JBA have advised that the following committed developments should, in terms of traffic impact, be accounted for as part of the cumulative assessments:

- Kirkleatham Lane (Application Reference: R/2016/0663/OOM) – Outline Planning Permission granted and Reserved matters application (Application Reference: R/2019/0485/RMM) for details of appearance, landscaping, layout and scale of 550 dwellings and associated facilities.
- Land at Low Grange Farm (Application Reference: R/2014/0372/OOM) – Outline consent granted for a site of 1250 dwellings.

The estimated daily traffic demand associated with the above development sites has been established through review of their accompanying Transport Assessments, noting that some assumptions have been made regarding the distribution of this traffic onto the links considered as forming the study highway network within this ES Chapter.

13.3.2 Highway Safety

Details of road traffic collisions that have been recorded across the study highway network within the latest five-year period (2014 to 2018) have been obtained from the Crashmap website.

13.3.3 Walking and Cycling Links

Knowledge of walking and cycling routes and facilities has been gained from detailed desk top investigation, including analysis of Google Earth and Street View imagery as well as the identification of key routes outlined on the RCBC Public Mapping Application and the Sustrans Cycle Map.

13.3.4 Public Transport Links

Knowledge of public transport links, including bus and rail routes and facilities, has been gained from detailed desk top investigation, including analysis of online local bus and rail timetable, as well as analysis of Google Earth and Street View imagery.

13.3.5 Characterisation of Impact

The IEMA Guidelines identify a number of potential environmental effects that may arise from changes in traffic conditions. The Guidelines set out the broad principles of how to assess the magnitude of impact for each category. These are summarised below for each likely environmental effect:

Driver delay

The IEMA Guidelines note that driver delay can occur at several points on the network, although the impacts are only likely to be significant in EIA terms when the traffic on the highway network is predicted to be at, or close to, the capacity of the system.
Severance

This is the perceived division that can occur within a community when it becomes separated by a major traffic artery. Such division may result from the crossing of a heavily trafficked road or a physical barrier created by the road itself. The measurement and prediction of severance is difficult, but relevant factors include road width, traffic flow, vehicle speed, the presence of crossing facilities and the number of pedestrian movements across the affected route. The IEMA Guidelines refer to the Manual of Environmental Appraisal, which suggests that changes in traffic flow of 30%, 60% and 90% would be likely to produce "slight", "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, in particular, the location of pedestrian routes to key local facilities and whether or not crossing facilities are provided.

Pedestrian delay The IEMA Guidelines note that a change in the volume, composition and/or speed of traffic may affect the ability of a person to cross a road. Typically, an increase in the traffic level results in increased pedestrian delay, although increased pedestrian activity itself may also contribute. The IEMA Guidelines do not set any thresholds for assessing pedestrian delay, recommending instead that assessors use their judgement to determine the magnitude of the impact.

Pedestrian amenity

This is broadly defined as the relevant pleasantness of a journey. It is affected by traffic flow, traffic composition, footway width and separation from the carriageway. The IEMA Guidelines suggest a tentative threshold for judging the significance of a change in pedestrian amenity where the traffic flow or the Heavy Goods Vehicle (HGV) component is halved or doubled.

Accidents and safety

- The IEMA Guidelines do not include a 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, e.g. junction conflicts.

Significance Criteria

The significance of the impacts of the proposed development have been determined using criteria developed from best practice techniques. The impact will be assessed based upon the significance criteria shown in Table 13-2.

Table 13-2 Significance Criteria

Significance	Description
Major	Where the proposed development is expected to have a substantial effect (either adverse or beneficial) on the existing environment.
Moderate	Where the proposed development is expected to have a noticeable effect (either adverse or beneficial) on the existing environment.
Minor	Where the proposed development is expected to result in a small, barely noticeable effect (either adverse or beneficial) on the existing environment.
Negligible	Where the proposed development is expected to result in no discernible effect on the existing environment.

The significance of an impact is derived from a measurement of the magnitude (or scale) of the change and the sensitivity and/or importance of the receptors affected. Categories of sensitivity and magnitude are defined and assessed to determine the significance of the impact.

The IEMA Guidelines identify groups, locations and areas which may be sensitive to changes in traffic conditions and which should be considered for assessment. These are set out below:

- People at home.
- People at workplaces.
- Sensitive groups, including: children, the elderly and disabled.
- Sensitive locations, e.g. hospitals, churches, schools and historic buildings.
- People walking.
- People cycling.
- Open spaces, recreational sites and shopping areas.
- Sites of ecological/natural conservation value.
- Sites of tourist/visitor attraction.

Categories of receptor sensitivity have been defined from the principles set out in the IEMA Guidelines and considering the following:

- The need to identify particular groups or locations which may be sensitive to changes in traffic conditions.
- The list of affected groups and special interests set out in the IEMA Guidelines.

- The identification of links or locations where it is felt that specific environmental problems may occur. Such locations would include accident black spots, conservation areas, hospitals, links with high pedestrian flows, etc.

These categories have been used to outline, in broad terms, the sensitivity of receptors to traffic for the types of impact assessed in this chapter; although in detail each receptor assessed will have a different sensitivity to each specific change/impact. Table 13-3 provides a summary of the sensitivity of receptors, categorised as either high, moderate or low.

Table 13-3 Receptor Sensitivity

Category	Receptor Sensitivity	Receptor Type
High	The receptor has little ability to absorb change without fundamentally altering its present character or is of national importance.	Schools, colleges, playgrounds, accident black spots, retirement homes, roads used by pedestrians with no footways.
Moderate	The receptor has moderate capacity to absorb change without significantly altering its present character or is of high importance.	Congested junction, surgeries and clinics, hospitals, shopping areas with roadside frontage, roads used by pedestrians with narrow footways, parks and recreational areas.
Low	The receptor is tolerant of change without detriment to its character or is of low or local importance.	Places of worship, public open space, tourist/visitor attractions and residential and employment areas with adequate footway provision.

The significance of the impact is judged on the relationship of the magnitude of the impact and the sensitivity and/or importance of the receptor. A matrix of the impact significance is set out in Table 13-4. The impacts have the potential to be adverse, beneficial or negligible.

Table 13-4 Criteria for Assessing Impact Significance

Receptor Sensitivity	Magnitude of Impact			
	High	Moderate	Low	Negligible
High	Major	Major	Moderate	Negligible
Moderate	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible

Impacts which are considered to be "moderate" or "major" are considered to be significant as they are important to the decision-making process. Impacts which are

considered to be "minor" or "negligible" are not considered to be significant in the context of the Environmental Impact Assessment (EIA) Regulations. In line with Part 7 of Schedule 4, those effects which are considered likely to be significant will set out a description of the mitigation measures designed to avoid, reduce or, if possible, offset/reduce any identified significant adverse effects on the environment, to a not significant level.

The temporal scope of impacts can be described as short, medium, long-term, or permanent, as shown below:

- Short Term – Less than 12 months.
- Medium Term – Between 1 to 5 years.
- Long Term – More than 5 years.
- Permanent – Impacts that are considered to be "irreversible" or extremely long lasting.

Although not explicit in the matrix in Table 13-4, duration has been accounted for in the assessments presented within this chapter, where required. For example, whether the effects are permanent or temporary, and if temporary, over what time period.

Assumptions/Limitations

The proposal is to redevelop the site for an Energy Recovery Facility (ERF) capable of processing up to 450,000 tonnes of residential waste per annum (over 1,200 tonnes per day).

The potential size of the ERF is approximately 140 metres by 70 metres (9,800 sqm) with the stack height being 80 metres in height. This size relates to the building itself and the parking areas which will be subject to further detail design. Planning Drawings are provided in Appendix C

The baseline traffic conditions include growth in background traffic noting that as outlined in Section 1.3.2 whilst RCBC Highways have confirmed that there are no committed developments which would affect the study highway network, the traffic demand associated with the Kirkleatham Lane site and Land at Low Grange Farm site has been included in the Base 2025 (Without Proposed Development) scenario. The estimated daily traffic demand associated with the above development sites has been established through review of their accompanying Transport Assessments, noting that some assumptions have been made regarding the distribution of this traffic onto the links considered as forming the study highway network within this ES Chapter.

Traffic demand associated with the proposed development has been provided by HBC and a breakdown of the daily generations across a typical weekday, Saturday and Sunday are provided in the accompanying Transport Statement.

Consultation

A scoping opinion request for the development project was submitted by JBA Consulting to RCBC and a scoping response was received on 23 October 2019.

A subsequent meeting was held with RCBC Highways Officer Tony Gordon on 19 November 2019 to agree the work to be undertaken as part of the Transport Statement and ES Transport and Access Chapter.

Table 13-5 Consultation

Consultee	Date	Comments	Actions
RCBC Highways and Highways England	N/A	JBA Scoping opinion request submitted.	N/A
RCBC Highways	23 October 2019	I refer to the application and have no further comments to add.	Fore to scope transport requirements with RCBC Highways.
HE	23 October 2019	Our interest is the continued safety and operation of the Strategic Road Network (SRN). The closest point of the SRN is the A1053, Greystones Road, approximately a kilometre from the site. It is unlikely that the traffic from this development causes us any concern, however for certainty if you could consult on receipt of the planning application. As the scoping report points out the impact is probably greater at the construction stage than during operation so if a relevant Construction Transport Management plan can be included this would be helpful.	RCBC to consult HE on receipt of the planning application.
RCBC Highways	19 November 2019	Fore met with RCBC Highways officer Tony Gordon to discuss the required scope of works.	Fore to prepare Transport Statement and ES Transport and Access Chapter based on agreed scope of works.

13.4 Baseline Conditions

This section describes the baseline conditions at the site and the surrounding area.

Study Highway Network

Average hourly traffic flows and total HGV flows over 24-hour (00:00-24:00) Average Annual Daily Traffic (AADT) and 18-hour (06:00-24:00) Average Annual Weekday Traffic (AAWT) time periods for all highway links in the study area in the Existing 2019 scenario are presented in Table 13-6.

Table 13-6 Existing 2019 Traffic Data for Highway Links

Highway Link ID	AADT (00:00-24:00 Hours)		AAWT (06:00-24:00 Hours)	
	Average Hourly Traffic Flow	Total HGV Flow	Average Hourly Traffic Flow	Total HGV Flow
1	114	436	185	559
2	167	232	267	295
3	258	323	380	381
4	945	3,045	1,310	3,166
5	432	231	601	262
6	945	3,045	1,310	3,166
7	117	466	190	602
8	945	3,045	1,310	3,166
9	352	294	504	308
10	422	276	592	313
11	432	231	601	262
12	762	439	1,053	472
13	672	315	943	356
14	751	309	1,043	351
15	2,834	4,278	3,928	5,316

Highway Safety

An assessment of road traffic accident data along the links comprising the study highway network has been undertaken. The table below provides a summary of the recorded accidents and includes details of the location and severity of the accident.

Table 13-7 Latest Five-Year Accident Data

Location	Link Number (s)	Link Extent	Accident Severity		
			Slight	Serious	Fatal
Eston Road / Middlesbrough Road East / Puddlers Road	1, 2, 7	Between junctions with A66 and Normanby Road	4	0	0
Normanby Road	3	Between junctions with A66 and Puddlers Road	2	0	0
A66	4	Between junctions with Normanby Road and Eston Road	10	2	0
Normanby Road	5, 11	Between junctions with A66 and A1085 Trunk Road	9	1	0
A66	6	Between junctions with Normanby Road and Old Station Road	9	1	0
A66	8	Between junctions with Eston Road and A1053	0	1	0
A1085 Trunk Road / Broadway	10	Between junctions with Church Lane and A1053	8	2	0
A1085 Trunk Road	12	Between junctions with Church Lane and Normanby Road	7	0	0
Normanby Road	13	Between junctions with The Avenue and A1085 Trunk Road	4	3	0
A1085 Trunk Road / Longlands Road	14	Between junctions with Normanby Road and A171 Cargo Fleet Lane	10	4	0
A66	15	Between junctions with B1272 and A172	14	4	0
Total			**77**	**18**	**0**

The data shows that across the study area the level of reported collisions is not abnormally high given the daily volumes of traffic and the characteristics of the road network.

Walking Links

The key routes and facilities for pedestrians within the vicinity of the proposed development site are outlined below for the pedestrian catchment area shown on Figure 13-2:

- Along Eston Road, a shared footway/cycleway is provided along the western side of Eston Road, extending northwards for approximately 110m from the signalised junction with the A66. Beyond this point a continuous footway is provided along the western side of the carriageway providing access into the adjacent industrial areas. A footway is provided along the north side of Middlesbrough Road East, terminating a short distance west of the site. Uncontrolled pedestrian crossing points in the form of dropped kerbs and tactile paving are provided across the majority of nearby junctions along Eston Road / Middlesbrough Road East. With the exception of the left turn slip roads from the A66 westbound and Eston Road, controlled pedestrian crossings are provided across all arms of the A66 / Eston Road / Church Lane signalised junction.
- Along the A66, to the east of its junction with Eston Road, a continuous footway is provided along the northern side of the A66 and a shared footway/cycleway is provided along the southern side. To the west of Eston Road a segregated shared footway/cycleway is provided along the southern side of the A66 and provides access to the residential area of South Bank.
- Along the A174, to the east of its junction with the A1053, a footway is provided along the northern side. The footway continues westward via a pedestrian subway beneath the A174 / A1053 roundabout providing access to the residential areas of Eston and Normanby.
- A public footpath exists to the north of the site running along the southern side of the Tees Valley line. This footpath can be accessed from informal tracks within the site and from South Bank railway station.
- A public bridleway exists to the south east of the site along the A1053. The bridleway begins at the five-am roundabout with the A1085 Trunk Road, on the western side of the southern arm. It runs south towards Lackenby and provides access to residential areas such as Old Lackenby and Teesville.
- A public footpath approximately 200m in length provides access between the residential area of South Bank and Cargo Fleet, between Harcourt Road and Skippers Lane, to the south west of the site.

Cycle Links

The key routes and facilities for cyclists within the vicinity of the proposed development site are outlined below for the cycle catchment area shown on Figure 13-3:

- National Route 1 of the National Cycle Network runs from Dover to the Shetland Islands. It also forms a part of the EuroVelo 12, a route which connects to Norway and Holland. Within the vicinity of the site, Route 1 approaches Lazenby along the A174 from Redcar, heads northward on Birchington Avenue and follows a short stretch of the A66. It crosses the River Tees into Portrack and heads north up the east coast.
- National Route 14 of the National Cycle Network runs from Darlington to South Shields via Durham and Consett. It is signposted in both directions. A section through Stockon-on-Tees and Wingate to Hasell shares the route with National Route 1.
- National Route 65 of the National Cycle Network runs from Hornsea to Middlesbrough and also forms a part of the Trans Pennine Trail (east) cycle route between Selby and Hornsea. The route is fully open and signed. Within the vicinity of the site, Route 65 begins on the south side of the River Tees at A178

Durham Street and heads southward along Abingdon Road. It continues along the west side of Park Vale Road before joining B1380 Ladgate Lane. Route 65 then crosses the A174 and continues south.

Public Transport Links

Bus Services

Details of the existing public transport provision within the vicinity of the proposed development site, along with the nearest bus stops, are shown on Figure 13-4. The closest bus stops in relation to the proposed development site are as follows:

- The nearest bus stops to the site are located on either side of Middlesbrough Road / Normanby Road to the west of the site. The bus stops can be reached from within approximately 1.2km walking distance to the site, measured from the site's connection point onto Eston Road. The bus stops provide access to the number 64, 64A and 794 bus services.
- Further provision is available to the south east of the site, with bus stops located on both sides of Broadway approximately 1.3km from the site. These stops also provide access to the number 62 and 62A bus services as well as the number 64, 64A and 794 bus services.

Table 13-8 Summary of Existing Bus Services

Bus Stop(s)	Service (Operator)	Destinations Served	Approximate Frequency (Both Directions)		
			Mon – Fri	Sat	Sun
Middlesbrough Road / Broadway	64 (Arriva)	Redcar – Dormanstown – Eston – Teesville – South Bank - Middlesbrough	30 Minutes	30 Minutes	-
Middlesbrough Road / Broadway	64A (Arriva)	Eston – Grangetown – Bankfields – Normanby – Teesville – South Bank - Middlesbrough	15 Minutes	30 Minutes	60 Minutes
Middlesbrough Road / Broadway	794 (Stagecoach Teesside)	Lazenby – Eston – Bankfields – Normanby – Teesville – South Bank - Middlesbrough	2 Daily	3 Daily	-
Broadway	62 (Arriva)	New Marske – Marske – Redcar – Coatham – Dormanstown – Teesville – North Ormesby - Middlesbrough	30 Minutes	30 Minutes	60 Minutes

Bus Stop(s)	Service (Operator)	Destinations Served	Approximate Frequency (Both Directions)		
			Mon – Fri	Sat	Sun
Broadway	62A (Arriva)	New Marske – Marske – Redcar – Coatham – Dormanstown – Teesville – North Ormesby - Middlesbrough	6 Daily	6 Daily	6 Daily

Note: Bus services correct as of 01 November 2019

Service 64 (Arriva) provides services approximately every 30 minutes in both directions between Middlesbrough and Redcar, Monday to Saturday. Towards Redcar, the services operate from Middlesbrough Bus Station and along bus stops on the A66 between 0500 and 1900 hours (approximate times). Towards Middlesbrough, the services operate from Eston between 0500 and 1800 hours (approximate times). No services are currently provided on a Sunday.

Service 64A (Arriva) provides services approximately every 15 minutes in both directions between Eston and Middlesbrough, Monday to Friday, every 30 minutes on Saturday, and every 60 minutes on Sunday. Monday to Friday, towards Middlesbrough, the services operate from the bus stops along Eston Labour Club and Grangetown St George's Road between 0700 and 2130 hours (approximate times), noting that between 0500 to 0800 hours, and 1900 to 2130 hours (approximate times), buses do not serve

Eston Labour Club. Towards Eston, the services operate between 0800 and 2200 hours (approximate times). On a Saturday towards Middlesbrough, the services operate every 30 minutes between 0815 and 2130 hours (approximate times). Towards Eston, the services operate between 0800 and 1900 hours (approximate times). On a Sunday towards Middlesbrough, the services operate every 60 minutes between 0900 and 1900 hours (approximate times), noting that the first two services of the day do not serve Eston Labour Club. Towards Eston, the services operate between 1030 and 1915 hours (approximate times), noting that the last service does not serve Eston Labour Club.

Service 794 (Stagecoach Teesside) provides services twice daily, Monday to Friday, and three times daily Saturday, between Lazenby and Middlesbrough. Monday to Friday, towards Middlesbrough, the services operate from the bus stops along the A174 scheduled at 0537 and 0637 hours. Saturday, towards Middlesbrough, the services operate from the bus stops along the A174 scheduled at 0537 and 0630 hours. Towards Lazenby a service operates at 0644 hours from Middlesbrough. No services are currently provided on a Sunday.

Service 62 (Arriva) provides services approximately every 30 minutes, Monday to Saturday, and every 60 minutes on a Sunday, between New Marske and Middlesbrough. Monday to Saturday, services operate between 0600 and 1900 hours (approximate times) at 30-minute frequencies in both directions. On a Sunday services operate between 0900 and 1830 (approximate times) at 60-minute frequencies in both directions.

Service 62A (Arriva) provides six daily services between New Marske and Middlesbrough, Monday to Sunday. Services operate between 1800 and 2340 hours (approximate times) at 60-minute frequencies in both directions.

Rail Services

The closest rail station is South Bank station, approximately 1.2km walking distance to the west of the site. It is on the Bishop Auckland to Saltburn line and is served by Northern. Monday to Saturday, between 0740 and 0820 hours (approximate times) there are five services, and after 0900 hours services are hourly. On Sundays, services are hourly.

Table 13-9 Summary of Rail Services

Operator	Destinations Served	Approximate Frequency (Both Directions)		
		Mon – Fri	Sat	Sun
Northern	Bishop Auckland – Darlington – Middlesbrough – South Bank – Redcar - Saltburn	Every 60 minutes	Every 60 minutes	Every 60 minutes

Note: Rail services correct as of 4 November 2019

13.5 Impacts during Construction

Embedded Mitigation

This section describes the measures which have been 'embedded' into the development. These are mitigation measures which will be designed into the proposals and are integral to the proposed development.

Completed Development

Vehicular Access

Vehicular access to the site will be provided as part of the delivery of the new link road infrastructure proposed to serve the wider STDC masterplan area. This includes a proposed new four-arm roundabout onto Eston Road located to the immediate southwest of the development site. Access to each individual development plot of the wider STDC masterplan area will be provided from the main link road from a series of simple priority junctions.

At this stage the internal layout of the site is unknown. However, discussions with the client team indicate that separate accesses will be required to accommodate staff and HGV movements.

The proposed layout of the link road infrastructure serving the STDC site masterplan is shown in the accompanying Transport Statement which is included as Appendix 1.1. It can be seen that the site has sufficient frontage to accommodate new access points along its southern, western and eastern boundaries.

As discussed with RCBC Highways, it is envisaged that the access points into the site will be provided from simple priority junctions onto the new link road. In line with the Tees Valley Design Guide & Specification for Residential and Industrial Estates Development, the design of the access points will ensure that the following geometric parameters are adhered to:

- A public footpath approximately 200m in length provides access between the residential area of South Bank and Cargo Fleet, between Harcourt Road and Skippers Lane, to the south west of the site.
- Siting of accesses on the same side of the carriageway will require a minimum separation distance of 90.0m. Siting of accesses on the opposite side of the carriageway will require a minimum separation distance of 40.0m.
- Minimum carriageway width of 7.3m.

- Minimum visibility splay of 2.4 x 43.0m to be provided for 30mph carriageways. Note that it may be a requirement on higher category roads for the Y distance to be 70.0m.
- Minimum junction kerb radii of 12.0m.
- It is envisaged that the link road infrastructure serving the STDC site masterplan will be built to adoptable standards and will be offered for adoption under Section 38 of the Highways Act. Auto-tracking of large vehicles around the proposed development site will be provided as part of subsequent planning applications for reserved matters.

Pedestrian and Cycle Access

As outlined above, vehicular access to the site will be provided as part of the delivery of the new link road infrastructure proposed to serve the wider STDC masterplan area. At the scoping meeting held on 19 November 2019, RCBC Highways advised that 3.0m wide shared footway/cycleways will be required along the key sections of the new link road to tie into the access connection points serving various development plots.

The layout of the pedestrian and cycle connections will be designed to tie into the existing infrastructure to ensure that users of the site and wider STDC masterplan area can access the existing public transport infrastructure and services.

Parking

As agreed with RCBC Highways, car parking provision at the site will be provided to accommodate the proposed staff shift patterns. Based on the current estimated levels of staff it is proposed to provide approximately 33 car park spaces, including two electric vehicle charging points.

The internal site layout will also accommodate an appropriate level of cycle parking, to be agreed with RCBC at the detailed design stage.

Construction Activities

Construction of the proposed development is anticipated to take approximately 3 years, with work commencing on site in 2022. It is anticipated that the full site will be completed in 2025.

Vehicle movements generated by the construction process are likely to be associated with the delivery of plant and construction materials, as well as construction staff travelling to and from the proposed development site. All construction vehicles will access the site via the A66 / Eston Road / Church Lane four-arm signalised junction.

The potential impacts from a transport perspective include additional large vehicles on the network that are associated with construction, as well as private vehicles from construction workers.

The movement of construction traffic may result in a temporary adverse impact on the operation of the local road network (in terms of pedestrian and driver delay on the main routes to and from the proposed development site), and may also adversely affect pedestrian amenity, severance and accidents and safety. In addition, construction vehicles could carry mud or dust on to the local road network.

During the construction phase, the potential impact of the proposed development is considered to be of minor adverse significance at the local level, prior to the implementation of mitigation measures. The potential impact will be medium-term (3 years), but non-permanent.

13.6 Impacts during Operation

Severance

The IEMA Guidelines suggest that changes in traffic flow of 30%, 60% and 90% would be likely to produce "slight", "moderate" and "substantial" changes in severance, respectively. It is advised, however, that regard should be paid to local conditions, in particular, the location of pedestrian routes to key local facilities and whether or not crossing facilities are provided.

Table 13-10, below, summarises the predicted average hourly traffic flows over a 24-hour period and the total HGV flows over the same 24-hour period for all links in the study area. Data is provided for the Base 2025 (Without Proposed Development) and the Total 2025 (With Proposed Development) scenarios, with the change and percentage change as a result of the proposed development identified.

Table 13-10 Hourly Traffic Flows

Highway Link ID	Base 2025 (Without Proposed Development)		Total 2025 (With Proposed Development)		Change from Base 2025 to Total 2025		Percentage Change from Base 2025 to Total 2025	
	Average hourly traffic flow over 24-hour day	Total 24-hour HGV flow	Average hourly traffic flow over 24-hour day	Total 24-hour HGV flow	Average hourly traffic flow over 24-hour day	Total 24-hour HGV flow	Average hourly traffic flow over 24-hour day	Total 24-hour HGV flow
1	119	457	120	457	0	0	0.1%	0.0%
2	175	243	175	243	0	0	0.0%	0.0%
3	270	338	270	338	0	0	0.0%	0.0%
4	1,058	3,189	1,067	3,384	9	194	0.9%	6.1%
5	486	242	486	242	0	0	0.0%	0.0%
6	1,093	3,189	1,102	3,384	9	194	0.9%	6.1%
7	122	488	136	742	14	254	11.2%	52.1%
8	1,007	3,189	1,011	3,249	4	60	0.4%	1.9%
9	420	308	421	308	1	0	0.2%	0.0%
10	506	289	506	289	0	0	0.0%	0.0%

Highway Link ID	Base 2025 (Without Proposed Development)		Total 2025 (With Proposed Development)		Change from Base 2025 to Total 2025		Percentage Change from Base 2025 to Total 2025	
	Average hourly traffic flow over 24-hour day	Total 24-hour HGV flow	Average hourly traffic flow over 24-hour day	Total 24-hour HGV flow	Average hourly traffic flow over 24-hour day	Total 24-hour HGV flow	Average hourly traffic flow over 24-hour day	Total 24-hour HGV flow
11	486	242	486	242	0	0	0.0%	0.0%
12	955	460	955	460	0	0	0.0%	0.0%
13	758	330	758	330	0	0	0.0%	0.0%
14	854	324	854	324	0	0	0.0%	0.0%
15	3,048	4,473	3,057	4,668	9	194	0.3%	4.3%

In relation to the average hourly traffic flows presented in Table 13-10 for the 2025 future year, it can be seen that as a result of the proposed development, none of the links in the study area are predicted to exceed a change in traffic flows above the thresholds suggested by the IEMA guidelines.

The highest predicted percentage change to the volume of traffic is 11.2% along Eston Road (Highway Link ID 7) between the proposed site access and the signalised junction with the A66. This would be expected, given that the site is effectively accessed from Eston Road.

Given the above, and with reference to relevant factors including road width, traffic flow, vehicle speed, the presence of crossing facilities and the number of pedestrian movements across the affected route, the potential impact of the proposed development on severance is considered to be of negligible significance at the local level. The potential impact will be permanent.

Driver Delay

The 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.

With reference to the predicted change in traffic flows shown in Table 13-10 it is considered that the likely impact of the proposed development across the study area, in terms of driver delay, will be of negligible significance at the local level. The potential impact will be permanent.

Pedestrian Delay

The IEMA Guidelines note that a change in the volume, composition and/or speed of traffic may affect the ability of a person to cross the road. The Guidelines do not set any thresholds for assessing pedestrian delay, recommending instead that assessors use their judgement to determine the significance of the impact.

It has previously been identified that as a result of the proposed development, none of the links in the study area are predicted to exceed a change in traffic flows above the thresholds suggested by the IEMA guidelines.

It is predicted that, with the exception of Link 7, there will be no discernible change in the HGV component on all links in the study area as a result of the proposed development. On Link 7, the predicted percentage change to the volume of HGVs is 52.1%. This would be expected, given that the site is effectively accessed from Eston Road.

Given the above, the potential impact of the proposed development on pedestrian delay is considered to be of negligible significance at the local level. The potential impact will be permanent.

Pedestrian Amenity

The IEMA Guidelines suggest a tentative threshold for judging the significance of a change in pedestrian amenity where the traffic flow or the HGV component is halved or doubled. It is noted that pedestrian amenity is also affected by footway width and separation from the carriageway.

It has previously been identified that as a result of the proposed development, none of the links in the study area are predicted to exceed a change in traffic flows above the thresholds suggested by the IEMA guidelines.

It is predicted that, with the exception of Link 7, there will be no discernible change in the HGV component on all links in the study area as a result of the proposed development. On Link 7, the predicted percentage change to the volume of HGVs is 52.1%. This would be expected, given that the site is effectively accessed from Eston Road.

Further, it is considered that the delivery of the new link road infrastructure proposed to serve the wider STDC masterplan area which is to include the provision of 3.0m wide shared footway/cycleways will ensure that the increase in traffic flow associated with the proposed development will not have a significant adverse impact on pedestrian amenity.

Given the above, the potential impact of the proposed development on pedestrian amenity is considered to be of negligible significance at the local level. The potential impact will be permanent.

Accidents and Safety

An assessment of road traffic accident data for the latest five-year period has been undertaken. The data shows that across the study area the level of reported collisions is not abnormally high given the daily volumes of traffic and the characteristics of the road network.

The IEMA Guidelines note that a projected change in the volume of traffic of less than 10% is generally considered to create no discernible environmental impact, given that daily variations in background traffic flow may fluctuate by this amount under normal operating conditions.

Table 13.10 identifies that the proposed development is predicted to result in an increase of traffic flows by more than 10% on just one link in the study area, this being 11.2% along Eston Road (Highway Link ID 7) between the proposed site access and the signalised junction with the A66. This would be expected, given that the site is effectively accessed from Eston Road.

On this basis, the potential impact of the proposed development on accidents and safety is considered to be of minor adverse significance at the local level. The potential impact will be permanent.

13.7 Mitigation

This section describes the measures which are required to mitigate any significant impacts with regards to transport.

During the construction phase, it is considered that the proposed development will likely result in a medium-term (3 years) minor adverse impact at the local level.

Whilst mitigation measures are not required in accordance with the approach presented in this chapter, the potential adverse impacts of the proposed development during the construction phase will be mitigated through the preparation of a Construction Environmental Management Plan (CEMP), which will be prepared and agreed with the relevant bodies, prior to construction commencing.

The CEMP will identify measures to help mitigate the potential adverse impacts associated with the addition of construction traffic onto the local road network. The measures are likely to include the following:

- The scheduling of deliveries to minimise potential disturbance on local residents and conflicts with the highway peak hours.
- The consideration of appropriate routes for construction traffic to access the proposed development site.
- The provision of wheel washing facilities at site egress points to minimise the potential for site debris to be transferred on to the local road network.

In addition to the CEMP, a Materials Management Plan (MMP) will likely be implemented to ensure verification and validation of any material transported to and from the proposed development site and its transportation and storage protocol.

Severance

The potential impact of the proposed development on severance has been identified as negligible significance at the local level.

Given the above it is considered that mitigation measures are not required in accordance with the approach presented in this chapter.

Driver Delay

The potential impact of the proposed development on driver delay has been identified as negligible significance at the local level.

Given the above it is considered that mitigation measures are not required in accordance with the approach presented in this chapter.

Pedestrian Delay

The potential impact of the proposed development on pedestrian delay has been identified as negligible significance at the local level.

Whilst mitigation measures are not required in accordance with the approach presented in this chapter, the potential impact of the proposed development on pedestrian delay will nevertheless be mitigated by the provision of improved pedestrian links incorporated as part of the delivery of the new link roads serving the wider STDC masterplan area.

Pedestrian Amenity

The potential impact of the proposed development on pedestrian amenity has been identified as negligible significance at the local level.

Whilst mitigation measures are not required in accordance with the approach presented in this chapter, the potential impact of the proposed development on pedestrian amenity will nevertheless be mitigated by the provision of improved pedestrian links incorporated as part of the delivery of the new link roads serving the wider STDC masterplan area.

Accidents and Safety

The likely impact of the proposed development on all links in the study area, in terms of accidents and safety, has been identified as being of minor adverse significance at the local level. No mitigation measures are therefore required.

13.8 Residual Impacts

The potential impact of the proposed development during the construction phase was identified as being of minor adverse significance at the local level.

Following the implementation of a CEMP and MMP, it is considered that the residual impacts of construction traffic on the main routes to and from the site will be reduced to an impact of negligible significance.

Completed Development

Severance

The potential impact of the proposed development on severance during the completed development phase was previously identified as being of negligible significance at the local level. The potential residual impact will be permanent.

Driver Delay

The potential impact of the proposed development on driver delay during the completed development phase was previously identified as being of negligible significance at the local level. The potential residual impact will be permanent.

Pedestrian Delay

The potential impact of the proposed development on pedestrian delay during the completed development phase was previously identified as being of negligible significance at the local level. The potential residual impact will be permanent.

Pedestrian Amenity

The potential impact of the proposed development on pedestrian amenity during the completed development phase was previously identified as being of negligible significance at the local level. The potential residual impact will be permanent.

Accidents and Safety

The potential impact of the proposed development on accidents and safety during the completed development phase was previously identified as being of minor adverse significance at the local level. The potential residual impact will be permanent.

A summary of the residual effects is shown in Table 13-11.

This chapter has been written by Fore Consulting Ltd. It has assessed the potential impacts of the proposed development on existing traffic conditions in the local area. In particular, it has considered the potential effects of traffic associated with the proposed development on severance, driver delay, pedestrian delay, pedestrian amenity and accidents and safety.

Within this chapter, the baseline conditions currently existing at the site and the surrounding area have been considered, before the potential impacts of the proposed development have been identified (both during the construction and completed development phases). Mitigation measures to prevent, reduce or offset the potential adverse impacts have then been identified, where appropriate, before the residual impacts of the proposed development have been assessed.

In summary, following the implementation of a CEMP and MMP, the residual impact of the proposed development during the construction phase is considered to be of negligible significance.

The proposed development is considered to have the following residual impacts during the operational phase:

- A residual impact on severance of negligible significance.
- A residual impact on driver delay of negligible significance.
- A residual impact on pedestrian delay of negligible significance.
- A residual impact on pedestrian amenity of negligible significance.
- A residual impact on accidents and safety of minor adverse significance.

With regards to all of the above, it is considered that once the identified mitigation measures are taken into account, traffic associated with the proposed development will be satisfactorily accommodated and will not give rise to any major or moderate adverse impacts. It is therefore concluded that the environmental impacts of the proposed development as a result of transport and access are acceptable.

Table 13-11 Summary of Effects (Traffic)

Description of Effect	Potential impact including significance	Mitigation	Residual Effect including significance
Construction			
Driver Delay, Severance, Pedestrian Delay, Pedestrian Amenity, Fear and Intimidation, and Accidents and Safety	Minor adverse significance at the local level – Medium term (3 years), non-permanent	Construction Environmental Management Plan (CEMP) and Materials Management Plan (MMP)	Negligible significance
Completed Development			
Severance	Negligible significance at the local level – Permanent	-	Negligible significance
Driver Delay	Negligible significance at the local level – Permanent	-	Negligible significance
Pedestrian Delay	Negligible significance at the local level – Permanent	Provision of improved pedestrian links incorporated as part of the delivery of the new link roads serving the wider STDC masterplan area	Negligible significance
Pedestrian Amenity	Negligible significance	Provision of improved pedestrian links incorporated as part of the delivery of the new link roads serving the wider STDC masterplan area	Negligible significance
Accidents and Safety	Minor adverse significance at the local level – Permanent	-	Minor adverse significance

14 Cumulative Impacts

14.1 Introduction

Cumulative impacts result from the combined impacts of multiple developments or the combined effect of individual impacts e.g. where different project elements in different locations have a cumulative impact on a particular receptor. The impacts resulting from a single scheme may not be significant on their own, but when combined with impacts resulting from other schemes, these could become significant.

The combined effect of individual impacts on specific resources or receptors identified has been described, where relevant, in each of the previous technical chapters. A qualitative cumulative effects assessment has been undertaken which considered the impacts from the proposed scheme with other proposed projects in the study area. The methods used are those described in Section 5.

14.2 Legislation, Policy and Guidance

The requirement for cumulative (or in-combination) assessment comes from the amended EIA Directive (Council Directive 97/11/EC, amending Directive 85/337/EEC), now superseded by the 2017 regulations.

Schedule 3 paragraph 1(b) of the EIA Regulations, which refers to the selection criteria for screening Schedule 2 development, states that '*the characteristics of development must be considered with particular regard to… …(b) the cumulation with other existing development and/or approved development*'.

Schedule 3 paragraph 3(g), which relates to the 'Types and characteristics of the potential impact' also requires '(g) the cumulation of the impact with the impact of other existing and/or approved development' to be taken into account. The EIA Regulations expand the definition set out in Annex III of the Directive, which simply refers to 'the cumulation with other projects'.

Schedule 4 paragraph 5 of the EIA Regulations requires 'A description of the likely significant effects of the development on the environment resulting from, inter alia: (e) 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 resources' the text goes on to state that 'The description of the likely significant effects on the factors specified in regulation 5(2) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development.'

14.3 Inter-project effects

The effects which result from two or more projects (inter-project effects) have been assessed through identifying the major infrastructure projects listed on the Planning Inspectorate website that could have potential in-combination effects on the designated sites (Tees Combined Cycle Power Plant (CCPP), York Potash Harbour Facilities Order and Teesside Cluster Carbon Capture and Usage project), as well as projects on the planning portal. These developments are shown on the map below.

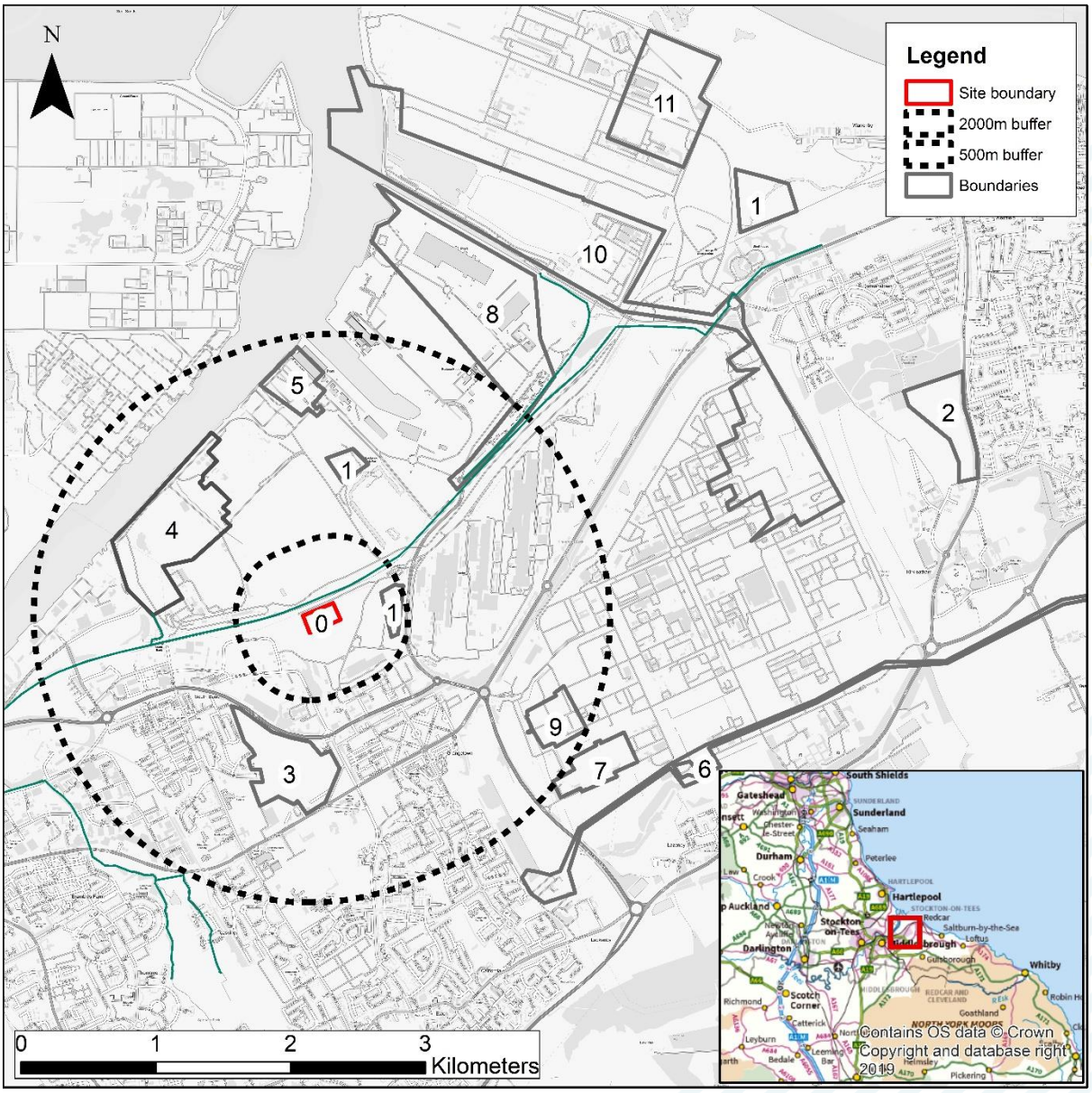

Figure 14-1: Location of committed projects

Descriptions for each of the committed sites is provided in the following tables.

Site 1	**Ground preparation for Soil for Storage**
Client	**South Tees Development Corporation**
Planning	R/2019/0427/FFM
Location	NZ 55969 22788
Description	Demolition of structures and engineering operations associated with the ground preparation and temporary storage of soil and its final use in the remediation and preparation of land for regeneration and development.
Potential cumulative impact	Both this and the proposed development are likely to create increases in traffic in terms of HGV, along similar routes (on a temporary basis during construction). Both developments will result in increases in employment in the area during the construction phase and are likely to have a cumulative positive impact on local employment levels. There may also be a cumulative negative impact on aesthetics and visual amenity for the surrounding area.

Site 2	**Kirkleatham Lane**
Client	**Homes and Communities Agency**
Planning	R/2016/0663/OOM
Location	NZ 59227 22954
Description	A development entailing the creation of up to 500 residential units, with associated access, landscaping and open space. The proposal has been granted outline consent, with the access having been constructed and issues being examined through Reserve Matters. The construction of the development is proposed to start in 2020.
Potential cumulative impact	A cumulative positive effect will likely result from increases in employment in the area during the construction phases of this project and the proposed development and thus impact on local employment levels. If the construction periods align, both developments could result in an increase in HGV construction traffic along similar routes. The housing development is likely to result in increases in private car traffic usage along similar routes during operational stages. Conversely however, this proposed housing development could result in shortened travel times to work for residents, reducing overall miles travelled in private vehicles in the area. Impacts on private car usage could be mixed and is difficult to predict from a cumulative standpoint. Housing development likely to require provision of new facilities (shops, doctors, schools etc.) in addition to open space. These facilities and amenities are likely to have a cumulatively positive impact on the local area in socio-economic terms with regards to the health and wellbeing impact of local residents and workforce. In terms of ecology, both proposed development surveys noted the presence of breeding birds - in particular, skylark breeding territories. The loss of ponds and undisturbed space at the proposed development site, together with the loss of breeding habitat at Kirkleatham Lane, are likely to have a cumulative negative impact for breeding birds. Possible screening of views from Kirkleatham Lane due to built form of the housing development preventing views from the east.

3	**Land at Low Grange Farm South Bank**
Client	**Taylor Wimpey**
Planning	R/2014/0372/OOM
Location	NZ 54266 20226
Description	This proposal is for a residential development comprising 1250 dwellings. The site is located on the Local Plan and the proposal has been granted outline consent. The start date is yet to be determined but the application has a ten year lifespan.
Potential cumulative impact	Both the residential development and the proposed development will offer employment opportunities during he construction phases, with a resulting cumulative positive impact on local employment. Regarding traffic, if the construction periods align there could be an increase in HGV construction vehicles in the areas Once built, the increased private car traffic from Low Grange Farm and the HGV waste vehicles for the facility could have a cumulative negative impact on traffic on the A174.

4	**Able South Bank**
Client	**York Potash Ltd.**
Description	A port-based development for the Offshire Marine Energy Sector (offshore wind turbines) for land at South Bank, Redcar. The use of the port will include HGV for transporting and storing and assembling the components of an offshore wind turbine (OWT).
Potential cumulative impact	The increased vehicles for site and outward-bound travel resulting from this proposal and the proposed development could therefore have a cumulative negative impact in terms of traffic, particularly related to HGVs in the local area during construction and operational phases of each proposed development.

5	**Biomass Power Station**
Client	**North Blyth Energy Ltd**
Planning	R/2008/671/EA National Infrastructure Planning: https://infrastructure.planninginspectorate.gov.uk/projects/north-east/port-blyth-new-biomass-plant/?ipcsection=docs
Location	NZ 54191 23232
Description	Proposed construction of a 300 Mw biomass fired renewable energy power station on land adjacent to the main southern dock at Teeside on the south bank of the River Tees.
Potential cumulative impact	Both proposed developments will result in increases in employment in the area, during construction and operation, resulting in a likely cumulative positive impact. Both proposed developments are industrial in nature and associated noise and air quality, and any associated socio-economic impact issues will be cumulative. However, they are both +2km from residential properties and so whilst cumulative, are not considered to be significant. Both developments are likely to create increases in traffic, both private car and HGV, along similar routes, although journeys would be spread throughout the day for the Biomass Power Station and journeys in the afternoon made outside rush hour for the proposed development. Nonethless there could be a cumulative negative impact in terms of traffic and also travel emissions. The development of multiple energy industry developments within Teesside could create an industry hub on the Tees. This could lead to an established supply chain in the area, leading to an increase in skills and employment in the wider area. There may be cumulative impacts on visual amenity depending on the size and orientation of the developments. The area is predominantly industrial with a number of large scale industries already in existence. Therefore, it is unlikely that the proposed new developments will significantly alter the visual characteristics of the area. The biomass power station proposed development has little ecological value and is not anticipated to have significant impacts on the SSSI and SPA in the area. No cumulative ecological impacts are therefore anticipated.

6	**Dogger Bank Wind Farm**
Client	**Forwind Ltd**
Planning	R/2018/0364/NID
Location	Wind farm to be in international waters. Onshore infrastructure is around NZ 57508 21916
Description	Large offshore wind farm at Dogger Bank Teesside (in international waters) and associated offshore export cabling and onshore infrastructure, with a generating capacity of up to 4.8GW. Both developments will result in increases in employment in the area, during construction and operation.
Potential cumulative impact	Both developments could alter the tourist experience of the area, by altering views from some areas. If the construction periods align, both developments could result in an increase in vessel movements within the Tees Estuary, as both are anticipating having materials delivered via barge. This could impact upon tourists' experience of the Teesside Coast. There may be cumulative impacts on visual amenity depending on the size and orientation of the developments. The area is predominantly industrial with a number of large scale industries already in existence. Therefore, it is unlikely that the proposed new developments will significantly alter the visual characteristics of the area. Redcar and Cleveland have confirmed that no overall impact would be likely to result from both proposed developments proceeding.

7	**Teesside Combined Cycle Power Plant (CCPP)**
Client	**OCGI Climate Investments LLP**
Planning	R/2017/0119/DCO National Infrastructure Planning: https://infrastructure.planninginspectorate.gov.uk/projects/north-east/teesside-cluster-carbon-capture-and-usage-project/?ipcsection=docs
Location	NZ 56370 20402
Description	Construction of a 1,700MWe combined-cycle gas turbine power station at Wilton International was granted permission.
Potential cumulative impact	Both developments will result in increases in employment in the area. Both developments may also attract national / international migrants to the area, creating slight changes in local demographics. The development of multiple energy industry developments within Teesside could create an industry hub on the Tees. This could lead to an established supply chain in the area, leading to an increase in skills and employment in the wider area. Both developments are likely to create increases in private car usage along similar routes. This is currently in the early stages of planning, therefore it is difficult to assess potential in-combination effects from this project. The CCPP has been granted a Development Consent Order. No likely significant effects were identified from the CCPP project alone, however it is still anticipated that there could be likely significant in-combination effects. Likely significant effects were noted for the Potash Facilities. The HRA Screening Assessment concluded that in the absence of mitigation, the project will have likely significant effects both alone and in-combination on the Teesmouth and Cleveland Coast SPA, pSPA, Ramsar and Ramsar. As a result, the HRA process was required to proceed to an Appropriate Assessment. This will be undertaken during detailed design / reserve matter stage. The Teesmouth and Cleveland Coast SSSI bird features will be subject to the same adverse impacts as the other European designated sites both during construction and decommissioning, and works will be subject to the submission of a SSSI assent application to Natural England. Redcar and Cleveland have confirmed that no significant cumulative impact would be likely to result from both proposed developments proceeding.

8	**Northern Gateway Container Terminal**
Client	
Planning	R/2006/0433/OO
Location	NZ 55495 23555
Description	Proposed container terminal at Teesport, Grangetown, with granted planning permission and reserved matters for landscaping.
Potential cumulative impact	Both developments are likely to create increases in traffic, both private car and HGV, along similar routes. If the operational stages of this development coincides with the construction stage of the Able development, the associated increase in vessels within the waters around Teesside could impact upon tourists' experience of the Teesside coast. There may be cumulative impacts on visual amenity depending on the size and orientation of the developments. The area is predominantly industrial with a number of large scale industries already in existence. Therefore, it is unlikely that the proposed new developments will significantly alter the visual characteristics of the area.

9	**Peak African Minerals Ltd.**
Client	**Peak African Minerals Ltd.**
Planning	R/2017/0876/FFM
Location	NZ 56091 20877
Description	Planning permission has been granted for this proposed refinery extracting rare earth minerals (neodymium, praseodymium, cerium, lanthanum) from the ore concentrates, although no further action has progressed.
Potential cumulative impact	Both developments are likely to create increases in private car traffic along similar routes, however these are not anticipated to be significant. There may be cumulative impacts on visual amenity depending on the size and orientation of the developments. The area is predominantly industrial with a number of large scale industries already in existence. Therefore, it is unlikely that the proposed new developments will significantly alter the visual characteristics of the area. In the absence of mitigation, the mineral processing proposed development has the potential to cause adverse impacts to ecological receptors, although tree and other brownfield habitat planting are proposed. However, since time would be required for such vegetation to become established there could be cumulative adverse effects when combined with the loss of brownfield habitat from the proposed development. For short term (construction) and long term (operation), both proposed developments provide employment opportunities, with a cumulative positive impact on the local economy.

10	**York Potash Port and Materials Handling Facilities**
Client	**York Potash Ltd**
Planning	R/2015/0218/DCO / R/2015/0218/DCO
Location	NZ 55054 24965
Description	A Development Consent Order Proposed has been granted for this port facility on Teesside for the export of polyhalite bulk fertiliser.
Potential cumulative impact	Both proposed developments are likely to create increases in traffic, both private car and HGV, along similar routes. Both will also result in increases in employment in the area. Both may result in altered / compromised views from Public Rights of Way in the area. There may be cumulative impacts on visual amenity depending on the size and orientation of the developments. The area is predominantly industrial with a number of large scale industries already in existence. Therefore, it is unlikely that the proposed new developments will significantly alter the visual characteristics of the area, meaning the local tourism industry should not experience adverse effects. Redcar and Cleveland have confirmed that no significant cumulative impact would be likely to result from both proposed developments proceeding.
Client	**York Potash Ltd**
Planning	R/2014/0626/FFM, R/2014/0627/FFM,
Location	NZ 55054 24965
Description	Planning permission has been granted for a proposed development by York Potash Limited (a subsidiary of Sirius Minerals plc) entailing the development of a new mine at Dove's Nest farm, south of Whitby
Potential cumulative impact	Redcar and Cleveland have confirmed that no significant cumulative impact would be likely to result from both proposed developments proceeding.

11	**Tees Cluster Carbon Capture and Usage**
Client	**OCGI Climate Investments LLP**
Planning	National Infrastructure Planning: https://infrastructure.planninginspectorate.gov.uk/projects/north-east/teesside-cluster-carbon-capture-and-usage-project/
Location	NZ 56984 25342
Description	This proposal comprises the development of a Combined Cycle Gas Turbine (CCGT) gas-fired generating station and gas, electricity and cooling water connections and a CO2 pipeline for the transport CO2 to an offshore geological storage area.
Potential cumulative impact	This proposal currently only has a scoping opinion attached to the proposals detailed on the National Infrastructure Planning and so the extent of potential cumulative impacts are not certain. However it is likely that the main cumulative impact will be the impacts from increased traffic,

Client	**Redcar and Cleveland Borough Council**
Planning	**N/A**
Location	**Various**
Description	**Highways Improvement Schemes**
Potential cumulative impact	None of the Highways Improvement Schemes is predicted to have cumulative impacts and RCBC Highways advised that that there were no committed developments to be included in the future year scenarios.

In addition to the potential for cumulative effects resulting from the proposed development and other proposed developments, there can also be cumulative effects resulting from the combination of potential impacts from the facility itself (intra-project cumulative effects). Table 14-1 identifies the receptors which may be impacted by a combination of impacts from the proposed development:

Table 14-1: Cumulative effects resulting from the combination of potential impacts

Receptor	Impacts	Overall significance
Surrounding businesses	• Visual amenity • Air pollution from vehicular movement • Noise • Exposure to soil -derived contaminants (dust, vapours, skin contact)	Not likely to be significant
Roads (incl A66 and A174)	• Air pollution from vehicular movement Congestion / traffic	Not likely to be significant
Statutory and Non-statutory sites	• No non-statutory sites or locally designated wildlife sites were identified within 2km of the development site. • Introduction of INNS • Habitat loss • Air pollution from vehicular movement • Introduction of synthetic and non-synthetic compounds	Not likely to be significant
Habitats and species	• Loss of habitat - ponds and open mosaic habitats • Creation of c. 7 ha of Habitat of Principal Importance • Visual impacts • Air pollution from vehicular movement • Noise and vibration • Introduction of INNS	Potentially Significant
Watercourses	• Potential introduction of synthetic and non-synthetic compounds • Influences on foul and surface water systems and drainage patterns • Impacts on ecological water quality of Tees estuary	Potentially Significant
Surrounding businesses	• Visual amenity • Air pollution from vehicular movement • Noise • Exposure to soil -derived contaminants (dust, vapours, skin contact)	Not likely to be significant
Roads (incl A66 and A174)	• Air pollution from vehicular movement • Congestion / traffic	Not likely to be significant

Table 14.2 Summary of potential cumulative impacts from other projects

Development	1	2	3	4	5	6	7	8	9	10	11
Ecology and Biodiversity			X				X		X		
Hydrology, Hydrogeology, Geology and Contamination			X								
Flood Risk and Water Quality											
Air Quality					X						
Cultural heritage											
Landscape and visual amenity	X				X	X		X	X	X	
Noise and vibration					X						
Traffic and transport	X		X	X	X		X		X	X	
Population and human health	X		X	X	X		X	X			

15 Environmental Commitments

The following commitments have been made to make sure that the mitigation stated in the individual chapters is fully implemented, Table 15.1.

A range of environmental measures will be implemented during construction to deliver adherence to the EA's guidance, CIRIA guidance into Construction Method Statements and other current best practice.

These will be set out in a Construction Environmental Management Plan (CEMP).

Table 15-1: Statement of Environmental Commitments

Receptor	Impacts	Commitment
Ecology	Habitat / Species disturbance during construction	• Implementation of appropriate pollution prevention measures e.g. CIRIA guidance: Control of water pollution from construction sites. Guidance for consultants and contractors (C532D). • Efforts shall be made to limit vehicle movements where possible. This could include making sure waste delivery vehicles are at full capacity before coming to the site. • Mitigation shall include appropriate biosecurity measures. These shall follow the Check-Clean-Dry biosecurity procedure ensuring that all PPE and equipment is cleaned before leaving site. To prevent the spread of the Small-leaved Cotoneaster, it is recommended that it is removed from adjacent to the site to reduce the likelihood of vehicles spreading the plant around the site and taking the plant off site. • Installation of a fish guard to prevent entrapment within the abstraction pipe(s)
	Habitat Loss	• Ecological Clerk of Works (ECoW) to work with the contractor during site clearance and site establishment to maintain any sensitive areas on the development plot. • Ecological enhancement / mitigation areas to be created on c. 7ha of site to replace the brownfield grassland habitats. No imported top soil to be brought onto the site and existing soils to be sorted and replaced after enabling works (SDTC). • Area B (Archaeology Area) to be covered with existing site won top soil to maintain connectivity of habitat across the open areas. • Ponds will be created within the designated biodiversity area which may be able to hold water and provide suitable habitat for amphibians and invertebrates. • The planned biodiversity area is expected to offset any valuable scrub habitat lost and impacts on populations of birds, butterflies, Brown Hare. • Minimal lighting fitted to directional cowls shall be used to reduce the impact on birds.
	Water Quality	• SuDS and water quality features to be designed to consider ecological benefits. Opportunities for bio-treatment of surface water to be considered where practical and appropriate.
	Post Construction	• Site Management Plan to be developed to maintain the ecological enhancement area. • Minimal lighting fitted to directional cowls shall be used to reduce the impact on birds.

Receptor	Impacts	Commitment
Hydrology, Geology and Contamination	Pre-construction	• In advance of site development, an updated Contaminated Land risk assessment should be undertaken, which may include additional ground investigation to characterise soil and groundwater conditions. Subsequently, a Remediation Strategy should be developed for the Site which would look to refine further baseline assessments, consider the risks associated with the identified contamination, and propose appropriate construction/ operational phase mitigation measures to reduce the potential for identified impacts to occur.
	During Construction	• Implementation of appropriate pollution prevention measures e.g. CIRIA guidance: Control of water pollution from construction sites. Guidance for consultants and contractors (C532D). • The timing of excavation and re-placement of ground materials should be sensitive to avoiding poor weather conditions. Other pollution control measures advised in the FRA, such as bunding of potential sources of contamination, will also be implemented in order to prevent potential contamination incidents of the receiving watercourse. • Minimising the amount of exposed ground and soil stockpiles from which water drains and the period of time such water drains. • Plant and machinery used during the construction phase would be well maintained to minimise the risks of oil leaks or similar. Maintenance and re-fuelling of machinery would be undertaken offsite or within filling areas of temporary hardstanding. In these designated areas, contingency plans would be implemented so that the risks of spillages are minimised. Placing a drip tray beneath plant and machinery during re-fuelling and maintenance would contain small spillages; and • Locating plant and wheel washing facilities in a designated area of hard standing at least 10m from any watercourse or surface water drain. • An emergency response protocol will be developed by contractors and incorporated into the CEMP so that any accidental spillages are intercepted and that there are procedures for site staff to follow. Spill containment equipment (e.g. absorbent material) will be provided on site. • Effluent from welfare facilities on the site will either be taken off site for disposal and treatment or routed to the local sewer network. • Pollution prevention measures shall be implemented during construction works to prevent excessive sediment input and mitigate impacts in the event of oil or fluid leaks. • Groundwater and surface water monitoring will be carried out associated with any site

Receptor	Impacts	Commitment
		investigation programme carried out.
	Embedded Design	• During the placement of the new surface water drainage system, oil-water interceptors would be placed at any outfalls from the site. This would provide the opportunity to isolate the system, should spillage of polluting chemicals occur. • The proposed drainage system incorporates design features to remove silt and other suspended solids, as well as capture any spills/oil and grease, prior to discharge. • Storage of all chemicals and oils within areas of hard standing and installation of secondary containment, such as a bund wall, so that at least 110% of the stored capacity is provided for. Storage areas should be located at least 10m away from any surface watercourses and areas at risk of flooding.
Flood Risk and Water Quality	During Construction	• The developer will need to comply with the requirements of the FRA in order that no impacts arise on flow volumes. Holme Beck is an Ordinary Watercourse, therefore, proposed discharge rates (if any) must be agreed with the LLFA. • Discharge through connection to mains sewage (as agreed with NWL) or obtain an appropriate Environmental Permit from the EA. • Minimise discharge and abstraction points wherever possible to limit disturbance. • All culverts will be designed following CIRIA's Culvert design and operation guide (2019) and SEPAs Engineering in the water environment: good practice guide. River crossings. December 2019. • An Emergency Plan should consider and avoid areas designated to contain on site surface water exceedance flows. • Site management requirements include maintenance of water quality and of water levels e.g. to allow partial winter flooding on wetlands, required for wintering bird habitats
	Embedded Design	• The development will incorporate a Drainage Strategy appropriate to the site to reduce runoff rates as set out in the FRA and Surface Water Drainage Strategy, whilst also taking into account potential changes in rainfall from climate change. • The attenuation requirements on site will be met through the use of a proposed detention basin which will discharge via a flow control device to restrict outflow to the Holme Beck culvert. The attenuation pools will be design to enhance the ecology of the site. • The drainage design takes account of climate change and such that water draining from the site into watercourses will not exceed existing runoff rates. The timing of excavation and re-placement of ground materials should be sensitive to avoiding poor weather

Receptor	Impacts	Commitment
		conditions. • In accordance with Tees Valley SuDS requirements, surface water runoff from development should be limited to the greenfield QBAR runoff rate for all return periods up to and including the 1% AEP rainfall event.
Archaeology and Cultural Heritage	During Construction	• Area B to be fenced and protected during earth moving and construction. • Area B to be top-soiled from site derived material to protect the buried archaeology. • Implementation of a programme of archaeological recording and reporting prior to or during construction
Socio-Economic	During Development	• Employment – when seeking employees for the operational stage of the scheme, the client use of the Grangetown Training and Employment Hub, a local scheme operated through a partnership between Jobcentre Plus, R&CBC, Coast and Country Housing, Work Programme providers, training providers and individual projects. • Security fencing should be installed surrounding the entire site to minimise the risk of break-ins, vandalism and theft. This fencing should be at least 2.0m high and have anti-climb devices on the top of the fence, such as anti-climb rotator spikes. Two perimeter fences with a gap between them was also a recommended feature to make break-ins more difficult; • Traffic management procedures will be in place to phase deliveries and avoid peak areas. • Incorporate measures or infrastructure to reduce the necessity for prospective employees to travel via private car. Electric points will be installed for staff vehicles. • Procurement of the materials required for construction could be planned carefully to minimise excess material and waste. This would both minimise transportation on site of materials and transportation off site of waste and excess materials; Materials could be sourced as locally to the site as possible, and transported to the site via shipping or rail freight due to the immediate proximity of the site to the Tees Estuary and rail line. • Minimising the impact of deliveries, parking and work on the public highway. • Contributing to and supporting the local community and economy. • Working to create a positive and lasting impression. • Assessment of the site under the Considerate Constructors Scheme (CCS).

16 APPENDICES

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