Seagreen 1A: Onshore Transmission Works

Environmental Impact Assessment Report

Volume 2: Main Report

March 2021

Sea green 1A WIND ENERGY

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Volume 2 Main Report Glossary and Abbreviations

Term (in alphabetical order)	Definition
'A' weighting	The A-weighting is a correction term applied to the frequency range in order to mimic the sensitivity of the human ear to noise.
dB	Decibel measure of sound.
dB(A)	Decibel measure of sound weighted with the 'A' weighting.
Decibel	The decibel is the unit used to quantify sound pressure levels as well as sound intensity and power levels. In accordance with the logarithmic scale, an increase of 10 dB in sound pressure level is equivalent to an increase by a factor of 10 in the sound pressure level (measured in Pa). Subjectively, this increase would correspond to a doubling of the perceived loudness of the sound.
Free-field	Sound pressure level measured in open conditions with no reflective surface (except the ground) nearby
Frequency	The rate at which the pressure fluctuations occur determines the pitch or frequency of the sound. The frequency is expressed in Hertz (Hz) or cycles per second.
Gross Value Added	Measure of economic activity that includes staff costs and profit
$L_{A90,T}$	'A' weighted statistical sound pressure level exceeded for 90% of a time period T. Used to represent the background sound level.
$L_{Aeq,(working)}$	'A' weighted average sound pressure level over a defined working period.
$L_{Aeq,T}$	'A' weighted average sound pressure level over the period T.
$L_{Ar,Tr}$	The acoustic measurement parameter representing the Rating Level.
L_{wA}	'A' weighted sound power level.
Noise	Noise is often defined as a sound or sounds, especially when it is unwanted, unpleasant or loud.
Noise Barrier	Purpose made solid obstacle introduced to reduce the noise level.
Peak Particle Velocity	Measurement of vibration in mms^{-1}.
Rating Level or rating level	A sound pressure level measured in decibels inclusive of character, tonality and impulsivity / intermittency corrections.
Sound	Sound is produced by mechanical vibration of a surface, which sets up rapid pressure fluctuations in the surrounding air.
Sound Power Level	The sound energy emitted by an object measured in Watts (W) (decibel referenced to 10^{-12} W)
Sound Pressure	The Sound Pressure is the force (N) of sound on a surface area (m^2) perpendicular to the direction of the sound. The SI-units for the Sound Pressure are Nm^{-2} or Pa (Pascal).
Sound Pressure Level	The human ear has an approximately logarithmic response to sound pressure over a very large dynamic range. The lowest audible sound pressure approximately 2×10^{-5} Pa (2 ten billionths of an atmosphere) and the highest is approximately 100 Pa. It is therefore convenient to express the sound pressure as a logarithmic decibel scale related to this lowest human audible sound.
Specific Noise Level	This is the equivalent continuous 'A' weighted sound pressure level at the assessment position due to due to a specific sound source. It is un-corrected for character, tonality or impulsivity / intermittency.

Abbreviation	Expanded Term
AIL	Abnormal Indivisible Load
BAP	Biodiversity Action Plan
BGS	British Geological Survey
BoCC	Birds of Conservation Concern
BTO	British Trust for Ornithology
CAR	The Water Environment (Controlled Activities) (Scotland) Regulations 2011
CEMP	Construction Environmental Management Plan
CIA	Cumulative Impact Assessment
CIEEM	Chartered Institute of Ecology and Environmental Management
CIfA	Chartered Institute for Archaeologists
COVID-19	Corona virus disease No.19
CTMP	Construction Traffic Management Plan
DIA	Drainage Impact Assessment
Dipl	Diploma
DMRB	Design Manual for Road and Bridges
DWQR	Drinking Water Quality Regulator
EcIA	Ecological Impact Assessment
ECoW	Ecological Clerk of Work
ECoW	Environmental Clerk of Works
EHO	Environmental Health Officer
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
ELC	East Lothian Council
Eng	Engineering
EPS	European Protected Species
ES	Environmental Statement
GIS	Geographic Information System
GVA	Gross Value Added
GW	Gigawatts
GWDTE	Groundwater Dependent Terrestrial Ecosystems
HDD	Horizontal Directional Drilling
HES	Historic Environment Scotland
HGV	Heavy Goods Vehicle(s)
HRA	Habitats Regulations Appraisal
IB	Inventory Battlefield
IEMA	Institute of Environmental Management and Assessment
IGDL	Inventory Garden and Designed Landscape
IOF	Important Ornithological Feature

Abbreviation	Expanded Term
JNCC	Joint Nature Conservation Committee
LBAP	Local Biodiversity Action Plan
LDP	Local Development Plan
LGV(s)	Light Goods Vehicle(s)
LLP	Limited Liability Partnership
LNR	Local Natura Reserve
MCIEEM	Member of the Chartered Institute of Ecology and Environmental Management
MHWM	Mean High Water Mark
MHWS	Mean High Water Spring
MIOA	Member of the Institute of Acoustics
MLWM	Mean Low Water Mark
MLWS	Mean Low Water Spring
MNR	Marine Nature Reserves
NCR76	National Cycle Route 76
NNR	National Nature Reserve
NSA	New Statistical Account of Scotland
NSR	Noise Sensitive Receptor
OnTW	Onshore Transmission Works
OS	Ordnance Survey
OSA	Old Statistical Account of Scotland
PhD	Doctor of Philosophy
PMP	Peat Management Plan
PPG	Pollution Prevention Guidelines
PPP	Planning Permission in Principle
PPV	Peak Particle Vibration
pSPA	Proposed Special Protection Area
PWS	Private Water Supplies
RBMP	River Basin Management Plan
ROV	Remotely Operated Vehicle
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SEPA	Scottish Environmental Protection Agency
SGT	Super Grid Transformer
SI	Site Investigation
SINC	Sites of Importance for Nature Conservation
SNH	Scottish Natural Heritage
SPA	Special Protection Area
SPP	Scottish Planning Policy
SSSI	Site of Special Scientific Interest

Abbreviation	Expanded Term
SUDS	Sustainable Urban Drainage Systems
SWEL	Seagreen Energy Ltd
SWT	Scottish Wildlife Trust
TMP	Traffic Management Plan
TS	Transport Scotland
TWIC	The Wildlife Information Centre
UKBAP	The United Kingdom Biodiversity Action Plan
UXO	Unexploded Ordnance
WCA	Wildlife and Countryside Act
WeBS	Wetland Bird Survey
WFD	Water Framework Directive
WSI	Written Scheme of Investigation
WTG	Wind turbine generator
WWT	Wildfowl and Wetlands Trust
ZoI	Zone of Influence
ZTV	Zone of Theoretical Visibility

1 Introduction

1.1 Introduction

1.1.1 This Environmental Impact Assessment Report (EIAR) has been prepared by Ramboll UK Limited (Ramboll) on behalf of Seagreen 1A Limited (The Applicant) in support of an application for Planning Permission in Principle (PPP) to construct and operate the onshore transmission infrastructure to export electricity from the Seagreen Offshore Wind Farm into the national electricity transmission system network. The Proposed Development is located on the coast of the Firth of Forth in between the towns of Prestonpans and Cockenzie and Port Seton, East Lothian, approximately 15 km east of Edinburgh. The site location is shown in **Figure 1.1**.

1.1.2 The EIAR comprises four volumes:

- Volume 1: Non-Technical Summary (NTS);
- Volume 2: Main Report;
- Volume 3: Figures; and
- Volume 4: Technical Appendices.

1.2 Background

1.2.1 The consented Seagreen Offshore Wind Farm is located in the outer Firth of Forth and Firth of Tay, approximately 66 km from the East Lothian coastline at its closest point. One hundred and fourteen of the 150 consented offshore wind turbines have a grid connection into Tealing substation in Angus. The construction of this grid connection started in 2020.

1.2.2 The proposed Seagreen 1A project seeks consent for the onshore and offshore infrastructure required to connect the remaining 36 turbines to the national electricity transmission system. An application was made to National Grid in October 2019 and the project was offered a grid connection at Cockenzie, East Lothian with a connection date of October 2023.

1.2.3 The offshore infrastructure will comprise one export cable, approximately 108 km in length, from the Seagreen Offshore Wind Farm to the landfall (mean high water springs) at Cockenzie. The offshore export cable will be the subject of an application for a marine licence made to Scottish Ministers via the Marine Scotland Licensing and Operations Team (MS-LOT).

1.3 Purpose and Scope of the EIAR

1.3.1 This EIAR has been prepared to accompany an application for PPP, in accordance with The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017[1] (herein referred to as the 'EIA Regulations'). The EIAR has been prepared to meet the requirements of Schedule 4 of the EIA Regulations and the Institute of Environmental Management and Assessment (IEMA) Quality Mark Criteria. The EIAR also takes account of the relevant guidance set out in the Scottish Government Planning Advice Note (PAN[2]), which emphasises the importance of achieving a proportionate EIA scope, focussed on the likely significant effects.

[1] URL: https://www.legislation.gov.uk/ssi/2017/102/regulation/4/made (accessed 18/01/2021)

[2] The Scottish Government (2013) Planning Advice Note 1/2013 Environmental Impact Assessment, URL: https://www.gov.scot/publications/planning-advice-note-1-2013-environmental-impact-assessment/ (accessed 18/01/2021)

1.3.2 The Proposed Development, for the purposes of the application for PPP, is as follows:

1.3.3 The construction, operation and decommissioning of an onshore substation, onshore electricity cables and associated infrastructure required to export electricity from the Seagreen Offshore Wind Farm to the national electricity transmission system at Cockenzie, East Lothian.

1.3.4 As noted in section 1.2, the Proposed Development can be considered as associated works to the offshore generation and export cable elements of the Seagreen Offshore Wind Farm. The offshore wind turbines are consented. Further environmental information on the likely significant effects associated with the consented components of the Seagreen Offshore Wind Farm is available on the Applicant's website: https://www.seagreenwindenergy.com/library.

1.3.5 An EIAR, prepared to comply with The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended) ("the 2017 MW Regulations") and The Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended) ("the 2007 MW Regulations"), accompanies the application for marine licence for the proposed offshore export cable.

1.3.6 The scope of this EIAR is focussed on reporting the likely significant effects of the onshore transmission works, which are the subject of the application for PPP. However, where there is the potential for likely significant effects associated with the offshore transmission works, for example, noise disturbance from near shore works during cable laying activities, these are addressed within the scope of this EIAR. The two EIARs for both the onshore and offshore works will be made available on the project website here: https://www.seagreen1a.com/documents.

1.4 Other Planning Documents

1.4.1 The Application is accompanied by the following documents that do not form part of the EIAR:

- Planning Statement; and
- Pre-Application Consultation Report.

1.5 The Applicant

1.5.1 The Applicant is Seagreen 1A Limited, owned by SSE Renewables (49%) and Total (51%).

1.5.2 SSE Renewables is a leading developer and operator of renewable energy across the UK and Ireland, with a portfolio of around 4 GW of onshore wind, offshore wind and hydro. Total is a broad energy Group, which produces and markets fuels, natural gas and low-carbon electricity.

1.6 EIA Process

1.6.1 EIA is a process that identifies the potential environmental effects (both beneficial and adverse) of a proposed development and proposes mitigation to avoid, reduce and offset any adverse environmental effects. EIA is required where a proposed development is 'likely to have significant effects on the environment by virtue of factors such as its nature, size or location'. In this case, the Applicant has volunteered to undertake an EIA rather than request a formal screening opinion. The key stages in the EIA process adopted for the Proposed Development are summarised below.

EIA Scoping

1.6.2 Due to programme constraints no formal request for an EIA scoping opinion was made to East Lothian Council for the Proposed Development. The Applicant did however engage with East Lothian Council and other key statutory consultees on the proposed scope of the EIAR through video-conference meetings and email correspondence. The consultation responses received are summarised in **Technical Appendix 1.1: Consultation Register**, along with a list of all bodies who were consulted.

1.6.3 Based on this consultation and a review of previous applications for similar development in the same area, the EIAR provides an impact assessment chapter for each of the following disciplines/ factors/ issues:

- Chapter 4: Seascape, Landscape and Visual;
- Chapter 5: Ecology;
- Chapter 6: Ornithology;
- Chapter 7: Hydrology; Hydrogeology and Ground Conditions;
- Chapter 8: Cultural Heritage and Archaeology;
- Chapter 9: Access, Traffic and Transport;
- Chapter 10: Noise and Vibration; and
- Chapter 11: Land Use, Socio-economics and Tourism.

1.6.4 Chapter 12 provides a schedule of the mitigation measures drawn from Chapter 4 to Chapter 11 listed above.

1.6.5 The EIA regulations require the EIAR to identify, describe and assess the likely significant effect on the factors specified in Regulation 4(3) and the interaction between those factors. **Technical Appendix 1.2: Scoping** lists the factors and outlines how this EIAR addresses each, including how the report describes the potential interactions between the factors.

Major Accidents and Disasters

1.6.6 The EIA regulations require the consideration of the potential risks to human health, cultural heritage or the environment associated with the vulnerability of the Proposed Development to accidents and disasters. This requirement is interpreted as requiring the consideration of high consequence events (even if of low likelihood) which would result in serious harm or damage to environmental receptors. Given the location of the Proposed Development, there is no flood risk. The design will incorporate a full appraisal of any potential ground instability issues related to historic mining activity. Even in the event of a significant uncontrolled fire, there would be no substances stored on Site that would pose a significant risk to human health or the environment more generally. On this basis, no further consideration is given to major accidents and disasters in this EIAR.

Cumulative

1.6.7 This EIAR provides an assessment of cumulative effects. Each topic chapter identifies the relevant 'cumulative' developments. Consideration has been given to the potential for likely significant effects in combination with the consented onshore transmission works associated with the Inch Cape Offshore Wind on the site of the former Cockenzie Power Station (planning reference 18/00189/PPM). Consideration has also been given, where appropriate, to the Blindwells housing masterplan (planning reference 14/00768/PPM and subsequent applications for matters specified in conditions). Specifically in relation to potential likely

significant effects on ornithological receptors, consideration has been given to cumulative effects with wider Forth and Tay Offshore Wind Farm development, including the Seagreen 1, Inch Cape, Neart Na Gaoithe, Berwick Bank and Marr Bank projects. No other developments have been identified which would be likely to give rise to significant effects in combination with the Proposed Development.

1.6.8 The consented Inch Cape onshore transmission works are the subject of a PPP consent. The planning conditions attached to this consent require that the footprint of the consented Inch Cape onshore substation shall not exceed 2.5 hectares (ha) in total and shall be located as far to the south western boundary of the application site as the agreed landscaping allows. They also require that the total height of any building for the Inch Cape onshore substation shall not exceed 12.3 m from the finished ground levels. No further applications for the approval of matters specified in conditions relevant to the Inch Cape onshore transmission works have been submitted. Taking this into account, this EIAR is limited to providing an assessment based on the consideration of cumulative effects of the maximum permitted development envelope for the Inch Cape onshore transmission works.

Pre-Application Consultation

1.6.9 The Scottish Government's National Planning Framework 3 (NPF3) confirms that the Proposed Development constitutes national development. The Applicant has complied with all the pre-application consultation requirements associated with being a national development. In accordance with Scottish Government guidance and regulations[3] in relation to the temporary suspension of the requirement for public meetings during the COVID-19 emergency period and their replacement instead with an alternative online consultation, the Applicant held a virtual public exhibition from Monday 11 January to Monday 1 February 2021. The project team were also available to answer questions on the Proposed Development via 'live chat' facility on the 18 January 2021 from 12:00 – 14:30 and 18:00 – 20:30.

1.6.10 A summary of the feedback received is provided in the Pre-Application Consultation Report (PACR) which accompanies the submission.

Baseline Characterisation

1.6.11 Baseline characterisation is the process by which the environmental conditions now and in the future assuming no development on the site are established. The process has included a combination of desk research, site survey and empirical study and projection.

1.6.12 The environmental baseline adopted for the purposes of the EIA is stated in each of the technical assessment chapters provided in the EIAR. The baseline is normally taken as the current character and condition of the site and surrounds, and the likely significant environmental effects of the development are then assessed in the context of the current conditions. However, potential future baseline scenarios are included within the assessments, where applicable.

Mitigation by Design and Consideration of Alternatives

1.6.13 Following the baseline characterisation, information collected on environmental constraints was used to inform the consideration of alternatives substation sites, landfall locations and onshore cable routes. An iterative process was followed, whereby the Applicant considered a range of landing points, cable routes, layouts and access proposals for the Proposed Development. The main aim has been to avoid likely significant environmental effects through

[3] The Town and Country Planning (Miscellaneous Temporary Modifications) (Coronavirus) (Scotland) Regulations 2020

the site selection. Further details on the consideration of alternatives are set out within **Chapter 3: Site Alternatives and Design Evolution**.

Impact Assessment

1.6.14 The next stage in the EIA process was to complete an impact assessment to address the likely significant effects remaining following the implementation of mitigation by design. An assessment chapter has been provided for each issue where it is considered that there are likely significant effects associated with the construction, operation, decommissioning or restoration phases of the Proposed Development. Each assessment chapter considers primary, secondary, direct, indirect and cumulative effects and defines the assessment methodology used and the criteria by which a significant effect is defined.

Additional Mitigation

1.6.15 The impact assessment is used to identify where additional mitigation is required to address likely significant effects, where it has not been possible to avoid the effect through design of the infrastructure layout. Mitigation has been considered following a hierarchy of first seeking to avoid effects, followed by seeking a reduction in effects to level not considered significant, and finally where necessary and possible, offsetting or compensatory measures are considered.

Environmental Impact Assessment Report

1.6.16 The process and outcomes of the assessment are presented in a single document, known as the EIAR. This EIAR has been prepared to provide clear and concise information on the likely significant environmental effects associated with the Proposed Development. The EIAR is focussed on the residual effects that remain following the implementation of mitigation. The aim is to provide proportionate environmental information, as required in accordance with EIA regulations, to support the determination of the planning application.

1.6.17 Each of the technical chapters provides the specific criteria, including sources and justifications, for quantifying the different levels of effect. Where possible, this has been based upon quantitative and accepted criteria together with the use of value judgements and expert interpretations to establish to what extent an effect is environmentally significant. The threshold at which effects are likely to be "significant" is defined in each of the technical chapters.

1.6.18 In this case, the EIAR is submitted to East Lothian Council.

Statement of Competence

1.6.19 In accordance with regulation 5(5) of the EIA Regulations, by appointing Ramboll the Applicant has ensured that the EIAR has been prepared by 'competent experts'. The EIAR has been compiled and approved by professional EIAR practitioners at Ramboll, holding relevant undergraduate and post-graduate degrees, membership of the Institute of Environmental Management and Assessment (IEMA) and Chartered Environmentalist status with the Society for the Environment. The EIAR meets the requirements of the IEMA EIA Quality Mark Scheme. This is a voluntary scheme operated by IEMA that allows organisations to make a commitment to excellence in EIA and to have this commitment independently reviewed on an annual basis.

1.6.20 The project team comprises the companies presented in Table 1.1 below. A compiled statement on the competence of the lead authors of the technical reports is included in Technical Appendix 1.2 (EIAR: Volume 4) and each of the impact assessment chapters

provides details of the relevant professional memberships of the author, code or practice followed and assessment methodology used.

Table 1.1: Project Team

Team Member	Roles and Responsibility
S1A Limited	Project Developer and owner (and temporary Offshore Transmission Owner, OFTO) for the Seagreen 1A project
Ramboll UK Limited	EIA Project Management Seascape Landscape and Visual Impact Assessment Hydrology, Hydrogeology, Ground Conditions Ecology Air Quality and Climate
RPS	Ornithology
AOC Archaeology	Cultural Heritage and Archaeology
Hoare Lea	Noise and Vibration
Systra	Access, Traffic and Transport
BiGGAR Economics	Land use Socioeconomics and Tourism
PSC	Electric and Magnetic Fields

1.7 Copies of the EIAR

1.7.1 Paper copies of the EIAR and other documentation are normally made available to view at publicly accessible locations.

1.7.2 The Town and Country Planning (Miscellaneous Temporary Modifications) (Coronavirus) (Scotland) Regulations 2020 make temporary modifications to the usual requirements placed on developer companies to make physically available application and EIA documentation for public inspection in named places within the locality of proposed developments. The modifications require that companies making applications, or submitting further environmental information in connection with a live application, instead provide that all required documentation is available electronically for public inspection.

1.7.3 As such, the EIAR, including all figures, technical appendices and accompanying documents are available to view on the project website (https://www.seagreen1a.com/documents).

1.7.4 The application documents will also be available via the East Lothian Council consents portal (https://www.eastlothian.gov.uk/info/210547/planning_and_building_standards/12214/search_for_planning_applications).

1.7.5 For anyone who has difficulty accessing the documentation online, a CD or USB copy can be made available on request by calling 0345 076 0530.

2 Development Description

2.1 Introduction

2.1.1 This chapter provides a description of the Proposed Development for the purposes of identifying and assessing likely significant effects. Information is provided on:

- the location of the Proposed Development;
- the physical characteristics of the operational Proposed Development;
- typical activities associated with the construction and commissioning of the Proposed Development;
- typical activities associated with the operation of the Proposed Development; and
- typical activities associated with the decommissioning of the Proposed Development.

2.1.2 As the application is for Planning Permission in Principle (PPP), it is not possible at this stage to provide a detailed description of all elements of the Proposed Development. The PPP will define the application site boundary and development zones (parameters) within the application site boundary to illustrate the areas of search within which different elements of the Proposed Development will be located. The PPP will therefore acknowledge that the details of the project will evolve within those parameters and will be subject to the approval of 'matters specified in conditions'. On this basis, this chapter aims to define the reasonable worst case spatial and temporal parameters such as to enable a robust assessment of the likely significant effects of the Proposed Development. Typical or indicative drawings are provided to illustrate the potential physical characteristics of the Proposed Development within the spatial parameters shown in **Figure 2.1**; however it is noted that detailed elements such as the dimensions, layout, colour, height, massing and access could all be varied within the development zones shown.

2.1.3 This chapter is supported by:

- Technical Appendix 2.1: Indicative Programme of Works
- Technical Appendix 2.2: Outline Construction Environmental Management Plan (OCEMP);
- Technical Appendix 2.3: Dust Risk Management Plan; and
- Technical Appendix 2.4: Electric and Magnetic Fields.

2.1.4 Figures 2.1 to 2.8 are referred to in the text where relevant and include the following:

- Figure 2.1: Proposed Development Parameters;
- Figure 2.2: Indicative HDD Design Plan and Profile;
- Figure 2.3: Typical Transition Joint Bay;
- Figure 2.4: Typical Trench Cross Section;
- Figure 2.5: Typical Cable Trench Installation General Arrangement;
- Figure 2.6: Typical Joint Bay;
- Figure 2.7: Indicative Substation Site Layout; and
- Figure 2.8: Axonometric View of Indicative Substation Layout.

2.2 The Development Site

2.2.1 The Proposed Development site ('the Site') covers an area of approximately 0.24 km^2 and is located on the coast of the Firth of Forth, on open land between the towns of Prestonpans to

the west and Cockenzie and Port Seton to the east in East Lothian, approximately 15 km east of Edinburgh. The Site extends from the Mean Low Water Springs (MLWS) through Preston Links, includes the existing Cockenzie substation and extends eastwards as far as the B6371 as illustrated in **Figure 1.1**.

2.2.2 The Site ranges from sea level to approximately 16.5 m Above Ordnance Datum (AOD). Historical land use within the Site includes collieries, mineral railway lines, a gas works and associated gasholder, a refuse tip and electricity substations. The current land uses included within the Site comprise a small intertidal area between MLWS at Prestonpans Beach and a car park located next to Prestonpans Beach. An amenity grassland area, commonly referred to as the Greenhills, is located north of the B1348, which includes the John Muir Way long distance trail. The Site is crossed by the B1348 Edinburgh Road. The Site to the south of the B1348 is mostly comprised of a mixture of amenity grassland areas and rough grassland with small areas of self-seeded trees and regenerating vegetation. The Site includes the hardstanding associated with a former gasholder, currently occupied by a car wash business, the existing Cockenzie substation and a private road (formerly associated with the coal store and former power station) which connects between the B1348 and the B6371. The private road is gated at each end and there is no public access. East Lothian Council (ELC) includes a path linking Whin Park around the south side of the existing Cockenzie substation as a 'Core Path'[1] (see Core Path 284 in **Figure 4.14**).

2.2.3 A network of public footpaths is located in the immediate area surrounding the Site to the south of the existing Cockenzie substation. A grassed 'acoustic screening bund'[2] of approximately 10 m above the surrounding ground level is located along the southern boundary, which also has a footpath along its top (core path 145/146) affording views of the surrounding area. Two overhead power lines are located within the Site, connecting to the existing Cockenzie substation.

2.2.4 The nearest residential properties to the Site are located along Whin Park to the north east, on the B1348 in Prestonpans and along Atholl View to the south west, albeit the properties on Atholl View have little interaction with the Site due to the intervening bund. In addition to residential properties, the Whin Park industrial estate is located immediately north of the Site and a dental surgery and health centre is located immediately west, in Prestonpans.

2.2.5 One cultural heritage asset of national importance, the Inventory Battlefield of the Battle of Prestonpans, extends into the portion of the Site located south of Edinburgh Road (the B1348) as shown in **Figure 8.2**. The Inventory also cites the location of an 18th century wagonway, which is located on the eastern boundary of the Site. Further details are provided in **Chapter 8: Cultural Heritage and Archaeology.**

2.3 Project Description

2.3.1 The Proposed Development spatial parameters plan is illustrated on **Figure 2.1** and includes areas of search that would accommodate the detailed proposals for:

- One shore end export cable from the Seagreen Offshore Wind Farm between the MLWS mark and the transition joint bay;

[1] URL: https://www.eastlothian.gov.uk/downloads/download/12660/east_lothians_core_paths_plan (accessed 25/01/2021)

[2] This bund was originally consented and formed as a landscape feature designed to provide noise attenuation between the Persimmon Homes residential development on the site of the former Longdykes Market Garden and the then operational Cockenzie Power Station. ELC Application reference 00/01165/OUT and 03/00786/REM

- One transition joint bay, where the shore end export cable would interface with the onshore export cable;
- One onshore export cable, running from the transition joint bay to the onshore substation;
- Potential joint bay and temporary pulling pits, for installation of the onshore export cable (potentially located anywhere within the onshore export cable development zone);
- The onshore substation;
- One grid connection cable linking the onshore substation and the existing Cockenzie substation;
- Temporary construction compound and working areas;
- Access and site tracks; and
- Associated works.

Shore End Export Cable

2.3.2 The landfall for the proposed offshore export cable would be located approximately 400 m south west of the former Cockenzie Power Station. The 'shore end export cable' would comprise the seaward part of the export cable between MLWS and the transition joint bay. The export cable installed at this location would utilise a design and manufacture that is suited to this environment.

2.3.3 The shore end export cable would be installed using a trenchless installation technique.

Trenchless Installation

2.3.4 Trenchless installation of the shore end export cable is likely to use a technique such as horizontal directional drilling (HDD), whereby a pilot hole is drilled from the landward side (within the landfall working area) to a point below MLWS. The pilot hole is then enlarged using a reaming process, followed by the installation of a conduit pipe through which the shore end export cable can pulled.

2.3.5 Indicative HDD design and profile options at landfall are illustrated on **Figure 2.2**. The detailed trenchless installation design, including entry and exit points, will be dependent on geotechnical investigation as well as the final cable route design of the project.

Transition Joint Bay

2.3.6 The type of export cable used onshore is different in construction to the shore end cable. A transition joint bay is required to join the multi-core shore end export cable to the single core onshore cable. The transition joint bay would be a buried chamber comprising a concrete plinth, where the cables and joints are anchored, with concrete walls. Additional steel reinforcements may be added if necessary.

2.3.7 The transition joint bay would be located at Preston Links, as shown on **Figure 2.1**. It would be a maximum of approximately 20 m in length, 3 m in width and 2.5 m in depth. The transition joint bay would also include an associated link box pit and a communications/ DTS box pit with manhole covers to allow for operational access. Typical details for the transition joint bay are shown on **Figure 2.3**.

2.3.8 The transition joint bay would be backfilled with a layer of stabilised material, typically cement bound sand, for about approximately 600 mm around the cable and topped up with material from the excavation.

2.3.9 Once the installation of the cables and joints is completed, the area around the transition joint bay would be landscaped and restored to its original condition. Following restoration, surface evidence of the transition joint bay would be limited to the two manholes above the link box and communications/ DTS box pits.

Onshore Export Cable

2.3.10 One onshore export cable would be required, which would also include two fibre optic cables connecting between the transition joint bay and the onshore substation, and between the onshore substation and the grid connection point at the existing Cockenzie substation. The cable would be located within the onshore export cable and the grid connection development zone areas shown in **Figure 2.1**. The exact location and alignment of the onshore export cable would be established following the detailed investigation of environmental and technical factors.

2.3.11 The onshore export cable would be buried using open cut trenching over unobstructed ground, or trenchless technology where necessary. Where open cut trenching is used, the typical cable trench dimensions would be approximately 1.5 m wide x 2 m deep, plus an allowance for slope batters during construction.

2.3.12 The approximate volume of excavated material for the cable trench would be 3,600 m^3 and the maximum cable trench working width would be approximately 20 m, allowing for temporary soil stockpiles, drainage, 5 m access track and working areas around the cable trench.

2.3.13 Typical details for the onshore cable trench are shown on **Figure 2.4,** with typical details of the general arrangement of the construction corridor for installation of the cable trench shown on **Figure 2.5**.

Joint Bay and Temporary Pulling Pits

2.3.14 It is anticipated one joint bay may be required to join together the lengths of cable along the onshore export cable route. If required, this joint bay may be located anywhere within the onshore export cable development zone area as shown on **Figure 2.1**. The exact location of the joint bay would be defined following the detailed cable route alignment design.

2.3.15 A typical joint bay would have a concrete base, with a manhole for access to an earth link box. The maximum joint bay dimensions would be approximately 10 m in length, 4 m width and 3 m in depth. There would also be a small link box pit and communications/DTS box pit adjacent to the joint bay. Typical details for the transition joint bay are shown on **Figure 2.6**.

2.3.16 Permanent access will be required to the link box pit and communications/ DTS box pit during the operational lifetime of the Proposed Development for maintenance purposes via two manhole covers. Post and wire fencing may be erected around these access points.

2.3.17 Up to two pulling pits may also be required, with a maximum volume of excavated material of approximately 120 m^3 (based on the footprint of the joint bay and excluding any slope batters required during construction). These pulling pits are temporary ground excavations that are required to provide a pulling point and locations to add lubrication during cable pulling operations. Once cable pulling operations are complete, these pulling pits will be fully reinstated back to existing ground levels.

Onshore Substation and Platform

2.3.18 The substation platform would have a maximum footprint of approximately 22,000 m^2 and would be located within the onshore substation search development zone in **Figure 2.1**. Electrical infrastructure would be located on the substation platform with a maximum height of 18 m. The detailed design of the substation will be subject to compliance with Grid Code[3], which sets the requirements for connecting to the National Electricity Transmission System (NETS). The substation is likely to comprise:

- Outdoor electrical equipment including shunt reactors and transformers;
- A building housing dynamic reactive compensation (DRC) equipment;
- A building housing gas insulated switchgear and a control room;
- A building housing harmonic filter (HF) equipment;
- Earthing equipment;
- Operational circulation roads; and
- Operational phase car parking for servicing vehicles.

2.3.19 Motion activated lighting would be installed sufficient to facilitate safe, normal access/ egress of the substation and the substation platform will be surrounded by a 2.5 m high palisade security fence. Detailed landscaping proposals for the area outside of the security fence would be brought forward by application for matters specified in conditions, however it is anticipated that landscaping would potentially include native scrub and tree planting to provide some visual screening and integration with the surrounding landscape.

2.3.20 The surface water runoff within the substation platform area would be managed using sustainable drainage system (SUDS), providing suitable levels of filtration and attenuation, prior to discharge, potentially to existing surface water drains located adjacent to the Site. The surface water runoff would be attenuated to equivalent greenfield runoff rates, which would ensure that the runoff from the Proposed Development would not result in any increase in flood risk within the wider surface water catchment. The SUDS system will be designed in compliance with CIRIA C753[4].

2.3.21 The design of the pollution control measures, including oil separation and containment, for the operational phase of the substation would be agreed with ELC in consultation with Scottish Environment Protection Agency (SEPA) at the detailed design phase.

2.3.22 **Figure 2.7** provides an indicative layout plan for the substation. **Figure 2.8** provides an illustrative axonometric view.

Temporary Construction Compounds and Working Areas

2.3.23 Two temporary construction compounds will be required during the construction phase of the project. These will comprise:

- a main construction compound of approximately 50 m x 50 m; and
- a substation construction compound of approximately 125 m x 110 m.

2.3.24 The main construction compound and the substation construction compound will both be located within the temporary construction compound development zone as shown on

[3] URL: https://www.nationalgrideso.com/industry-information/codes/grid-code (accessed 25/01/2021)

[4] CIRIA C753 (2015) The SUDS Manual, UR: https://www.ciria.org/ItemDetail?iProductCode=C753&Category=BOOK&WebsiteKey=3f18c87a-d62b-4eca-8ef4-9b09309c1c91 (accessed 25/01/2021)

Figure 2.1. Final locations for compounds will be submitted to ELC for approval at the matters specified in conditions application stage.

2.3.25 Each of the temporary construction compounds would incorporate temporary facilities such as boundary fencing, security lighting, parking for construction workers, site storage and site facilities such offices, welfare, toilet facilities, waste and materials management areas. The temporary construction compounds shall be bounded by fencing. Additional security measures shall be provided during construction to prevent trespass, vandalism and theft of materials and equipment.

2.3.26 If a trenchless solution is selected for landfall, a landfall works area compound of approximately 2,500 m^2 will be required on Preston Links. This will provide a safe working area to support the drilling rigs, associated drilling equipment and materials, plant, welfare and turning and parking areas for the operation. A pit will be excavated at the compound to contain the slurry arisings from the drilling operations. This excavation pit/ settling pond will be sized to accommodate the drill arisings/ slurry from the operations being undertaken.

2.3.27 Where trenchless solutions are used on other sections of the onshore cable route to cross obstructions, smaller launch pits and receptor pits will also be required. Each pit will be approximately 1,250 m^2. Further details on the locations of these launch and receptors pits will be finalised at the detailed design stage.

Access and Site Tracks

2.3.28 Given the location of the Site, it is most likely that components of the Proposed Development would be brought to site along the A1, exiting at the Bankton Junction. Direct access to the Site would be taken from the B6371 via the former Coal Store service road, with additional access points to the working areas from the B1348 Edinburgh Road. There is the potential need to upgrade the existing service road and to add a new junction or improved junction to the B6371. The detail of these improvements will be subject to further detailed design following engineering appraisal.

2.3.29 During construction, a temporary haul road would also extend along the full length of the cable corridor and would have a maximum width of 5 m. This haul road will be located within the 20 m wide working corridor.

2.4 Associated Development

2.4.1 The Proposed Development, as described in this chapter, is associated with the Seagreen Offshore Wind Farm as a whole. The consented Seagreen wind turbine generators (WTGs) are located approximately 27 km off the Angus coastline and 66 km off the East Lothian coastline, and will be able to generate approximately 1.5 gigawatts (GW) of renewable electricity from 150 wind turbines. One hundred and fourteen of the 150 consented turbines have a consented grid connection into Tealing, Angus, and construction on this grid connection started in 2020. To facilitate full export capacity for the Seagreen Project, the Applicant is seeking a Marine Licence for an additional export cable corridor (approximately 110 km) from the consented Seagreen Project Area. The Marine Licence application is for the construction, operation and decommissioning of the Seagreen 1A offshore export cable to transport electricity from the Seagreen Offshore Wind Farm to landfall at Cockenzie, East Lothian. The offshore transmission infrastructure for the Seagreen 1A Project consists of one high voltage export cable to mean high water springs (MHWS).

2.4.2 The offshore transmission works are expected to include:

- seabed preparations, which may include the removal of seabed debris, pre-sweeping, boulder clearance or Unexploded Ordnance (UXO) clearance; and
- the installation, burial and protection of the cable.

2.4.3 The cable will be buried wherever possible. This will be achieved by either:

- burying the export cable using a jetting Remotely Operated Vehicle (ROV) or a mechanical trencher after it has been laid; or
- burying the export cable as it is laid using an export cable plough or a mechanical trencher.

2.4.4 However, where this is not achievable, external export cable protection may be required. The following methods are being considered:

- a form of trenchless installation from the shore end at Cockenzie from above MHWS to below MLWS;
- rock placement;
- concrete mattresses;
- grout bags; or
- export cable crossings infrastructure.

2.4.5 It is anticipated that the offshore export cable installation and associated works will take place over a six month period.

2.4.6 Further detail on characteristics of the offshore transmission works and the likely significant effects associated with the offshore work is provided in the Export Cable EIAR, available for review at the project website here: https://www.seagreen1a.com/documents.

2.5 Construction Activities

Construction Working Hours

2.5.1 The construction working hours for the proposed Development would be 07:00 to 19:00 Monday to Saturday. As noted in **Chapter 10: Noise and Vibration**, noisy activities on Saturday afternoons would be restricted to reduce noise disturbance.

2.5.2 The installation of the offshore export cable at landfall (using trenchless installation techniques, e.g. HDD) is likely to require greater flexibility in working hours. For the purpose of characterising the likely environmental effects associated with construction, the assessment allows for three scenarios:

- 24 hour HDD working, seven days a week;
- HDD working daytime (07:00 to 19:00) and evenings (19:00 to 22:00); and
- HDD working daytime only (07:00 to 19:00).

2.5.3 Further assessment of noise associated with HDD is provided in **Chapter 10: Noise and Vibration**.

2.5.4 There may also be specific construction activities associated with the installation of the onshore export cable, for example the crossing of the B1348, where HDD or other trenchless installation techniques are required. The requirement for such working would, if required, be pre-agreed in advance with ELC.

Construction Programme

2.5.5 An indicative programme for the Proposed Development is provided in **Technical Appendix 2.1**. This identifies the construction windows and anticipated sequence of construction. At this stage, it is anticipated that the enabling and construction activities will take place over approximately 22 months.

2.5.6 A detailed programme of works for the Proposed Development cannot be finalised until a more detailed and optimised design is available and the Principal Contractor has been appointed. The following section presents indicative timescales for each of the key elements of the construction works.

Landfall

2.5.7 Subject to detailed site investigation findings, the trenchless option at landfall will take approximately nine weeks to prepare the ground plus an additional four weeks for the drilling and duct installation, giving a total construction period for this phase of the works of approximately 13 weeks. This construction period is based on 24 hour working, seven days a week. In the event that HDD drilling operations are restricted to daytime and evenings, or daytime only, then the drilling and duct installation works may increase to approximately 11 weeks, therefore increasing the total construction period for this phase of works to approximately 20 weeks.

2.5.8 The cable installation at landfall will take approximately two weeks. The timing of these cable installation activities may occur sometime after the drilling and duct installation works are complete.

Onshore Export Cable

2.5.9 The duration of operations to lay the onshore export cable will depend upon the final route alignment. The onshore export cable installation rate including trench digging, cable laying and backfilling the trench, is approximately 30 m/day to 45 m/day. It is therefore estimated that the installation between the transition joint bay and the onshore substation will take approximately five to six weeks and the installation between the onshore substation and the grid connection point will take approximately one to two weeks.

2.5.10 As discussed in the construction methods section below, some sections of the onshore export cable route such as the crossing of the B1348 may require a trench or trenchless solution. Depending on the existing services in the road, trenching works across it will take between approximately four to 12 weeks to complete.

2.5.11 If HDD or other trenchless solution is used to cross the B1348, it is anticipated that drilling and duct installation would take up to two weeks. This construction period is based on 24 hour working, seven days a week. In the event that HDD drilling operations are restricted to daytime and evenings, or daytime only, then the drilling and duct installation works may increase to up to four weeks.

2.5.12 Overall, it is therefore anticipated that the maximum duration of operations to lay the onshore export cable between the transition joint bay and the grid connection point will take up to 20 weeks in total.

Onshore Substation

2.5.13 It is anticipated that the construction of the onshore substation would take approximately 100 weeks in total.

Construction Methods

Phase 1 – Site Establishment and Enabling Works

PRE-CONSTRUCTION SURVEYS

2.5.14 Prior to commencement of the Proposed Development pre-construction surveys would be undertaken, and mitigation put in place, where required, as detailed within the CEMP. This may include measures to prevent disturbance to protected species and the installation of pollution prevention measures, such as silt fencing.

VEGETATION CLEARANCE

2.5.15 Once site controls are established site clearance, including the removal of any vegetation, can commence. The Applicant will seek to avoid positioning site infrastructure, such as the temporary haul road, construction compounds and working area, in areas of existing scrub vegetation wherever possible.

ROAD IMPROVEMENTS, SITE ACCESS AND SITE HAUL ROAD

2.5.16 Site access works will be completed as part of phase 1, including constructing new junctions to the B6371 and B1348 as required, and making any improvements required to the existing service road. Temporary stone (using geotextile and crushed stone) or track panel access track would also be provided along the cable construction area and to access the temporary construction compound and laydown areas for each of the main working areas (landfall, onshore export cable and substation). The temporary construction compounds would provide parking for construction staff.

CONSTRUCTION COMPOUNDS

2.5.17 A level crushed stone platform would be provided for each of the temporary construction compound areas. Civil engineering works would be required to achieve a level area of the size required. Vegetation and topsoil and subsoil would be stripped and stored in separate soil storage stockpiles around the perimeter of the proposed platform area. Crushed rock will be placed and compacted on top of a geotextile membrane to form the compound platform, prior to the Principal Contractor bringing in site facilities. Security fencing will be set up around each construction compound and working area, as required.

Phase 2 – Construction Works

LANDFALL

2.5.18 The trenchless installation of the shore end export cable is likely to use a technique such as HDD, whereby a pilot hole is drilled from the landward side (within the landfall working area) to a point below the MLWS. The pilot hole is then enlarged using a reaming process, followed by the installation of a conduit pipe through which the shore end export cable can pulled.

2.5.19 Bentonite (an inert clay mineral) is mixed with water to form a drilling mud, used to lubricate during drilling, casing and potentially cable pulling. The drilling would use a 'closed-loop' system whereby drilling fluids are recovered for reuse with no discharge.

2.5.20 A mechanical excavator and winches are likely to be used for installing the conduit pipe and pulling the cable. Pulling cables through ducts is more straightforward where there are fewer curves to negotiate. Trenchless installation of ducts around curves is more difficult. Dependent upon the final HDD design and profile it may be necessary for the ducts to be temporarily laid out across the B1348 during installation; however to avoid the need for road closures, a temporary bridge structure would be used if required.

TRANSITION JOINT BAY

2.5.21 The construction of the transition joint bay will include excavations for the transition joint bay chamber. The excavations at the transition joint bay will be safely shored or the sides may be battered to a safe angle of repose. The chamber will be constructed using a reinforced concrete base requiring formwork, preparation of the reinforcing steel and concrete pouring. The transition joint bay is likely to be constructed prior to the landfall works in order to minimise construction delays and reduce the length of time for the offshore cable pull in works. Any surplus excavated material will be removed and disposed of.

ONSHORE EXPORT CABLE

2.5.22 Between the transition joint bay and the substation, the majority of the buried onshore export cable will be installed by cutting open trenches. The cables are then either installed directly into the trench or into a duct laid within the trench. The trench will then be back filled once cable installation is complete. In special circumstances, such as road crossings or crossings or other obstacles such as underground services, other trenchless installation techniques may be used as required.

2.5.23 **Chapter 7: Hydrology, Hydrogeology and Ground Conditions** notes the potential for contamination associated with historic land-use at the Site. In the event that suspected contaminated soils are encountered during the construction phase, including cable installation works and substation development (e.g. soils that are visibly stained or have a strong odour), guidance would be sought from a suitably qualified environmental consultant to determine whether the material would be suitable for use as backfill. Should an environmental risk be identified (e.g. to human health, the water environment or cable material) then alternative material would be imported for use as backfill and an appropriate treatment/ disposal route identified for the unsuitable soil.

2.5.24 The working area will be fenced off. The fencing type will depend on an assessment of the adjacent land use and the need to ensure the health and safety of general public. Gates will be incorporated, where appropriate, to maintain access. Temporary diversions (with signage) will be provided where the cable working area crosses existing public footpaths.

2.5.25 Topsoil and vegetation will be stripped from the working area using tracked excavators and stored to one side of the allocated area. Topsoil will be stored separately from subsoil and away from watercourses or drains. Storage times for topsoil will be kept to a minimum to prevent deterioration in its quality.

2.5.26 An excavator or trench digger will be used to dig the trench. A 5 m wide area will be required beside the trench for access, for example for earth digging equipment and cable drum lifting equipment. A further 5 m will be required for lay down of equipment, topsoil and spoil from the trenching. Dependent upon the method of trench construction up to 2 m width may also be required on each side of the trench for safety and to prevent trench collapse under load. A final 3 m to 5 m may be required on the far side of the trench for access, storage or working space. The maximum working corridor width for installation of the buried cable will therefore be approximately 20 m. The typical general arrangement of the construction corridor for installation of the cable trench is illustrated on **Figure 2.5**.

2.5.27 The onshore export cable route will include a crossing under the B1348. This may be achieved through either open cut trenching techniques or trenchless installation. If using open cut trenching, the road surface will be removed and a trench excavated in the underlying substrate. The cables or ducting will be installed in the trench and buried before the road is

reinstated and opened for normal use. Protective tiles may be installed in the trench above the cables to provide further protection. These works may require temporary traffic management using a traffic light system with only one lane closed at a time.

CABLE JOINT BAY

2.5.28 The excavations at the joint bay (if required) will be safely shored or the sides may be battered to a safe angle of repose. The chamber walls will be constructed using reinforced concrete and the base will be concrete lined to provide a flat, clean working environment. Cable joints are generally undertaken in a portable container providing controlled conditions. This is then removed on completion of the jointing. Earth bonding links will be installed in a permanent chamber adjacent to the joint bay, with access via a manhole.

ONSHORE SUBSTATION

2.5.29 Substation construction follows a similar pattern to any building works:

- Establish site controls, as per the CEMP, including pollution prevention measures and temporary works drainage;
- Stripping and storage of turves and soils in accordance with CEMP and best practise to ensure they can be reused for site reinstatement;
- Works to divert any existing underground utilities within the footprint of the proposed substation;
- Civil engineering earthworks to create a level platform for the substation infrastructure;
- Erection of a security fence;
- Installation of building and electrical infrastructure foundations;
- Construction of operational site drainage and SUDS;
- Upgrading/ construction of internal access roads;
- Erection of buildings;
- Mechanical and electrical installation of electrical plant; and
- Commissioning.

2.5.30 The base foundations for all electrical plant and buildings will typically be constructed from reinforced concrete pads, or with steel or concrete piles. Once the foundations are in place and the oil containment system complete, delivery and installation of the plant will take place.

2.5.31 Delivery to the Site will be by road. The size of vehicle required will depend on the size of the plant. Each transformer delivery will be classed as an Abnormal Indivisible Load (AIL) and transformers will be transported using a special vehicle. Delivery and installation will include the use of cranes and jacks to lift the equipment into position, typically via skidways or rails to manoeuvre the transformers into place. Once fixed into place the plant will be connected and configured. Extra security fencing is also sometimes installed around certain plant or areas of the substation switchyard.

Phase 3 – Decommissioning of Temporary Infrastructure and Site Reinstatement

2.5.32 Following commissioning of the Proposed Development, all temporary infrastructure would be removed, and the construction site would be reinstated. Reinstatement would form part of the contract obligations for the Principal Contractor and would include all temporary works, such as temporary access tracks, temporary compounds and working areas.

2.5.33 Following removal of the temporary works, best practise techniques would be used to ensure soils are replaced in the order they were removed with any turves replaced on top. Where required, reseeding of these areas would also be undertaken with an appropriate seed mix.

2.5.34 Landscape planting would be undertaken in line with a Landscape and Reinstatement Plan to be agreed with ELC.

Construction Traffic and Plant

2.5.35 A Traffic Management Plan (TMP) would be agreed at the detailed design stage, in consultation with ELC, Transport Scotland and other stakeholders (including the local communities). This would address the scheduling, routing and overall management of abnormal loads movements along with the programming and management of all other HGV movements.

2.5.36 During these works, the Applicant commits to maintaining access to the Prestonpans Yachting and Boating Club, located adjacent to the landfall, at all times. Similarly a safe diversion will be provided for the John Muir Way and local core paths affected by the Proposed Development.

2.5.37 Further detail is provided in **Chapter 9: Access, Traffic and Transport**.

Standard Mitigation and Working Methods during Construction

Construction Environmental Management Plan (CEMP)

2.5.38 A contractual requirement of the Principal Contractor for both the Proposed Development and the Associated Development would be to develop and implement a CEMP. This document would detail how the Principal Contractor(s) would manage the construction of the Proposed Development in accordance with all mitigation commitments detailed in this EIAR, and any conditions attached to statutory consents and authorisations. The CEMP would also include, but not be limited to, a Pollution Prevention Plan (as required by condition of a Construction Site Licence issued under the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR), as amended[5]) and a Site Waste Management Plan. An outline of the CEMP is provided in **Technical Appendix 2.2: Outline Construction Environmental Management Plan**.

2.5.39 The implementation of the CEMP would be overseen, where appropriate, by a suitably qualified and experienced Environmental Clerk of Works (ECoW), with support from other environmental professionals as required.

2.5.40 The CEMP would also set out mechanisms to ensure that workers on the Site, including subcontractors, are aware of environmental risks, and are well controlled in this context, and the role of the ECoW and any other Clerk of Works appointed to provide specialist advice.

Associated Development

2.5.41 The offshore export cable is considered to be Associated Development. The offshore export cable is the subject of a separate consenting (marine licence) and EIA process[6], covering the cable from MHWS seaward. A vessel or other plant and equipment that can operate in the near-shore environment will be required to be stationed approximately 700 m to 1100 m offshore during the cable installation and landfall works to support cable pulling, jointing, laying and cable trenching/ burial. Consideration will be given to the potential for these works

[5] URL: The Water Environment (Controlled Activities) (Scotland) Regulations 2011 [online]. Available at: http://www.legislation.gov.uk/ssi/2011/209/contents/made [last Acccessed:25/01/2021]

[6] The offshore export cable is subject of screening opinion issued by Marine Scotland Licensing and Operations Team (MS-LOT) on behalf of the Scottish Ministers confirming that the offshore export cable is EIA development.

to cause significant effects in combination with the Proposed Development in the technical chapters of this EIAR.

2.6 Operation Management and Maintenance

Operational Phase

2.6.1 There is no operational need to limit the lifetime of a renewable energy development. Increasing the operational period allows the costs of renewable energy to be reduced and maximises the contribution that developments can make towards climate change and renewable energy targets. Therefore, permission is being sought for the Proposed Development in perpetuity.

Maintenance Programme

2.6.2 Substation plant requires maintenance and inspection at regular intervals, with most substations having monthly inspections and maintenance occurring about once every four to six years on each circuit. Maintenance activities would be likely to involve a site presence for about one week per annum with light vehicles, with other visits as required for operational duties.

2.6.3 Routine, planned operational and maintenance intervention on the onshore transmission cable element of the Proposed Development will not be required other than an inspection of the link boxes. This will take place approximately one day every year.

Operational Residues and Emissions

2.6.4 The EIA Regulations require that the EIAR provides an estimate, by type and quantity, of expected residues and emissions (such as water, air and soil pollution, noise, vibration, light, heat, radiation and quantities and types of waste produced) resulting from the construction and operation of the Proposed Development and the Associated Development.

2.6.5 Table 2.1 provides a summary of the anticipated residues and emissions from the Proposed Development.

Table 2.1: Residues and Emissions

Topic	Potential Residue/ Emission – Construction Phase	Potential Residue/ Emission – Operational Phase
Water	Surface water runoff and discharge is likely during construction. In addition, occasional discharges may arise from pumping, or over-pumping in order to dewater foundation excavations. Release of pollutants to groundwater, watercourses or on-site water bodies may arise as a result of soil erosion or from oil/ fuel/ chemical storage and/ or use, including accidental spills. During construction water quality could be impacted through direct discharge of untreated foul sewage from temporary welfare facilities to groundwater, watercourses or on-site water bodies. All discharges would be managed in accordance with the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR), as amended by The Water Environment (Miscellaneous)	Operational water discharges are anticipated to be limited to surface water run-off and small volumes of foul water from the domestic welfare facilities. Full details are presented in **Chapter 7: Hydrology, Hydrogeology and Ground Conditions**.

Table 2.1: Residues and Emissions		
Topic	**Potential Residue/ Emission – Construction Phase**	**Potential Residue/ Emission – Operational Phase**
	(Scotland) Regulations 2017. The proposals for the control and management of water quality and quantity from the Proposed Development will be presented the CEMP, as outlined in **Technical Appendix 2.2: Outline CEMP**. Further details are provided in **Chapter 7: Hydrology, Hydrogeology and Ground Conditions**.	
Air	The construction phase would require the transport of people and materials by road, with associated emissions, including dust emissions, to the atmosphere. There are no air quality management areas within the vicinity of the Proposed Development. Overall the quantity of air emissions is expected to be low relative to the general background air emissions from road traffic. No significant air emissions are anticipated. A dust risk management plan is provided in **Technical Appendix 2.3**.	During the operational phase potential impacts could arise from road traffic accessing the Site for maintenance work and from the release of air pollutant emissions, such as sulfur hexafluoride (SF_6) and carbon dioxide (CO_2), from equipment within the gas insulated substation (GIS). The Proposed Development would facilitate the export of renewable electricity from up to 36 of the consented Seagreen Offshore Wind Farm turbines, in turn displacing emissions associated with fossil fuel-based electricity generation elsewhere.
Soil and Subsoil	Soil and subsoil excavation, handling and storage would be required during construction. All soil and subsoil would be stored temporarily for use in reinstatement. Given the historical land uses at the Site, there is the potential for construction work to mobilise contamination in the ground. Further details are provided in **Chapter 7: Hydrology, Hydrogeology and Ground Conditions**. The release of sediment or pollutants generated during excavation of soil, earth moving and from temporary soil stockpiles during construction could impact surface water quality. All discharges would be managed in accordance with CAR. The proposals for the control and management of water quality and quantity from the Proposed Development will be presented the CEMP, as outlined in **Technical Appendix 2.2: Outline CEMP.**	No requirement for soil or subsoil excavation or handling during the operation phase has been identified. No pollution sources have been identified during the operational phase.
Noise and Vibration	Noise sources during the construction phase would include increased traffic flows and noise from construction activities. Liaison with landowners and local residents would be carried out to ensure that minimum disruption occurs throughout all stages of construction of the Proposed Development. Appropriate working hours would be agreed with ELC. Details on noise management measures that would be implemented during construction will be outlined in the CEMP.	The substation would generate noise during operation. Details on the baseline noise levels at noise sensitive receptors (NSRs) identified for the Proposed Development and the predicted operational noise levels of the substation are provided in **Chapter 10: Noise and Vibration**.

Table 2.1: Residues and Emissions		
Topic	**Potential Residue/ Emission – Construction Phase**	**Potential Residue/ Emission – Operational Phase**
Light	The temporary construction compounds are likely to be equipped with lighting installations for use during low light conditions and security lighting. All temporary lighting installations would be downward facing and all lights would be switched off during daylight hours and out with working hours. Any effect would be temporary and not expected to be significant.	Substations are not generally illuminated during operation. Floodlights would be installed at the Proposed Development but would only be used in the event of a fault or when essential maintenance needs to be carried out during the hours of darkness.
Heat and Radiation	No significant heat or radiation sources have been identified during the construction phase.	No significant heat or radiation sources have been identified during the operational phase. **Technical Appendix 2.4: Electric and Magnetic Fields** provides further detail to demonstrate that there would be no electric or magnetic fields in excess of public health guidance thresholds.
Waste	Construction would generate general waste in the form of domestic wastes and other materials, for example, wood, metals, plastics and stone. Details on pollution prevention control and site waste management that would be implemented during construction will be identified in the CEMP, as outlined in **Technical Appendix 2.2: Outline CEMP**. Litter would be managed in accordance with the appropriate waste regulations.	The general maintenance of the Proposed Development has the potential to produce a small amount of waste. This is likely to be restricted to waste associated with employees and visiting contractors. All waste arising on site would be managed in accordance with the appropriate waste regulations.

2.7 Decommissioning

2.7.1 In the event of permanent cessation of electricity generation from the Seagreen Offshore Wind Farm, confirmation will be provided to ELC whether or not the Proposed Development continues to be required for electricity transmission purposes.

2.7.2 Where the Proposed Development is not required for electricity generation purposes beyond the operational period of the Seagreen Offshore Wind Farm, the elements would be decommissioned and the land reinstated as follows:

- the above ground infrastructure would be removed from site for reuse elsewhere or disposed of in line with the waste regulations in force at the time;
- where removal of infrastructure such as cables, cable ducting and foundations would result in more damage than leaving them in place, they would be left in situ; and
- disturbed ground would be reinstated, and where required tree planting similar to the surrounding woodland and/or reseeding with an appropriate seed mix.

2.7.3 Details of the decommissioning and restoration scheme would be submitted to ELC for approval within 24 months of the permanent cessation of electricity generation from the Seagreen Offshore Wind Farm and prior to any decommissioning works commencing. Where the Proposed Development is required for electricity transmission purposes beyond the operational period of the Seagreen Offshore Wind Farm, the demolition and restoration scheme will instead be submitted to ELC for approval within 24 months of the Proposed Development no longer being required for electricity transmission purposes.

2.7.4 The effects associated with the construction phase can be considered to be representative of reasonable worst-case decommissioning effects, and therefore no separate assessment of the decommissioning phase is considered necessary in this EIAR.

3 Site Alternatives and Design Evolution

3.1 Introduction

3.1.1 This chapter provides a description of the reasonable alternatives studied by the Applicant, which are relevant to the Proposed Development and its specific characteristics, in accordance with regulation 5(2)(d) and schedule 4 (paragraph 2) of the EIA regulations. The chapter provides a description of the main reasons for selecting the chosen option for the Proposed Development, taking into account the effects of the Proposed Development on the environment.

3.1.2 A separate Planning Statement accompanies the planning application to describes the planning policy background relevant to the Proposed Development. Where specific aspects of the legislative or policy context are relevant to the consideration of Site selection, alternatives and the main reasons for selecting the chosen option, they have been referenced in this chapter.

3.1.3 Figures 3.1 to 3.3 are referred to in the text where relevant and include the following:

- Figure 3.1: Landfall Locations
- Figure 3.2: Substation Site Options
- Figure 3.3: Cable Route Options

3.2 Site Selection Considerations

3.2.1 The site selection for the Proposed Development has been undertaken on the basis of a grid connection offer from Scottish Power Energy Networks for connection of the energy generation from 36 turbines (approximately 360 MW) consented as part of the Seagreen offshore wind farm (as described in **Chapter 2: Description of Development**). The grid connection offer is for a connection at Cockenzie substation.

3.2.2 The Applicant adopted a two-stage approach to site selection. Table 3.1 summarises this process.

Table 3.1: Approach to Site Selection

Stage	Scope of Work
Stage 1: Identification of site options and review	▪ Identification of multiple landfall and substation site options, on the basis of proximity to existing Cockenzie substation; ▪ Completion of a proforma-based exercise to consider the landfall and substation site options in technical, environmental and planning terms.
Stage 2: Further assessment of the short-listed site options and selection of preferred site	▪ Further detailed consideration of site options short-listed at Stage 1; ▪ Identification of preferred landfall and substation locations.

3.2.3 The site selection was informed by a review of publicly available data sources, including extant national, regional and local planning policy; and community proposals (including the Coastal Regeneration Alliance Community Vision and 2017 Masterplan Report), review of planning application-related activity, including supporting information, and available environmental data sources.

Extant Planning Policy

3.2.4 Relevant sources of extant planning policy have been considered, including:

- National Planning Framework 3 (NPF3), which:
  - Recognises the national significance of major onshore transmission infrastructure through the definition of national development 4 (Scotland-wide);
  - Recognises the significance of the Forth coast stretch between the study area and the Torness area (as an area of co-ordinated action), including the potential for offshore wind farm grid connections. Within this area, where conflicting proposals emerge, priority will be given to those maximising the economic development potential of the site;
- SESplan2 (albeit not yet approved by the Scottish Ministers, SESplan2 has been subject to examination and outstanding issues relate only to residential matters. It therefore represents the Strategic Development Planning Authority's up-to-date thinking in respect of infrastructure and the study area);
- East Lothian Local Development Plan ("the LDP"), which:
  - Generally supports development in accordance with NPF3's national development 4, subject to there being acceptable environmental impacts;
  - Recognises the potential of the area of co-ordinated action for grid connections for major offshore wind farms;
  - Recognises the principle of energy-related uses referenced within NPF within the study area; and
  - Includes environmental policies which would inform detailed technical environmental assessment.

3.2.5 In addition, the Applicant engaged in consultation on East Lothian Council's (ELC's) emerging ClimatEvolution process.

Planning Application-related Activity

3.2.6 In addition, consideration was given to the planning history during approximately the last decade. This includes:

- S36 and public gas transporter consent to SPGL for a 1,000MW gas-fired power station and associated gas pipeline, respectively;
- Two planning permissions for Onshore Transmission Works associated with Inch Cape Offshore Wind Farm:
  - The first, on a greenfield area to the south of the former coal storage area, reference: 14/00456/PPM, which has now expired;
  - The second, which remains extant, on part of the site of the former power station, reference: 18/00189/PPM;

3.2.7 Considering these two planning permissions, the Applicant considered that this general location was suitable for the Proposed Development.

Community Proposals

3.2.8 Local communities have expressed visions for the future of the area through the following:

- The Coastal Regeneration Alliance Community Vision, c. 2014, which considered a community-based approach to the future use of the study area; and

- 'Former Cockenzie Power Station and Surrounding Area Masterplan Report 2017', undertaken by PBA.

3.2.9 Neither document has any status in planning terms but provide useful illustration of community visions at particular points in time.

3.3 Stage 1 - Identification of Site Options and Comprehensive Review

3.3.1 Engineering and cost factors required the identification of locations for the proposed landfall and onshore substation in close proximity to Cockenzie substation, taking due account of engineering restrictions, including potential conflict with the consented Inch Cape Offshore Wind Farm landfall, cable route and substation.

3.3.2 A high-level analysis identified seven potential landfall options, as shown in **Figure 3.1** and eleven potential substation site options, as shown in **Figure 3.2**.

3.3.3 Each landfall and substation site option was reviewed to identify and consider the following:

- its general features and those of its surroundings;
- provides contextual information (e.g. distances between substation options and landfall options);
- relevant planning considerations;
- relevant environmental constraints and potential impacts;
- potential technical and construction issues, including crossings of linear features;
- any land-related consultation feedback; and
- any relevant commentary on the option by third parties, as part of separate consenting processes.

3.3.4 The baseline information collected was analysed against a set of technical requirements for the landfall and substation options (including area, installation method, cable length, access, ground conditions, topography) and was used to identify the potential constraints associated with each option. The site selection process followed a hierarchical approach to avoid, minimise and reduce negative interaction with or effects on the identified potential constraints.

3.3.5 As a result of this process, five of the seven landfall sites (LF1, LF2, LF3, LF4 and LF7) were discounted, based on cost, technical and environmental considerations. The remaining two sites, LF5 and LF6, were considered feasible if combined and micro-sited, and were taken forward for further detailed analysis in parallel with the substation site selection process. Of the eleven substation site options considered, seven were discounted for a range of cost, technical and environmental reasons. Table 3.2 provides a summary of the appraisal of the landfall and substation site options:

Table 3.2: Landfall and Substation Site Options – Stage 1 Site Appraisal

Site Name	Appraisal	Stage 1 Conclusion
LF1/Seton Sands East	Longest route, unnecessarily complex crossings and multiple landownerships.	Discount
LF2/CPS Outfall	Inch Cape conflict, unavailable	Discount
LF3/CPS Jetty	Inch Cape conflict, unavailable	Discount
LF4/CPS West	Inch Cape conflict, unavailable	Discount

Table 3.2: Landfall and Substation Site Options – Stage 1 Site Appraisal		
Site Name	**Appraisal**	**Stage 1 Conclusion**
LF5/Green Hills	**Link to previously approved Inch Cape landfall, previously granted planning permission**	**Preferred landfall location is between LF5 and LF6, subject to micro-siting**
LF6/Lidl		
LF7/Seton Sands West	Lengthy route, unnecessarily complex crossings and multiple landownerships.	Discount
SS1/CPS Outfall	Loss of amenity space, Land unavailable	Discounted
SS2/CPS ICOL	Land Unavailable	Discounted
SS3/Green Hills	Loss of amenity space, visual impact, ground conditions, unavailable	Discounted
SS4/Edi Rd South	Loss of amenity space, visual impact, land unavailable	Discounted
SS5/Football pitch	Loss of amenity space, visual impact, land unavailable	Discounted
SS6/Coal Yard North 1	**Potential visual and noise impacts for adjacent residential areas, but subject to mitigation development could be accommodated. Co-location alongside SPEN substation supported by National Planning Framework 3(NPF3)[1]. Consistent with community masterplan[2]. Land available.**	**Shortlisted for Stage 2**
SS7/Coal Yard North 2	**Potential visual and noise impacts for adjacent residential areas, but subject to mitigation development could be accommodated. Co-location alongside SPEN substation consistent with NPF3. Consistent with community masterplan. Land available.**	**Shortlisted for Stage 2**
SS8/Coal Yard	High risk of unacceptable ground conditions / requirement for remediation, land unavailable	Discounted
SS9/ICOL Original	**Principle of land use for a substation was established through original Inch Cape planning permission for this site. Land potentially available**	**Shortlisted for Stage 2**
SS10/SM & Surrounds	Distance from landfall, cultural heritage sensitivities (scheduled monument and wagonway)	Discounted
SS11/Car Wash Site	**Brownfield site. Co-location alongside SPEN substation supported by LDP. Land potentially available.**	**Shortlisted for Stage 2**

3.3.6 The majority of the undeveloped 'brownfield' land around Cockenzie substation, which was part of the former Cockenzie Power Station, is owned by ELC. The ELC Estates Team provided input regarding the availability of the different site options for development. On the basis of the Stage 1 analysis, four site options were taken forward to Stage 2.

[1]Cockenzie is identified as a potential energy hub for the grid connection of offshore wind farms, URL: https://www.gov.scot/publications/national-planning-framework-3/ (accessed 10/02/2021)

[2] Former Cockenzie Power Station & Surrounding Area – Masterplan Report (August 2017)

3.4 Stage 2 – Further Assessment of Site Options and Selection of Preferred Site

3.4.1 Stage 2 comprised a more detailed analysis of those options shortlisted within Stage 1 (**Figure 3.2**). It also proposed a cable corridor between preferred landfall and substation sites. In the case of each shortlisted option the following was identified:

- the key strengths of each option;
- key constraints, i.e. uncertainties to be resolved, either through further studies or assessment;
- site specific requirements, i.e. "non-standard" issues to be addressed; and
- other considerations, i.e. anything else which is noteworthy.

Substation Site Options

3.4.2 Assessed together, SS6 and SS7 were considered to be acceptable in principle due to the availability of sufficient land and the proximity to the grid connection location at Cockenzie substation. However, technical, environmental and planning constraints were also identified including:

- the potential for conflict with existing overhead line infrastructure connecting to Cockenzie substation;
- its close proximity to residential receptors and a play park to the north, which would likely require visual and acoustic screening; and
- its archaeological potential.

3.4.3 Substation site option SS9 is the site of the first planning permission for onshore transmission works associated with Inch Cape Offshore Wind Farm (application reference: 14/00456/PPM), to the south of the former coal storage area. It was shortlisted on the basis of its planning history, which suggested that it would be of a lower risk from a consenting perspective. However, from a cost perspective this site is the most remote option from the preferred landfall, at approximately 1.2 km from the coastline, and would involve an element of "doubling back" of the cable route in order to connect to the existing Cockenzie substation. In addition, the above planning permission was subject to local community opposition, on the basis of perceived impacts on cultural heritage, which would likely be replicated with a new application on this site.

3.4.4 Substation site option SS11, comprising a car wash site, was also considered to be acceptable in principle due to availability of land and the proximity to the grid connection location at Cockenzie substation. While the site currently occupies a car wash business, this is subject to a short term and temporary lease. Site SS11 is also relatively close to neighbouring residential areas and recreational routes (i.e. there is a core path which follows the top of the screen mound located to the north of Atholl Place and Preston Crescent); however the site strengths include:

- visual screening is provided by the existing Cockenzie substation, and the acoustic attenuation bund located to the north of Atholl Place and Preston Crescent;
- the site has sufficient space to maintain the building line set back distance from the B1348 Edinburgh Road;
- It would be possible to access the substation from the existing Coal Yard service road (subject to engineering assessment and possible upgrade) or Edinburgh Road; and

- The site is predominantly brown field, being located within the former Power Station coal yard area and over the footprint of a former gasholder.

3.4.5 On balance substation site option SS11 was considered to be the preferred option both from an environmental, technical and cost perspective.

Landfall Site Option

3.4.6 The preferred landfall option identified at Stage 1 was confirmed as having been suitable for the Inch Cape Offshore Wind Farm onshore transmission works, which was previously approved as part of the first planning permission. Therefore, this provided relative certainty over both the technical feasibility and the associated planning process. A refined site option, located between the previously identified LF5 and LF6 site options, was identified as having the following benefits:

- it would reduce construction phase impacts on surrounding residential receptors by increasing the distance from residential receptors, albeit it is noted that mitigation for noise impacts will still be required (further details are provided in **Chapter 10: Noise**);
- it would avoid crossing third party land, where possible, including the boat club;
- it would minimise activity within the Green Hills area;
- it would maximise efficiency through previously approved Inch Cape Offshore Wind Farm landfall and associated cable route; and
- it would minimise potential impacts on the existing access road and car park at Prestonpans beach.

Recommended Cable Corridor between Preferred Substation and Landfall Sites

3.4.7 Following the above analysis, a cable corridor was recommended within the Site. **Figure 3.3** shows a range of cable route options considered (which relate to the landfall options shown in **Figure 3.1**). The proposed cable corridor was selected on the basis that it takes a direct route through the 'Green Hills' amenity area, thus minimising the extent of disruption during construction. The route would reflect the route of the original Inch Cape Offshore Wind Farm planning permission (ref 14/00456/PPM). The route was previously approved, and therefore the principle of the planning acceptability has been established. In addition, it was recognised that the existing bunding around nearby residential dwellings would reduce construction impacts.

3.5 Conclusions

3.5.1 This chapter provides a summary of the process followed and rationale used in making an assessment of reasonable alternatives to the Proposed Development. In formulating the proposals the Applicant has had regard to a range of environmental, technical and economic criteria. The Proposed Development has selected options for the landfall, onshore cable corridor and substation which seek to minimise environmental effects by providing a short and direct route, whilst also avoiding conflict with other known development proposals (namely the consented Inch Cape onshore transmission works). On this basis, it is concluded that the Applicant has satisfied the requirements of regulation 5(2)(d) of the EIA regulations.

4 Seascape, Landscape and Visual

4.1 Introduction

4.1.1 This chapter considers the likely significant effects on the seascape, landscape and visual resource of the Site and adjoining area associated with the construction and operation phase of the Proposed Development. The effects associated with the construction phase of the Proposed Development on the seascape, landscape and visual resource can be considered to be representative of reasonable worst-case decommissioning effects. Moreover, the Proposed Development would be a long-term, effectively permanent feature and therefore a separate assessment of the decommissioning phase has not been undertaken as part of this assessment.

4.1.2 The seascape, landscape, and visual impact assessment (SLVIA) comprises:

- a description of the scope and methodology utilised in completing the assessment;
- a description of the existing seascape, landscape and visual baseline context and cumulative context and identification of sensitive receptors;
- a discussion of impact generators associated with the construction and operation of the type of development proposed, and their potential to result in significant effects on seascape, landscape and visual receptors;
- a description of design priorities and any mitigation measures proposed to address likely significant seascape, landscape and visual effects; and
- an assessment of residual seascape, landscape and visual effects, including cumulative effects taking into account the influence of design responses and mitigation.

4.1.3 The assessment has been carried out by Bob Bainsfair of Ramboll Limited who is a chartered Landscape Architect with over 25 years of experience working across a wide range of sectors including renewable energy and grid infrastructure and has extensive experience of managing and undertaking seascape, landscape and visual impact assessments (SLVIA), cumulative assessments (CLVIA), and has provided expert witness testimony and written evidence for a number of pubic local inquiries and court proceedings.

4.1.4 The SLVIA is accompanied by a series of figures including:

- Figure 4.1a: Topographical Analysis
- Figure 4.1b: Zone of Theoretical Visibility and Assessment Viewpoint Locations;
- Figure 4.2a: Viewpoint 1 – Preston Links Mound (baseline and operational view);
- Figure 4.2b: Viewpoint 1 – Preston Links Mound (baseline and cumulative view);
- Figure 4.3: Viewpoint 2 – John Muir Way, north of visitor car park (baseline photograph);
- Figure 4.4a: Viewpoint 3 – B1348, Prestonpans (baseline and operational view);
- Figure 4.4b: Viewpoint 3 - B1348, Prestonpans (baseline and cumulative view);
- Figure 4.5: Viewpoint 4 – B134, Cockenzie (baseline photograph);
- Figure 4.6: Viewpoint 5 - Whin Park Road, On the Edge of Cockenzie (baseline photograph);
- Figure 4.7: Viewpoint 6 - B6371 - East of Proposed Development baseline photograph);
- Figure 4.8: Viewpoint 7 - CP146 on Screen Mound, North of Preston (baseline photograph);

- Figure 4.9: Viewpoint 8 - Vantage Point by Meadowmill (baseline photograph);
- Figure 4.10a: Viewpoint 9 - Former Cockenzie Power Station Site (baseline and operational view);
- Figure 4.10b: Viewpoint 9 - Former Cockenzie Power Station Site (baseline and cumulative view);
- Figure 4.11a: Viewpoint 10 - Edge of Cockenzie Conservation Area (baseline and operational view);
- Figure 4.11b: Viewpoint 10 - Edge of Cockenzie Conservation Area (baseline and cumulative view);
- Figure 4.12a: Viewpoint 11 - Cockenzie Harbour Pier (baseline and operational view);
- Figure 4.12b: Viewpoint 11 - Cockenzie Harbour Pier (baseline and cumulative view);
- Figure 4.13a: Viewpoint 12 - CP146 on Screen Mound at Northern Edge of Prestonpans (baseline and operational view) and
- Figure 4.13b: Viewpoint 12 - CP146 on Screen Mound at Northern Edge of Prestonpans (baseline and cumulative view).
- Figure 4.14: Core Paths

4.1.5 The SLVIA is also accompanied by Technical Appendix 4.1: Viewpoint Assessment.

4.2 Scope of Assessment

4.2.1 This chapter considers the potential for likely significant effects of the Proposed Development, as described in Chapter 2: Development Description, on:

- Landscape fabric, including the foreshore area in the Site;
- Seascape and landscape character;
- Landscape designations and classifications; and
- The visual amenity of:
  - Residential receptors to include neighbouring settlements;
  - Road users;
  - Passengers/mariners on vessels on the Firth of Forth; and
  - Recreational receptors (including the John Muir Way and locally important rights of way).

4.2.2 The chapter assesses the effect of the Proposed Development on the existing baseline context as well and also establishes likely 'in-addition' and 'in-combination' cumulative effects when considered in addition to similar existing developments and the consented but currently unbuilt Inch Cape substation.

4.2.3 The scope of the assessment has been informed by consultation responses and professional guidelines in:

- The Landscape Institute and Institute of Environmental Management & Assessment, 2013. Guidelines for Landscape and Visual Impact Assessment, 3rd ed. Abingdon: Routledge (GLVIA3);
- The Countryside Agency and Scottish Natural Heritage (2002); Landscape Character Assessment; and
- Landscape Institute (2019) Photography and Photomontage in Landscape and Visual Impact Assessment - Technical Guidance Note.

4.2.4 Table 4.1, below, summarises the consultation responses received regarding seascape, landscape and visual impacts and provides information on where and/or how they have been addressed in this assessment.

4.2.5 Full details on the consultation responses can be reviewed in Technical Appendix 1.1: Consultation Register.

Table 4.1: Consultation

Consultee and Date	Issue Raised	Response / Action Taken	Where issue is addressed in EIAR
East Lothian Council (ELC) November 2020	ELC suggested the following viewpoints: ▪ Viewpoint from the top of Preston links mound coordinates; 339185E, 675243N and a viewpoint from the John Muir Way coordinates; 339220E, 675368N. ▪ Viewpoint from the edge of Cockenzie conservation area coordinates; 339729E, 675536N. ▪ Viewpoint from Cockenzie Harbour Pier, coordinates; 339840E, 675716N. ▪ Viewpoint from the path on top of mound to north of 23 Appin Drive, coordinates 339451E, 674980N. ▪ Viewpoint inside former coal power Site looking s 339453E, 675624N because it gives a good 180 panoramic of the three adjacent grid development Sites.	The suggested viewpoints have been included in the SLVIA.	An assessment of impacts on the selected viewpoints is provided in TA4.1.

Potential Effects Scoped Out

4.2.6 The scope of this assessment takes account of the committed mitigation measures both incorporated into the design and those standard construction and decommissioning mitigation measures incorporated into the Proposed Development, as described in Chapter 2: Development Description, and Technical Appendix 2.2: Outline Construction Environmental Management Plan. Table 4.2, below, summarises the issues scoped out of the assessment:

Table 4.2: Issues Scoped Out of EIA

Potential Effect	Basis for Scoping Out
Decommissioning of the Proposed Development	The effects associated with the construction phase of the Proposed Development are considered to be representative of a reasonable worst-case decommissioning effects, therefore a separate assessment of the decommissioning phase has not been undertaken as part of this assessment. Moreover, the Proposed Development would be a long-term, effectively permanent feature and so there is considerable uncertainty as to the timing of any decommissioning of the development.

4.3 Assessment Methodology and Significance Criteria

Extent of the Study Area

4.3.1 The study area adopted for the SLVIA would comprise:

- the interior of the Site;
- an area extending 0.5 km out from the boundary of the access development zone from the B6371 which would include neighbouring residential areas as well as parts of the Battle of Prestonpans Site and Seton Mains;
- an area extending up to 0.5 km from the onshore export cable development zone and temporary construction compound development zone, including sections of the coast and town along the B1348 between Mackie Rocks and Cockenzie harbour, including sections of the John Muir Way; and
- a 1 km radius from the substation development zone.

4.3.2 This is considered proportionate and sufficient with which to capture potentially significant effects for such a development given its seascape and landscape context.

Method of Baseline Characterisation

Desk Study

4.3.3 Initially, a desk study was undertaken to establish the baseline context of the Proposed Development, this considered physical components of the landscape (i.e. landscape fabric) as well as the distinctive recognisable patterns of elements that form the landscape character of the area and of designated and classified landscapes. Visual elements and receptors/receptor locations were also identified including settlements, transportation corridors and recreational trails and summits, as well as specific seascape and landscape character types and designated areas.

4.3.4 Seascape and landscape character and designation data were derived from Supplementary Planning Guidance (SPG) on Landscape Character (Special Landscape Areas SPG Part 1, Part 2 and Part 3) and augmented by further characterisation as necessary, to reflect the specific characteristics of the seascape and landscape in and around the Proposed Development.

Field Survey

4.3.5 Field reconnaissance was undertaken during December 2020 and January 2021 to:

- Verify baseline findings and the location of sensitive receptors; and
- Select assessment viewpoints.

Criteria for the Assessment Effects

Criteria for Assessing the Sensitivity of Receptors

4.3.6 The sensitivity of the seascape/landscape to the type of development proposed is defined as High, Medium or Low based on professional interpretation of a combination of its susceptibility to change associated with the type of development proposed, and the value attributed to the seascape and landscape. The following parameters were therefore applied in determining the susceptibility of the seascapes and landscapes within the study area:

- Seascape/Landscape quality and condition;
- Existing land-use;

- The pattern and scale of the seascape/landscape;
- Visual enclosure/openness of views and distribution of visual receptors;
- The scope for mitigation, which would be in character with the existing seascape and landscape; and
- The degree to which the particular element or characteristic contribution to the seascape and landscape character can be replaced or substituted.

4.3.7 In determining value, the SLVIA uses, as its primary indicator, formal landscape designations. Where other clearly defined indicators were identified, these have also been referred to, including matters pertaining to the factors identified in Box 5.1 on page 84 of GLVIA3.

4.3.8 Visual receptor sensitivity is also defined as High, Medium or Low based on an interpretation of a combination of parameters, and also relates to the susceptibility and value ascribed to visual receptors or receptor locations.

4.3.9 The following criteria were utilised in determining viewpoint sensitivity:

- The land use or main activity at the viewpoint/receptor location;
- The frequency and duration of use of receptor location; and
- The seascape and landscape character and quality.

In relation to land use at the viewpoint, visual sensitivity is defined in Table 4.4, below.

Table 4.4: Sensitivity in relation to Receptor Type and Activity

Sensitivity	Receptor Type and Sensitivity
High	▪ Tourists and those engaged in outdoor recreational activities for which the seascape/landscape and views form a key part of their experience, including walkers and tourists to formal vantage points; ▪ Passengers and tourist travelling on key routes; ▪ Passengers on trains and ferries where visual amenity and scenic qualities form an integral part of receptors experience and expectations; ▪ Walkers on strategic recreational footpaths or on hills, cycle routes or rights of way; ▪ Tourists to landscapes/sites that have a strong physical, cultural or historic connection with the landscape or a particular view; and ▪ Residential receptors at individual dwellings and within settlements.
Medium	▪ Local road users/commuters whose are generally travelling alone and/or are focused on the road rather than the adjoining landscape or seascape.
Low	▪ People engaged in outdoor sports or recreation (other than appreciation of the seascape/landscape); and ▪ Receptors located in commercial and retail buildings, industrial complexes, and other locations where people's attention may be focused on their work or activity.

Criteria for Assessing the Magnitude of Impacts

4.3.10 The magnitude of impact arising from the Proposed Development may be described as Substantial, Moderate, Slight, Negligible or None based on the interpretation of a combination of largely quantifiable parameters, as follows:

- The distance of receptors from the Proposed Development;
- The duration of the predicted change and whether it is reversible;
- The size and scale of the change anticipated;

- The geographical extent of the study area, seascape/landscape character unit, designation or route that would be affected;
- The angle of view in relation to main receptor activity;
- The degree of contrast represented by the Proposed Development in the context of the baseline seascape/landscape or view;
- The background context to the Proposed Development; and
- The extent and nature of other built development visible.

4.3.11 Table 4.5, below, provides a brief definition for different magnitudes of impact.

Table 4.5: Magnitude of Impact	
Magnitude	Definition
Substantial	Total loss or considerable alteration/interruption of key elements, features or characteristics of the seascape/landscape character and/or composition of views resulting in a substantial change to baseline conditions.
Moderate	Notable partial loss or alteration to one or more key features or characteristics of the baseline, resulting in a prominent, but localised change within a broader unaltered context.
Slight	Discernible loss or alteration to one or more key elements, features or characteristics of the baseline conditions. Change arising from the loss/alteration would be discernible but underlying seascape/landscape character or view composition would be broadly consistent with baseline.
Negligible	Very limited or imperceptible loss or alteration to one or more key elements/characteristics of the baseline. Change may be barely discernible.
None	No aspect of the Proposed Development would be discernible. The Proposed Development would result in no appreciable change to the seascape/landscape resource or view.

Criteria for Assessing Cumulative Effects

4.3.12 Table 4.6, below, provides a brief definition for different magnitudes of cumulative impact.

Table 4.6: Magnitude of Cumulative Impact	
Magnitude	Definition
Substantial	The Proposed Development would represent a considerable or possibly fundamental increase in the influence of grid infrastructure development on the character of the seascape/landscape and/or the composition of views.
Moderate	The Proposed Development would represent a notable and possibly considerable increase in the influence of grid infrastructure development on the character of the seascape/landscape and/or the composition of views. Moderate cumulative impacts may, however, equate to a localised change within an otherwise unaltered context.
Slight	The Proposed Development would represent a minor addition to the influence of grid infrastructure development on the character of the seascape/landscape and/or the composition of views. The change would be discernible, but the original baseline conditions would be largely unaltered.
Negligible	The Proposed Development would represent a barely discernible addition to influence of grid infrastructure development on the character of the seascape/landscape and/or the composition of views. The baseline condition of the seascape/landscape or view would, for all intents and purposes, be unaffected.
None	No other cumulative development would be apparent.

4.3.13 In assessing potential cumulative seascape/landscape and visual effects, consideration has been given to cumulative effects arising from combined and/ or consecutive (concurrent)

visibility (where the observer is able to see two or more developments from one viewpoint location), and sequential effects (where a number of similar developments would be visible individually or simultaneously over a sequence of connected viewpoints, such as would be found along a road or footpath).

4.3.14 Consideration has also been given to the 'in-addition' effects attributable specifically to the Proposed Development, as well as its 'in combination' effect, where the combined effect of the Proposed Development and other cumulative developments are taken into account. For the purposes of the SLVIA cumulative effects are concerned with the Proposed Development in conjunction with existing/operational developments such as the Cockenzie substation, as well as consented, but currently unbuilt developments, such as the proposed Inch Cape substation.

Criteria for Assessing Significance

4.3.15 Table 4.7 illustrates how residual effects are determined by comparison of the sensitivity of receptors with the magnitude of predicted change. For the purposes of this assessment significant seascape, landscape or visual effects are Major or Major/Moderate. It should be noted, however, that significant effects in seascape, landscape and/or visual terms can be localised without being significant overall. Where localised significant effects are predicted this is made clear, and a separate assessment made as to the significance of such effects on the wider resource of the affected seascape and landscape character types, designated areas settlements, transportation and recreational routes.

Table 4.7: Residual Effects

Seascape, Landscape and Visual Sensitivity	Magnitude of Impact				
	Substantial	Moderate	Slight	Negligible	None
High	Major	Major/Moderate	Moderate	Moderate/ Minor	None
Medium	Major/Moderate	Moderate	Moderate/Minor	Minor	None
Low	Moderate	Moderate/Minor	Minor	Minor/None	None

4.3.16 In line with the recommendations in the GLVIA3, the matrix above was not used as a prescriptive tool or arithmetically, and the methodology and analysis of potential effects at any particular location must allow for the exercise of professional judgement. Descriptions of residual effects, especially those considered significant, are described in narrative text.

4.3.17 Seascape, landscape and visual effects can be adverse (i.e. having a detrimental effect on the physical elements, character and visual amenity of the area) or beneficial (i.e. having a positive effect on the seascape/landscape and visual amenity of the area through strengthening or augmentation of baseline conditions and/or improvement of the existing seascape/landscape or views). For the purposes of this assessment residual effects are assumed to be adverse, unless stated otherwise.

Limitations and Assumptions

4.3.18 The SLVIA has been prepared in accordance with current standards and guidance. Commercially obtained data utilised in the preparation of the SLVIA has a number of inherent tolerances and limitations. Where this is relevant to the findings of the assessment it is stated.

4.3.19 The cumulative assessment component of the SLVIA that includes consideration of the existing Cockenzie substation, and the consented Inch Cape substation was based on information available at the time of the preparation of the assessment. At the time of the preparation of the SLVIA insufficient detailed design for the Inchcape substation was available (no further applications for the approval of matters specified in conditions have been made) and so it has been represented by translucent rectangle that represents its maximum development envelope instead.

4.3.20 The Zone of Theoretical Visibility (ZTV) in Figure 4.1b was produced using a 50 cm interval Digital Surface Model in order to capture the screening effect of existing structures, localised topographical features that aren't represented in Digital Terrain models, as well as structural vegetation. However, the ZTV records visibility from a number of locations that aren't receptor locations (e.g. the edge of tree lines and the rooflines of a number of residential properties in Prestonpans). Such locations should therefore be disregarded for the purposes of understanding the visual impact of the Proposed Development.

Measurement

4.3.21 Unless stated otherwise, all measurements pertaining to the distance of receptors from the Proposed Development are based upon distance to the substation buildings. Where measurements pertain to Seascape and Landscape Character Areas, designations and classifications, the measurement given relates to the nearest section of the landscape character type or designated/classified area boundary to the Proposed Development, which may not be subject to potential views of the Proposed Development. This is important because effects experienced within such areas may could occur at a considerably greater distance, with corresponding consequences for the level of residual effect.

Verification of Findings

4.3.22 The findings of Technical Appendix 4.1: Viewpoint Assessment have informed and verified the findings of the SLVIA in respect of operational effects.

4.4 Baseline Conditions

Current Baseline

Landcover and Landuse

4.4.1 The Site covers an area of approximately 0.24 km^2 and is located on the coast of the Firth of Forth, on open land between the towns of Prestonpans and Cockenzie, in East Lothian, approximately 15 km east of Edinburgh. The Site covers an area extending from the foreshore at the northern end of Prestonpans Beach, through the currently open grasslands of Preston Links, to a brownfield site area immediately abutting the existing Cockenzie substation (part of the former Cockenzie Power Station), and extends eastwards through a highly modified landscape as far as the B6371.

4.4.2 The Site is bisected by the B1348 which connects Levenhall to Longniddry and is bound by the B6371, which runs north-south to the east of the Site, between Cockenzie and the A198 at Tranent.

4.4.3 The nearest residential properties to the Site are located along Whin Park to the north east, on the B1348 in Prestonpans and along Atholl View to the south west, albeit the properties on Atholl View have little interaction with the Site due to the intervening bund. In addition to

residential properties, the Whin Park industrial estate is located immediately north of the Site and a dental surgery and health centre is located immediately west, in Prestonpans.

4.4.4 Currently, the Site represents brownfield land and mostly comprises rough grassland with small areas of self-seeded trees and regenerating vegetation, and service access tracks and grid infrastructure in the form of overhead power lines. However, at the westernmost end of the Site landcover is dominated by open grasslands and the B1384 carriageway and the foreshore of the Firth of Forth. At the eastern end of the Site screening landforms, and structure vegetation associated with the mitigation an earlier coal store are prominent features.

4.4.5 Section 4.7 (paragraphs 4.7.1 and 4.7.11) of the SLVIA addresses potential construction and operational effects on the landscape fabric of the Site.

Seascape and Landscape Character

4.4.6 The seascape and landscape character of the Site and adjoining area is described in Part 1 of the East Lothian Local Development Plan – Special Landscape Areas Supplementary Planning Guidance (SPG) which was adopted by ELC in 2018.

4.4.7 The Proposed Development is located within the Coastal Margins – Musselburgh/Prestonpans fringe seascape/landscape character area which extends from the eastern margins of Edinburgh in the west to the eastern side of Port Seton in the east.

4.4.8 It is defined by the Tranent Ridge and Settled Farmland to the south and includes the lower floodplain of the River Esk. Its geology is mainly sedimentary overlain with marine deposits and raised beaches close to the coast. The coastline consists of a sandy beach at Fisherrow and the open mudflats and mussel beds of the River Esk estuary. Land has been reclaimed at Musselburgh with waste ash from the former Cockenzie Power Station to form an extensive area of lagoons separated from the sea by a concrete retaining wall. At Prestonpans and Cockenzie and Port Seton the foreshore consists low rocky platforms and small rocky headlands.

4.4.9 The coastal strip is almost continuously settled however inland there are some large arable fields of prime agricultural land divided by broken hedgerows and fences with occasional hawthorn or beech hedgerow trees. The area between Musselburgh and Prestonpans contains both the policy woodlands of Drummohr House and the wooded grounds of the Royal Musselburgh Golf Course, which is protected by tree preservation orders. The links landscape to their north skirts the coast from Fisherrow links to Musselburgh Racecourse and onto Morrison's Haven at Prestonpans. The designed landscapes of Newhailes House and Pinkie House create green open spaces within the heart of the urban settlement of Musselburgh and the River Esk itself provides a green although narrow corridor through the town.

4.4.10 The majority of the area is settled with the burgh town of Musselburgh spanning the mouth of the River Esk to the west with its harbour at Fisherrow. Prestonpans, Cockenzie and Port Seton are also located adjacent to the coast and have a strong relationship with it. Historically the fishing industry has been important and harbours at Cockenzie and Port Seton remain in use today. The historical harbour at Morrison's Haven was used as a port for the brickworks and mining industry still evident at Prestongrange. The villages have continued to expand with modern housing developments due to their proximity to Edinburgh. Wallyford to the southeast of Musselburgh was a traditional mining village that has expanded considerably in recent years with new housing due to its location close to the transport routes into Edinburgh. The historic building of Bankton House is visible to the north of the A1 as you pass

Prestonpans. The attractive inventory Garden and Designed Landscapes at Newhailes and Pinkie and wooded Drummohr designed landscape breaks up the built development.

4.4.11 The Proposed Development is partly within the Prestonpans Inventory Battlefield which is listed in the Scottish Government's national inventory of significant battle sites. Potential direct and indirect (setting) effects on the Inventory Battlefield are covered in Chapter 8: Cultural Heritage and Archaeology.

4.4.12 The former Cockenzie Power Station, a previously dominant landmark, has been demolished leaving a brownfield site. However, the area continues to demonstrate a predominance of energy infrastructure and the remnants of previous developments, including the ash lagoons. There are pylon lines and major transport routes throughout the area, and the existing substation building at Cockenzie, which lies immediately adjacent to the Site.

4.4.13 The SPG cites the following *"positive elements"* of this area as including:

- River Esk floodplain and parkland;
- Mature woodland and open land of designed landscapes;
- Fields of prime agricultural land which are being significantly reduced in area due to settlement expansion important in providing settlement setting;
- Open land within/between settlements providing landscape variety, settlement setting and reducing the appearance of coalescence;
- Estate landscapes and boundary features;
- Coastal scenery and habitats; and
- Open views across the area to the Firth of Forth, Fife and Edinburgh.

4.4.14 The SPG cites the following factors as "negative attributes":

- Dominant urban and industrial character including high voltage pylon lines, especially between settlements;
- High visual sensitivity of flat unwooded terrain increases visual impact of new development; and
- Residential expansion pressures on coastal villages.

4.4.15 Key priorities identified in the SPG for this area comprise:

- Retention of the wooded character at Drummohr and Prestongrange;
- Retention of the diversity of species in any new woodland planting should be increased;
- Management of existing woodland to avoid over-reliance on singular species to avoid loss of large areas of woodland due to disease e.g. ash dieback, Dutch elm disease, red needle blight;
- Retention of the open character of Fisherrow Sands;
- Retention of the elemental appearance of areas of rocky coastline;
- Promotion of tree and woodland planting to integrate existing and new built development with the surrounding countryside and within the urban area and to reduce appearance of coalescence of built development;
- Long term management of important estate landscape features;
- Promotion of integrated coastal zone management strategy balancing visitor management, tourism, recreation and other development while avoiding adverse impact on the integrity of and maintaining the interest of the Natura 2000 network;

- Reclamation of ash lagoons;
- Protection of bird reserves; and
- Preservation and restoration of traditional stone wall and hedge field boundaries.

4.4.16 Section 4.7 (paragraphs 4.7.2, 4.7.3, and 4.7.12 to 4.7.14) of the SLVIA identifies the residual effects of the Proposed Development on the key characteristics of this character area and whether it is consistent with the priorities of the SPG's priorities.

Landscape Designations

4.4.17 The study area does not contain nationally important landscape designations or classification, but does contain parts of Prestonpans Coast Special Landscape Area (SLA) which covers the westernmost part of the Site. The special qualities of this SLA are described in Part 3 of the SPG as follows:

"The rocky foreshore contains geological features along its length featuring sedimentary and volcanic rocks. It is an excellent example of Carboniferous fluvial sedimentary rocks with regional stratigraphic significance. The Johnny Moat stone, a large blue whinstone rock deposited by a glacier and named after the 17th century harbourmaster is a feature of the shore. Local folklore has it that "as long as the Johnny Moat Stone stands on its rock, the town will flourish". Its fall from its stand in 1952 seemed to bear out the legend, predating as it did the closure of many local industries – colliery, brickworks, potteries. It has now been put back in place after another more recent fall.

The area has a distinctive relationship with the sea. The houses of Prestonpans extend to the rocky edge of the shore, with Rock Cottage sitting proudly above the foreshore, creating a dramatic juxtaposition of natural wildness with the built environment. The closes between houses allow for framed views of the coast from within the town, reinforcing the town's coastal character.

The Green Hills at Preston Links are important for recreation, providing large open green space easily accessible from the neighbouring towns with raised views along the coast and out over the Firth of Forth. These were identified by many respondents in the public consultation as a popular local resource for many activities as well as for good views along the coast.

The John Muir Way follows the line of the coast through this area.

There are panoramic views over the Firth of Forth and Musselburgh to Edinburgh, Arthurs Seat and the Pentland Hills to the west, as well as to Fife and in some parts, toward the open sea

A very historic area with strong links to the sea. Although now landscaped and filled-in, Morrison's Haven remained a busy harbour right up until the 1920s, exporting coal and bricks. Originally known as Aitchison's Haven it was built in 1526 to export the salt panned at nearby Prestonpans. By 1796, it rivalled Leith in importance, supporting the various industries of Prestonpans – coal exports, glass, tile and brick factories, a flint mill, and it had both a weekly market and an annual fair. The links, partly on the reclaimed land here, is an open area popular with dog walkers and has an abundance of coastal flowers.

Prestongrange is a site of major importance in the story of Scotland's Industrial Revolution. Over the centuries, the Site has been a harbour, glass works, pottery, coal mine and brick works. You can still see remnants of these former industries, and many of the structures are still intact. These include the rare Hoffman Kiln built in 1937 and the Cornish Beam Engine, unique in Scotland as the only beam engine still on the Site where it worked.

The woodlands to the west of Prestonpans set on raised land provide a strong scenic green backdrop to the town when viewed from the coast, also providing a habitat for deer and other

small mammals close to the built settlements. Areas of the woodland especially at Drummohr are identified as ancient woodland. Their importance is recognised by the tree preservation orders protecting them.

Drummohr House itself is a locally identified designed landscape. Its policy woodlands to the north of the house provide the setting for the old carriage drive entrance from Westpans, with mature trees surrounding the house and framing its outlook to the south.

The development of Cockenzie Power Station, to the east of Prestonpans, in the 1960s led to the installation of a pipe to take the waste ash to the reclaimed land at the ash lagoons to the west of Morrison's Haven. This forms the coastal path along the rocky shore to the north of Prestonpans. This path, which is identified as a right of way, enables a sea level walk at low tide providing a dramatic, although often slippery, route passed the many named rocks along the foreshore and views along the coast and over the Firth of Forth. Right of Way along the pipeline walkway along the top of the rocks to the north of the sea wall with the boundary of Prestonpans.

Wildlife is abundant from the seals hauled out on the rocks to the myriad of sea birds bobbing on the water or circling overhead. The coastal grasslands at Morrison's Haven provide another habitat important for insects, butterflies and nesting birds. Morrison's Haven provide another habitat important for insects, butterflies and nesting birds."

The SPG provides guidelines for development. These are addressed in the assessment of residual effects on the SLA, in Section 4.7 (paragraphs 4.7.4, 4.7.5, 4.7.15 and 4.7.16) of the SLVIA. The guidelines in the SPG are as follows:

- *Any proposed development must not harm the coastal character of the area and characteristic features of the area.*
- *Any proposed development must not harm the habitat and openness of the coastal grasslands.*
- *Any proposed development must not harm the mature setting of the woodlands to the west of Prestonpans.*
- *Any proposed development must not harm open views out from the coastline, particularly from the John Muir Way, Sustrans cycle route 76, the B1348, the rocky foreshore, including views westwards towards Edinburgh and the Forth Bridges.*
- *Any proposed development must not harm the operation of natural coastal processes other than where sea defences are needed to protect important infrastructure and reclaimed land.*
- *Any proposed sea defences must not harm the scenic appeal of the relationship of the foreshore with the built environment.*
- *Any proposed development must not harm the openness and natural appearance of the areas of reclaimed land at Preston Links (the Green Hills) and the Morrison's Haven Links and their value for informal recreation and as part of the landscape setting for Prestonpans."*

Visual Amenity

4.4.18 The key road transport routes in the study area comprise:

- The B1348 extends along the coastal between Prestonpans and Cockenzie, and is linked to the wider coastal network of roads along the southern side of the Firth of Forth and the eastern coast of southern Scotland; and
- The B6371, which links Cockenzie to Tranent.

4.4.19 The study area contains a number of recreational routes that would be subject to potential views of the Proposed Development, including:

- National Cycle Route (NCR76): This nationally important recreational route starts at Kirkcaldy in Fife and traces the Fife coast, extending westwards to the upper reaches of the Forth before turning eastwards at Stirling, to following the southern side of the Forth. The route connects Edinburgh to the commuting towns of Musselburgh, Port Seaton and Cockenzie and Haddington, in the east, thereafter extending along the eastern coast to Berwick on Tweed.
- The John Muir Way: The John Muir Way stretches 134 miles or 215 km across Scotland's heartland, running between Helensburgh in the west through to Dunbar on the east coast and Muir's birthplace.
- Core Path (CP) 440: Prestonpans, which coincides with a section of the John Muir Way.
- CP276: Which extends along part of the John Muir Way between the B1348 and Cockenzie Harbour, before returning to the B1348 carriageway.
- CP146: Which extends along the top of a screen mound that encloses the northern and eastern sides of Atholl View residential area.
- CP284: Which crosses the Site and extends north-eastwards to Cockenzie.
- CP147: Which follows the northern part of the B6371, east of the Site.

4.4.20 The amenity of NCR76, the John Muir Way, and CP270 is derived, to a large extent, from their position and role in the long-range coastal access and seaward views. Similarly, CP146 provides extensive views across the settled coastline of East Lothian to the open waters of the Firth of Forth and Fife to the north. CP147 and CP248, in contrast, are inland routes that have restricted view towards the coast and are short range routes that a primarily utilised for local community connectivity rather than recreational access. Whilst the coastal and inland routes described differ in respect of their character and position, they are all subject to the substantial longstanding influence of urban forms as well as large scale energy and grid infrastructure.

4.4.21 Section 4.7 (paragraphs 4.7.6 to 4.7.10, 4.7.17 and 4.7.18) of the SLVIA assesses potential construction and operational effects of the Proposed Development on the visual amenity of the study area and its constituent visual receptors.

Future Baseline

4.4.22 In the event of the Proposed Development not going ahead the Site is likely to undergo some form of light industrial development as it is located in an area allocated in the East Lothian LDP for such uses and which are already subject to the influence of a number of energy and grid infrastructure projects.

Summary of Sensitive Receptors

Table 4.8: Summary of Receptor Sensitivity

Receptor	Sensitivity	Justification
Seascape/Landscape Character	Variable. High in coastal locations and medium inland	The more open sections of coastline north of Prestonpans Beach where the removal of the Cockenzie Power Station has re-established an open and coastal edge that has increased susceptibility to the type of development proposed.

Table 4.8: Summary of Receptor Sensitivity		
Receptor	Sensitivity	Justification
		In contrast, locations to the south of the B1348 carriageway are typified by large scale buildings and grid infrastructure and which have reduced value and susceptibility.
Landscape Designations: Prestonpans Coast SLA	High	Whilst subject to the influence of existing urban, peri-urban and industrial forms the SLA is valued for its cultural and natural heritage qualities as well as its open coastal character and the resource it represents to local communities as well as visitors.
Settlement and residential receptors in Prestonpans and Cockenzie	High in respect of views from residential properties and areas of public access and public realm.	Duration and permanence of outlook, value of views from residential properties.
Road Users	Ranging from Medium in respect of general road users and commuters to High in respect of tourists (e.g. on the B1348 coastal road).	Receptors expectation and basis of amenity of different road users. Commuters and those travelling alone are less likely to focus on views across the adjoining landscape.
Recreational receptors including: ▪ Cyclists on NCR76; ▪ Walkers on - the John Muir Way; - CP440; - CP276; - CP146; - CP284; - CP147; and - The vantage point by Meadowmill.	Generally High.	Such recreational routes provide valuable access and connections to neighbouring communities as well as coastal environments. The elevated vantage point by Meadowmill is a promoted vantage point.

4.5 Assessment of Likely Effects

4.5.1 Aspects of the Proposed Development with the potential to result in seascape, landscape and visual effects include:

- One shore end export cable from the Seagreen Offshore Wind Farm would cross the Mean Low Water Spring mark and run underground through the intertidal area to the transition joint bay;
- Transition joint bay (TJB), located south of the beach where the shore end export cable would interface with the onshore export cable;
- Onshore export cable, running from the transition joint bay to the onshore substation;
- Joint bay and temporary pulling pits, for installation of the onshore export cable
- Substation structures and platform;
- Construction compound and laydown areas; and
- Access and Site tracks.

4.5.2 These aspects are considered in respect of potential construction and operational effects below.

Potential Construction Effects

4.5.3 The shore end export cable will be installed using a trenchless installation technique, (i.e. requiring no construction works on the beach/in the intertidal area). By using trenchless construction there would be no apparent impacts on the seascape, landscape character or visual amenity of the area. On this basis no long term discernible seascape, landscape or visual impacts are anticipated in respect of this aspect of the Proposed Development.

4.5.4 The TJB bay would be a buried chamber comprising a concrete plinth, where the cables and joints are anchored, with concrete walls. Additional steel reinforcements may be added if necessary. This is likely to pose only localised and short duration impacts on landscape fabric, character and amenity. Such effects are unlikely to be significant.

4.5.5 The onshore export cable would be buried using open cut trenching over unobstructed ground, or trenchless technology where necessary. Where open cut trenching is used, the typical cable trench dimensions would be approximately 1.5 m width x 2 m depth. The maximum cable trench working width would be 20 m, allowing for temporary soil stockpiles, drainage, 5 m access track and working areas around the cable trench. At this stage the cable working corridor could be anywhere within the onshore export cable development zone. Given the short duration and temporary nature of construction impacts associated with this aspect of the Proposed Development, the construction effects are not anticipated to be significant.

4.5.6 Up to one joint bay would be needed to join together lengths of cable along the onshore cable route. The detailed design would be customised so that the joint bay location is situated in a preferable location or to comply with access restrictions. The exact location of the joint bay would be defined following the detailed design. The maximum joint bay dimensions would be 10 m length x 4 m width; with a depth of up to 3.0 m. The joint bay would be marked by post and wire fencing. The excavation required for the joint bay would be of relatively small scale, and present for a short duration, the site of the bay being reinstated shortly after backfilling of the bay. In this context, effects on landscape fabric landscape fabric, character and amenity are unlikely to be significant.

4.5.7 The substation platform would have a maximum footprint of approximately 22,000 m^2. Electrical infrastructure and buildings housing electrical infrastructure, a control suite and welfare facilities would be located on the substation platform with a maximum height of 18 m. The construction of these aspects of Proposed Development is likely to represent the largest scale and most visible aspects of the Proposed Development and to last for a short to medium duration (estimated to be approximately 100 weeks in total) during which there is potential for impacts on:

- the landcover and topography and condition of the Site;
- the character of the Site and adjoining waterfront and hinterland; and
- the visual amenity of passengers/mariners on vessels on the Firth of Forth, local recreational receptors, road users, residential receptors.

4.5.8 CP284, which currently bisects the Site, would need to be permanently diverted outwith the Site, with consequent impacts on its alignment and effects on the amenity of this route.

4.5.9 With the exception of the direct impacts on CP284, seascape, landscape and visual impacts would arise primarily from disturbance associated with a combination of:

- temporary working areas at the TJB compound;
- temporary site construction compound and associated parking and offices/welfare facilities;
- security fencing and construction lighting;
- site clearance and earthworks;
- construction of foundations and site structures;
- site plant and, haulage vehicles;
- site cranes; and
- reinstatement works.

4.5.10 However, views of these elements would be screened from the north east, east and southeast either partially or fully by the existing Cockenzie substation building and the existing acoustic screen mounding to the southwest, south and southeast of the Site, with consequent containment of landscape and visual effects. Moreover, the construction impacts would be of short to medium term duration and would cease following completion of construction activities and be replaced by operational impacts and as such are not expected to cause significant seascape, landscape, or visual effects.

Potential Operational Effects

4.5.11 Upon completion of the construction and commissioning works at the Site and the reinstatement of the areas of disturbed ground, the principal source of seascape, landscape and visual impacts would be:

- the substation structures;
- site infrastructure;
- site security fencing;
- access and Site tracks; and
- internal and external lighting.

4.5.12 The proposed substation and associated structures and built forms are likely to constitute a substantial change to the existing landcover and condition of the central section of the Site and to cause the permanent diversion of CP284. They are also likely to extend existing impacts associated with the Cockenzie substation and remnants of the earlier power station site. It is also the case that there is potential for the Proposed Development to be inconsistent with the established pattern, form, scale and colour of existing built forms or the established roofline of the area. However, such differences are unlikely to represent a significant effect on the character of the seascape and landscape of the area. Moreover, this context, coupled with the partial visual containment of the Proposed Development to the north, southwest, south and southeast mean that the influence of the operational development would be geographically limited. In this context, no significant effects on the visual amenity of the area are anticipated.

Potential Cumulative Effects

4.5.13 The Inch Cape substation has a Planning Permission in Principle, however there is no certainty regarding the timescale for construction. If the construction programmes were to overlap, there would be the potential for additional and in combination cumulative effects. In particular there may be the need for temporary diversion of the John Muir Way. The combined construction impacts would be of short to medium term duration and would cease following

completion of construction activities and as such are not expected to cause significant seascape, landscape, or visual effects.

4.5.14 Similarly, the consented Inch Cape substation if constructed by the time the Proposed Development commences, would represent part of the established baseline. The SLVIA therefore addresses the implications of the addition of the Proposed Development to this future baseline, and the effect of all of the substation developments on the character and visual amenity of the area.

4.6 Mitigation

Mitigation during Construction

4.6.1 Given that no significant construction impacts on seascape, landscape and visual receptors are anticipated no additional mitigation is required outside of that provided for in the outline Construction Environmental Management Plan (CEMP) in Technical Appendix 2.2.

4.6.2 Site lighting utilised during the construction of the Proposed Development would be minimised and carefully designed and controlled to minimise impacts such as glare, light spill and intrusion on neighbouring receptor locations. A lighting specification based on the Institute of Lighting Professionals (2020) Guidance Note 1 for the reduction of obtrusive light would be agreed with ELC prior to commencement of construction operations at the Site.

Mitigation during Operation

4.6.3 No significant operational impacts on seascape, landscape and visual receptors are anticipated and so no additional mitigation measures are required outside of that provided for in the design of the Proposed Development, as described in Chapter 2: Development Description. As this EIA accompanies an application for Planning Permission in Principle, it is anticipated that suitably worded conditions will be attached to any consent requiring further design detail (within the parameters assessed here) covering aspects such as:

- Site layout;
- Design of site elements;
- Lighting on site; and
- Reinstatement and landscaping of land used for temporary construction compounds, around the substation, at the TJB and along the cable route, and potentially including some native tree and scrub planting around the periphery of the substation (outside of the security fence).

Site Layout

4.6.4 The Proposed Development would be aligned with the existing pattern of development along the eastern side of the B1348 and occupy land within a location that is enclosed on three sides by a combination of existing built structures, screening landforms and structural vegetation that contribute to the containment of impacts on neighbouring seascape, landscape and visual receptors.

4.6.5 The proposed substation buildings and perimeter security fence would be set back from the B1348 carriageway, in keeping with position of the neighbouring Cockenzie substation building, thereby avoiding structures projecting closer to the carriageway. The indicative substation layout provided in Chapter 2: Development Description shows the substation buildings oriented in a northwest to south east direction, thereby reducing the apparent mass

and volume of the buildings in views experienced by north bound road users on the B1348 carriageway whilst focusing the greatest extent of building facades within Site areas that are enclosed by screening landforms that limit the degree of their visibility from external viewpoints. It is noted that the final layout will be confirmed through applications for matters specified in conditions; however it would be the intension to adopt the same general design principles regarding building mass and orientation.

Design of Site Elements

4.6.6 The substation buildings would be simple steel portal constructions with pitched roofs to limit their overall height and perceived volume. This approach also minimises the incidence with which the buildings overtop the skyline or interrupt views of the coast as demonstrated in the photomontages for Viewpoints 1, 3, 9, 10, 11 and 12.

4.6.7 Whilst the colour of the substation buildings in the visualisations in Figures 4.1 to 4.13b is a dark grey, the precise colour of these structures would be agreed with ELC prior to commencement of construction and is anticipated to be closer to that of the neighbouring Cockenzie substation to reduce contrast with this building.

Lighting

4.6.8 Operational lighting at the Site would be minimised and carefully designed and controlled to minimise impacts such as glare, light spill and intrusion on neighbouring receptor locations. To this end details of the lighting design and specification based on the Institute of Lighting Professionals (2020) Guidance Note 1 for the reduction of obtrusive light would be agreed with ELC prior to commencement of construction operations at the Site.

4.6.9 The design would set out both internal and external lighting specification for the Proposed Development along with measures such as louvre blinds, tiers and proximity sensors to reduce the sources of potential light impacts.

4.7 Assessment of Residual Effects

Residual Construction Effects

Landscape Fabric

4.7.1 Construction operations would be limited in geographical extent and duration and would not result in disturbance to the most sensitive coastal areas. Impacts would be largely confined to the interior of the substation compound and associated access track locations. In such locations, construction operations would undoubtedly cause substantial changes to landcover and topography but would be of relatively short duration and seen in the context of current brownfield conditions in and immediately adjoining the Site. Consequently, impacts would be Moderate and short term, which, coupled with the medium sensitivity of the Sites landscape would constitute a Moderate temporary effect on landscape fabric, which would not be significant.

Seascape and Landscape Character

4.7.2 Construction operations would be of relatively short duration and would primarily occur within the substation compound and associated access track locations, and as such would be set back from the sensitive coastal edge and the concentration of open grassland that predominates north of the B148 which forms a gap between Prestonpans and Cockenzie settlements and which is susceptible to visual disturbance. The substation compound and

access tracks, in contrast, occupy a partially enclosed position within an area subject to remnants of previous energy developments and existing large-scale structures.

4.7.3 Given the short duration of construction impacts, their limited geographical extent and focus within an area of brownfield land the magnitude of impacts would be Moderate, and combined with the Medium sensitivity of the area, would constitute a Moderate temporary residual effect on the seascape and landscape character of the area, which would not be significant.

Designations

4.7.4 Construction operations, whilst introducing localised disturbance close to the SLA, would be of short duration and positioned away from key aspects of the coastal edge that from special qualities of the SLA, including:

- its openness and views out from the coastline,
- views westwards towards Edinburgh and the Forth Bridges particularly from the John Muir Way, NCR 76 and the B1348;
- it would also not adversely affect the rocky foreshore; or
- the seascape and landscape setting of Prestonpans.

4.7.5 The construction of the Proposed Development would primarily occur to the south of the B1348 in an enclosed location where remnants of previous energy developments are present as well as existing, large scale and more imposing structures are present and is therefore not anticipated to result in significant effects on the special qualities of the SLA.

Visual Amenity

4.7.6 Views of construction operations would be experienced at locations along the coast and offshore to the west of the Site and along the top of the screen mound around the northern side of the Atholl View residential area, with filtered views also provided through the intervening Cockenzie substation plant from locations in Whin Park, on the western edge of Cockenzie.

4.7.7 Viewed from the coast and offshore vessels construction operations would be viewed inland, away from the critical views along the coast and across the Firth of Forth, which form a key aspect of the amenity of recreational routes and the B1348. Moreover, the works would be seen against a backdrop of existing built structures and grid infrastructure. Visual disturbance caused by the construction activities would represent slight localised visual impact of short duration which is experienced by generally transient receptors. In this context the construction works would constitute a residual effect on the amenity of recreational receptors and roads users of John Muir Way and coastal walks, NCR76 and the B1348 would be Moderate and not significant.

4.7.8 Viewed from the CP146 on the screen mound along the northern side of Atholl View (Viewpoint 7) construction operations would be clearly visible and would occupy a considerable portion of the outlook to the north, towards the coast, and a substantial, albeit temporary and short-term impact. In this context the residual effect on the amenity of walkers at this location would be Major but would cease once the construction operations cease.

4.7.9 Viewed from low lying inshore positions, including the edge of Cockenzie (Viewpoint 5 and Viewpoint 10), the majority of construction operations would be partially screened by structures in the intervening Cockenzie substation and would therefore represent a Slight impact that would be barely discernible and short lived.

4.7.10 Construction operations would also be substantially screened in views from the B6371, to the east, and the elevated vantage point to the south, by Meadowsmill from where the construction woks would be screened by a combination of intervening topography and vegetation.

Residual Operational Effects

Landscape fabric

4.7.11 The operational development would establish a series of built structures, infrastructure and security fencing at the substation compound which would comprehensively change the baseline landscape fabric and landcover in this part of the Site, resulting in Major (significant) effects on the landscape fabric of this part of the Site (localised within the substation footprint). However, the majority of the Site would be virtually unchanged with negligible operational effect (not significant). Moreover, the Site is allocated for energy development and the Proposed Development would be consistent with this.

Seascape and Landscape character

4.7.12 The Proposed Development would be set back from the sensitive coastal edge and rocky foreshore and concentration of open grassland that predominates north of the B1348 since the removal of the Cockenzie Power Station and which currently serves to form a gap between Prestonpans and Cockenzie settlements. The Proposed Development would instead add to the concentration of built forms associated with the Cockenzie substation to the south of the B1348 and would occupy an area allocated for energy developments in the East Lothian LDP.

4.7.13 The Proposed Development has been located and designed to follow the pattern of existing development and to utilise built forms that are smaller in scale and of lower volume whilst also avoiding interrupting key contextual views towards the cost and skylines. This is illustrated in the visualisations for Viewpoints 1, 3, 9, 10, 11 and 12.

4.7.14 On the basis of the preceding analysis the effect on the seascape and landscape character of the study area would be Slight, representing a Slight impact and Moderate residual effect, which would not be significant.

Designations

4.7.15 The Proposed Development, whilst introducing further built development and grid infrastructure close to the SLA, would be positioned away from key aspects of the coastal edge that form special qualities of the SLA, including:

- its openness and views out from the coastline;
- views westwards towards Edinburgh and the Forth Bridges particularly from the John Muir Way, NCR 76 and the B1348;
- it would also not adversely affect the rocky foreshore; or
- the seascape and landscape setting of Prestonpans.

4.7.16 The Proposed Development would be concentrated to the south of the B1348 in an enclosed location where remnants of previous energy developments are present as well as existing, large scale and more imposing structures are present and is therefore not anticipated to result in significant effects on the special qualities of the SLA.

Visual Amenity

4.7.17 The ZTV (Figure 4.1) suggests that views of the Proposed Development would be concentrated at locations along the coast and offshore to the north west and west of the Site and along the top of the screen mound around the northern side of the Preston View residential area, with filtered views also provided through the intervening Cockenzie substation plant from locations in Whin Park, on the western edge of Cockenzie. Whilst some visibility is shown from Atholl View, Prestonpans, field reconnaissance indicates that there would, in fact, be no visibility from the interior of properties or from ground level positions from this settled location.

4.7.18 Viewed from the coast and offshore vessels the Proposed Development would be viewed inland, away from the critical views along the coast and across the Firth of Forth, which form a key aspect of the amenity of recreational routes and the B1348. The Proposed Development, seen from such locations would be seen in the context of the existing Cockenzie substation and extensive grid infrastructure, and would therefore not be anticipated to result in significant effects.

Residual Cumulative Effects

4.7.19 Inclusion of the consented Inch Cape substation would add significantly to the established developed context, being seen within an open grassland context (albeit within the footprint of the former power station) and forming a substantial lateral extension to existing development, crossing the B1348 and establishing new grid development in an area currently valued for its openness and connecting views out to sea and along the East Lothian coastline. This is likely to result in localised significant 'in addition' and 'in-combination' effects on the character of the Musselburgh and Prestonpans Coastal Margins landscape and Prestonpans Coast SLA. In contrast, the Proposed Development would be positioned within an existing development envelope enclosed by screen mounds and vestigial features of the previous Cockenzie power station, and as such would represent only a slight additional change to both the current baseline and the cumulative context of Cockenzie substation and the consented Inch Cape substation. This is assessed to be a Moderate in- addition' effect (not significant).

4.7.20 Cumulative effects on the sensitive Musselburgh and Prestonpans Coastal Margins landscape area and Prestonpans Coast SLA are illustrated in Figures 4.2b, 4.4b, 4.10b and 4.13b.

4.8 Summary

4.8.1 This chapter assesses the seascape, landscape and visual effects of the proposed development as described in Chapter 2: Development Description. This chapter considers construction and operational effects on:

- Landscape fabric;
- Seascape and Landscape character;
- Designated Landscapes and Classified landscapes; and
- Visual amenity.

4.8.2 The chapter provides an assessment of 'in-addition' and 'in-combination' cumulative effects attributable to the Proposed Development when considered in conjunction with the existing Cockenzie substation and consented Inch Cape substation.

4.8.3 The scope of the assessment was informed by consultation responses, published guidance and landscape planning policy.

4.8.4 Key sensitive receptors identified during the baseline appraisal include:

- Coastal Margins – Musselburgh/Prestonpans seascape/landscape character area;
- The Prestonpans Coast SLA;
- Settlement and Residential receptors in Prestonpans and Cockenzie;
- Tourist road Users;
- Recreational receptors including:
- Cyclists on NCR76; and
- Walkers on:
  - the John Muir Way;
  - CP440;
  - CP276;
  - CP146;
  - CP284;
  - CP147; and
  - At the vantage point by Meadowmill.

4.8.5 Significant effects identified would be localised and concern:

- Construction and operational effects within the Proposed Development substation compound.
- Construction and operational effects on the visual amenity of CP146 which extends along the top of a screen mound that encloses the northern and eastern sides of Atholl View residential area.

4.8.6 Inclusion of consented Inch Cape substation would add significantly to the established developed context, being seen within an open grassland context (albeit within the footprint of the former power station) and forming a substantial lateral extension to existing development, crossing the B1348 and establishing new grid development in an area currently valued for its openness and connecting views out to sea and along the East Lothian coastline. This is likely to result in localised significant 'in addition' and 'in-combination' effects on the character of the Musselburgh and Prestonpans Coastal Margins seascape/landscape and Prestonpans Coast SLA. In contrast, the Proposed Development would be positioned within an existing development envelope enclosed by screen mounds and vestigial features of the former Cockenzie power station, and as such would represent only a slight additional to both the current baseline and the cumulative context of Cockenzie substation and Moderate in-addition' effect (not significant).

4.8.7 A summary of the residual effects and mitigation measures is provided in Table 4.9, below.

Table 4.9: Summary of Potential Significant Effects of the Proposed Development

Likely Significant Effect	Mitigation Proposed	Means of Implementation	Outcome/Residual Effect
Construction			
Landscape Fabric	Incorporated into design and CEMP	CEMP	Not significant
Seascape and Landscape Character	Incorporated into design and CEMP		Not significant
Landscape Designations	Incorporated into design and CEMP		Not significant

Table 4.9: Summary of Potential Significant Effects of the Proposed Development			
Likely Significant Effect	Mitigation Proposed	Means of Implementation	Outcome/Residual Effect
Visual Receptors	Incorporated into design and CEMP		Localised Significant effects (Viewpoint 7 and 12 on mound north of Preston Cres only)
Operation			
Landscape Fabric	Incorporated into siting and design	It is anticipated that mitigation would be implemented through detailed siting and design, subject to applications for matters specified in conditions.	Not significant
Seascape and Landscape Character	Incorporated into siting and design		Not significant
Landscape Designations	Incorporated into siting and design		Not significant
Visual Receptors	Incorporated into siting and design		Localised Significant effects (Viewpoint 7 and 12 on mound north of Preston Cres only)
Cumulative			
Seascape and Landscape Character	None	NA	No significant in-addition effects. Some localised significant 'in-combination' effects with introduction of Inch Cape substation.
Landscape Designations	None	NA	No significant in-addition effects. Some localised significant 'in-combination' effects with introduction of Inch Cape substation.
Visual Receptors	None	NA	No significant in-addition effects. Some localised significant 'in-combination' effects with introduction of Inch Cape substation.

5 Ecology and Nature Conservation

5.1 Introduction

5.1.1 This chapter considers the likely significant effects on ecology and nature conservation associated with the construction, operation and decommissioning of the Proposed Development. The effects associated with the construction phase of the Proposed Development on ecology and nature conservation can be considered to be representative of reasonable worst-case decommissioning effects, therefore a separate assessment of the decommissioning phase has not been undertaken as part of this assessment.

5.1.2 The specific objectives of the chapter are to:

- describe the ecological baseline;
- describe the assessment methodology and significance criteria used in completing the impact assessment;
- describe the potential effects, including direct, indirect and cumulative effects;
- describe the mitigation measures proposed to address likely significant effects; and
- assess the residual effects remaining following the implementation of mitigation.

5.1.3 The assessment has been carried out by suitably qualified ecologist Elizabeth Butler (MSc) of Ramboll and reviewed by Adam Fitchet MCIEEM, also of Ramboll.

5.1.4 The assessment follows the Chartered Institute of Ecology and Environmental Management (CIEEM) Ecological Impact Assessment (EcIA) Guidelines[1].

5.1.5 This chapter is supported by the following figures (Volume 3a) and technical appendices (Volume 4):

- Figure 5.1: Designated Sites – Ecology;
- Figure 5.2: Phase 1 Habitat Survey;
- Figure 5.3: Ecology Target Notes;
- Technical Appendix 5.1: Ecology Survey Methodology; and
- Technical Appendix 5.2: Ecology Survey Results.

5.1.6 Figures and technical appendices are referenced in the text where relevant.

5.2 Scope of Assessment

5.2.1 This chapter considers the potential for likely significant effects on:

- Designated nature conservation sites;
- Habitats, such as peatlands, ground water dependant terrestrial ecosystems (GWDTE) and ancient and semi-natural woodland, potentially affected by habitat loss and fragmentation; and
- Protected species (e.g. badger *Meles meles*, otter *Lutra lutra*, all bat species, reptiles and amphibians- i.e. great crested newt *Triturus cristatus*).

[1] CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester.

5.2.2 The scope of the assessment has also been informed by the following policy and legal framework:

- EC Directive on the Conservation of Natural Habitats and Wild Flora and Fauna, 92/43/EEC, 1992[2];
- Directive 2009/147/EC of the European Parliament and of the Council of the 20th November 2009 on the Conservation of Wild Birds[3];
- The Wildlife and Countryside Act 1981 (as amended)[4];
- The Protection of Badgers Act 1992[5];
- The Conservation (Natural Habitats Etc.) Regulations 1994 (as amended)[6];
- Nature Conservation (Scotland) Act 2004[7];
- Wildlife and Natural Environment (Scotland) Act 2011[8];
- UK Biodiversity Action Plan (UK BAP)[9];
- Scotland's Biodiversity: (A strategy for the conservation and enhancement of biodiversity in Scotland)[10]; and
- 2020 Challenge for Scotland's Biodiversity[11].

5.2.3 The chapter assesses the potential for additional cumulative effects when considered in addition to other consented developments and those that are the subject of valid applications.

5.2.4 The assessment is based on the Proposed Development as described in Chapter 2: Development Description.

Consultation

5.2.5 The scope of the assessment has been informed by consultation responses summarised in Table 5.1.

5.2.6 Table 5.1 summarises the consultation responses received regarding ecology and nature conservation and provides information on where and/or how they have been addressed in this assessment. The following organisations made comment on ecology and nature conservation:

- NatureScot; and
- East Lothian Council (ELC) Biodiversity.

[2] Department for Environment, Food and Rural Affairs (Defra), 2001. European Community Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora. First report by the United Kingdom under Article 17 on implementation of the Directive from June 1994 to December 2000. Defra Bristol.

[3] European Commission, 2009. Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds.

[4] Her Majesty's Stationery Office (HMSO), 1981. Wildlife & Countryside Act (1981), Chapter 69 As Amended.

[5] HMSO, 1992. Protection of Badger Act 1992, Chapter 51. HMSO.

[6] HMSO, 1994. The Conservation (Natural Habitats, &c.) Regulations 1994.

[7] HMSO, 2004. Nature Conservation (Scotland) Act 2004.

[8] HMSO, 2011. Wildlife and Natural Environment (Scotland) Act 2011.

[9] Joint Nature Conservation Committee (1992) The UK Biodiversity Action Plan (UK BAP) [online]. Available at: http://jncc.defra.gov.uk/default.aspx?page=5155 .

[10] Scottish Executive, 2004. Scotland's Biodiversity: it's in Your Hands; A Strategy for the Conservation and Enhancement of biodiversity in Scotland [online]. Available at: https://www.gov.scot/Resource/Doc/25954/0014583.pdf

[11] Scottish Government, 2013. 2020 Challenger for Scotland's Biodiversity: A Strategy for the Conservation and Enhancement of Biodiversity in Scotland. Scottish Government, Edinburgh. Available at: 2020 Challenge for Scotland's Biodiversity - gov.scot (www.gov.scot)

5.2.7 Full details on the consultation responses can be reviewed in Technical Appendix 1.1: Consultation Register.

Table 5.1: Consultation Responses

Consultee and Date	Consultation	Issue Raised	Response / Action Taken	Where issue is addressed in EIAR
East Lothian Council (ELC)- Biodiversity Officer 18/12/2020	ELC Biodiversity officer reviewed ecology survey scope and results. Biodiversity officer deemed the survey effort appropriate to establish a baseline. Satisfied with results of habitat survey and protected species surveys.	▪ Breeding bird surveys will be required if vegetation clearance occurs within breeding season (March-August). ▪ ELC pointed out that the habitat survey occurred outwith the optimum survey season for habitat surveys, however ELC do not see this as a constraint, given the nature of the Site.	▪ Mitigation regarding breeding birds and vegetation clearance has been addressed within this chapter- vegetation clearance should occur outwith the breeding/nesting season. Where this is not possible vegetation must be surveyed by a suitably qualified ecologist prior to removal. ▪ Given the nature of the Site the suboptimal timing of the habitat survey does not invalidate results or assessment.	Mitigation is detailed in Section 5.6 of this chapter.
NatureScot Area Office (Forth) 06/01/2021	NatureScot area officer for the Forth area reviewed ecology survey scope and results. NatureScot are happy with the scope and support the results and assessment of potential constraints. Ramboll's findings match NatureScot's understanding of the development location.	No issues raised	N/A	N/A

5.3 Assessment Methodology and Significance Criteria

Method of Baseline Characterisation

Extent of the Study Area

5.3.1 The ecology study area included the area within the Site along with a 50 m survey buffer as shown on Figure 5.2. This buffer was considered to account for the occurrence of species and habitats which could be affected by the Proposed Development. Please note that the red line boundary for the Proposed Development was reduced subsequent to the ecology surveys being undertaken. As such the ecology survey area exceeds 50 m in some places.

Desk Study

5.3.2 The desk study considers a buffer of 10 km from the Proposed Development as shown on Figure 5.1. The purpose of the desk study was to collect existing baseline data about the Site and the surrounding area, such as the location of designated nature conservation sites or other natural features of potential ecological importance. The desk study area was surveyed using the following data sources:

- MAGIC mapping website[12];
- The Wildlife Information Centre (TWIC)[13]; and
- Supplementary information obtained from aerial images available from Google™ Earth Pro[14].

Field Survey

5.3.3 Field survey methodologies are detailed in Technical Appendix 5.1: Ecology Survey Methodology.

Criteria for the Assessment Effects

5.3.4 This section presents full details of the methodology utilised for the assessment during field surveys which were undertaken for the Proposed Development, including references to best practice.

Criteria for Evaluating Importance of Features

5.3.5 Habitats and species (e.g. ecological features) identified within the desk and field study areas have been assigned ecological values using the standard CIEEM scale[15] that classifies ecological features within a defined geographic context. The classification uses recognised and published criteria[16,17] where the ecological features are assessed in relation to their size, diversity, naturalness, rarity, fragility, typicalness, connectivity with surroundings, intrinsic value, recorded history and potential value.

5.3.6 Table 5.3 describes the geographic frame of reference that has been used.

[12] Natural England, 2020. MAGIC Mapping [Online]. Available at: https://magic.defra.gov.uk/ (Accessed 15/12/20)

[13] The Wildlife Information Centre, 2021. Home page [Online] Available at: http://www.wildlifeinformation.co.uk/ (Accessed 15/12/20)

[14] Google Inc., Google Earth Pro- 2020-21 Imagery.

[15] Chartered Institute of Ecology and Environmental Management (CIEEM), 2016. Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal. Winchester: CIEEM.

[16] Ratcliffe, D., 1977. A Nature Conservation Review. Cambridge: Cambridge University Press.

[17] Wray, S., Wells, D., Long, E. and Mitchell-Jones, T., 2010. Valuing Bats in Ecological Impact Assessment. In Practice. December 2010, pp 23-25. Winchester: CIEEM.

Table 5.3: Geographic Conservation Importance	
Importance	Examples
International	Internationally designated sites including Special Area of Conservation (SAC), Ramsar sites, Biogenetic Reserves, World Heritage sites, Biosphere Reserves, candidate SACs and potential Ramsar sites; discrete areas which meet the published selection criteria for international designation but which are not themselves designated as such; or a viable area of a habitat type listed in Annex I of the Habitats Directive[18], or smaller areas which are essential to maintain the viability of a larger whole. Resident or regularly occurring populations of species which may be considered at an international level, such as European protected species (EPS), the loss of which would adversely affect the conservation status or distribution of the species at an international level; or where the population forms a critical part of a wider population; or the species is at a critical phase of its life-cycle.
National	Nationally designated sites including Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Marine Nature Reserves (MNR) and Special Protection Areas (SPA); discrete areas which meet the published selection criteria for national designation but which are not designated as such; or areas of a habitat type identified in the UK Post-2010 Biodiversity Framework[19]. Resident or regularly occurring populations of species which may be considered at the national level, such as species listed in Schedules 5 and 8 of the Wildlife and Countryside Act 1981[20], the loss of which would adversely affect the conservation status or distribution of the species across Britain or Scotland; or where the population forms a critical part of a wider population; or the species is at a critical phase of its life-cycle.
Regional	Areas of a habitat type identified in the Regional Biodiversity Action Plan (BAP); viable areas of habitat identified as being of Regional value in the appropriate Natural Area Profile (or equivalent); or smaller areas of such habitat which are essential to maintain the viability of a larger whole. Resident or regularly occurring populations of species which may be considered at an international level, or at the national level, the loss of which would adversely affect the conservation status or distribution of the species across the region; or where the population forms a critical part of a wider population; or the species is at a critical phase of its life-cycle.
County	Designated nature conservation sites at the local authority level in Scotland including statutory Local Nature Reserves (LNR) and non-statutory Local Biodiversity Sites; or discrete areas which meet the published selection criteria for designation, but which are not designated as such. Resident or regularly occurring populations of species which may be considered at the local authority level, the loss of which would adversely affect the conservation status or distribution of the species across the local authority area.
Local	Features of local value include areas of habitat or populations/communities of species considered to appreciably enrich the habitat resource within the immediate surrounding area, for example, species-rich hedgerows. Resident or regularly occurring populations of species which may be considered at an international level, or at the national level, the loss of which would adversely affect the conservation status or distribution of the species across the immediate surrounding area; or where the population forms a critical part of a wider population; or the species is at a critical phase of its life-cycle.

5.3.7 A wide range of sources can be used to assign importance to ecological features, including legislation and policy. In the case of designated nature conservation sites, their importance reflects the geographic context of the designation. For example, sites designated as SACs are recognised as being of importance at an international level. Ecological features not included in legislation and policy may also be assigned importance due to, for example, local rarity or

[18] European Commission, 1992. Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.

[19] UK Government, 2012. UK Post-2010 Biodiversity Framework [online]. Available at: http://jncc.defra.gov.uk/page-6189 (Accessed on 19/06/18).

[20] Her Majesty's Stationery Office (HMSO), 1981. Wildlife and Countryside Act 1981 (as amended). HMSO.

decline, or provision of a functional role for other ecological features. Professional judgement is used to assign such importance.

Criteria for Characterising Impacts

5.3.8 The potential impacts upon ecological features have been considered in relation to the Proposed Development. The impacts have been assessed without consideration of any specific mitigation measures that might be employed. The assessment of likely ecological impacts has been made in relation to the baseline conditions of the study area. The likely impacts of development activities upon ecological features have been characterised according to several variables detailed in Table 5.4.

Table 5.4: Impact Characterisation

Parameter	Description
Direction	Impacts are either adverse (negative) or beneficial (positive).
Magnitude	This is defined as high, moderate, low or negligible, with these being classified using the following criteria: ▪ High: Total/near total loss of a population due to mortality or displacement or major reduction in the status or productivity of a population due to mortality or displacement or disturbance. Total/near total loss of a habitat. ▪ Medium: Partial reduction in the status or productivity of a population due to mortality or displacement or disturbance. Partial loss of a habitat. ▪ Low: Small but discernible reduction in the status or productivity of a population due to mortality or displacement or disturbance. Small proportion of habitat lost. ▪ Negligible: Very slight reduction in the status or productivity of a population due to mortality or displacement or disturbance. Reduction barely discernible, approximating to the 'no change' situation. Slight loss of habitat that is barely discernible from the habitat resource as a whole.
Extent	The area over which an impact occurs.
Duration	The time for which the impact is expected to last prior to recovery of the ecological feature or replacement of the feature by similar resource (in terms of quality and/or quantity). This is expressed as a short-term, medium-term, or long-term effect relative to the ecological feature that is impacted.
Reversibility	Irreversible impacts: permanent changes from which recovery is not possible within a reasonable time scale or for which there is no reasonable chance of action being taken to reverse it. Reversible impact: temporary changes in which spontaneous recovery is possible or for which effective mitigation (avoidance/cancellation/reduction of effect) or compensation (offset/recompense/offer benefit) is possible.
Frequency and Timing	The number of times an activity occurs will influence the resulting effect (if appropriate, described as low to high and quantified, where possible). The timing of an activity or change may result in an impact if it coincides with critical life-stages or seasons e.g. the badger breeding season.

5.3.9 The assessment only describes those characteristics relevant to understanding the ecological impact and determining the significance of the effect.

Criteria for Assessing Cumulative Impacts

5.3.10 Cumulative impacts can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. Cumulative impacts are particularly important in Ecological Impact Assessments (EcIA) as many ecological features are already exposed to background levels of threat or pressure and may be close to critical thresholds where further impacts could cause irreversible decline and significant effects. Further impacts can also make habitats and species more vulnerable or sensitive to change.

5.3.11 Developments included in the cumulative impact assessment are the following types of future development within the same zone of influence:

- Committed developments within 5 km of the Proposed Development; and
- Similar project proposals that are the subject of valid but currently undetermined applications.

Significance Criteria

5.3.12 Significant effects are assessed with reference to the geographical importance of the ecological feature. However, the scale of significance of an effect may not be the same as the geographic context in which the feature is considered important. For example, a significant effect on a species protected by national legislation does not necessarily equate to a significant effect on its national population.

5.3.13 For the purposes of EcIA, apart from in exceptional circumstances, a significant effect, as defined by the EIA Regulations, is only considered to be possible where the feature in question is considered to be of regional, national or international importance. That is not to say that impacts from the Proposed Development could not result in significant effects on features of county or local importance, simply that those effects are not considered significant under EIA Regulations.

5.3.14 Mitigation and/or compensation is proposed for all effects considered significant under the EIA Regulations. Where appropriate, as part of additional good practice, mitigation and/or compensation may be proposed for significant effects on features of county or local importance, or where required in relation to protected species where legislation may require actions to protect populations or individuals.

Limitations and Assumptions

5.3.15 It should be noted that the availability and quality of the data obtained during desk studies is reliant on third party responses and recorders. This varies from region to region and for different species groups. Furthermore, the comprehensiveness of data often depends on the level of coverage, the expertise and experience of the recorder and the submission of records to the local recorder.

5.3.16 The habitat and faunal surveys provide a snapshot of ecological conditions and do not record plants or animals that may be present in the field study area at different times of the year. The absence of a particular species cannot definitely be confirmed by a lack of field signs and only concludes that an indication of its presence was not located during the survey effort. It is worth noting that surveys were undertaken outwith the optimal season for recording flowering species and recording signs of faunal species, nevertheless given the nature of the Site this is deemed not to be a limiting feature of the assessment. This was also confirmed and acknowledged by ELC (Table 5.1)

5.4 Baseline Conditions

Current Baseline

Statutory Designated Nature Conservation Sites

5.4.1 The Site includes part of the Firth of Forth Site SSSI. The majority of the coastline within the search area is covered by this designation, notified due to the variety of coastal habitats and

both floral and faunal assemblages. The total area of this SSSI is 7,423.9 ha, 0.6 ha of which occurs within the Site boundary. This represents 0.008 % of the total designation.

5.4.2 Designated sites of ecological importance located within 5 km of the Site are listed in Table 5.5 and shown on Figure 5.1.

Table 5.5: Designated Sites

Site Name	Qualifying Feature(s)	Distance from Site at Closest Point (km)	Connectivity with Site
Designated sites within Red Line Boundary			
Firth of Forth SSSI	Coastal habitats including maritime cliffs, saltmarsh, sandy dunes, mudflat and lagoons. Other notable habitat types including lowland neutral grassland and transitional grassland. Notable vascular plant assemblage. Notable beetle assemblage. Notable invertebrate- Northern brown argus *Aricia artaxerxes.*	Coastal section within the Site is covered by this designation. The designation covers much of the coast line from this point (apart from a 0.6 km stretch between The Humlocks and Cockenzie Harbour- see Figure 5.1).	Area of designation occurs within the Site. The total area of this SSSI is 7,423.9 ha, 0.6 ha of which occurs within the Site. This represents 0.008 % of the total designation.

Non- Statutory Designated Nature Conservation Sites

5.4.3 Stands of woodland listed on the Ancient Woodland Inventory[21] are present within 5 km of the Site however there are no stands of Ancient Woodland within the Site or ecological study area.

5.4.4 The following non-statutory Scottish Wildlife Trust (SWT) sites occur within 5 km of the Site;

- Longniddry Bents;
- Longniddry to Haddington Railway;
- Gosford Estate;
- Myles Hedgerows; and
- River Esk.

5.4.5 None of these SWT sites occur within 500 m of the Site or have any form of connectivity with the Site.

The Wildlife Information Centre (TWIC)

5.4.6 As part of the desk study, local biological records were sought from TWIC, data was received January 2021. Notable species records within 5 km of the Site received from TWIC are summarised in Table 5.6. The legislation of which applies to each species is detailed along with details of the species inclusion within the UK or local (East Lothian) Biodiversity Action Plans (BAPs). BAP species are those identified as being the most threatened and requiring conservation, these species are used as indicators of biodiversity and referred to as priority species.

[21] SNH, 2018. History of Scotland's Woodland [online]. Available at: http://www.snh.gov.uk/docs/C283974.pdf (Accessed on 05/09/18).

Table 5.6: TWIC Records of Notable Species within the Desk Study Area							
Species	UKBAP[22]	LBAP[23]	WCA[24]	Scottish Biodiversity List[25]	Habitat Regulations Species[26]	Habitats Directive Species (EPS)[27]	Protection of Badgers Act[28]
Terrestrial mammals							
Water vole Arvicola amphibius	x	x	x	x			
European hedgehog Erinaceus europaeus	x			x			
Brown hare Lepus europaeus	x	x		x			
European otter	x	x	x	x	x	x	
Eurasian badger		x					x
Red squirrel Sciurus vulgaris	x	x	x	x	x		
Daubentons bat Myotis daubentonii	x		x	x	x		
Natterer's bat Myotis nattereri	x	x	x	x	x		
Common pipistrelle Pipistrellus pipistrellus	x	x	x	x	x		
Soprano pipistrelle Pipistrellus pygmaeus	x	x	x	x	x		
Brown long-eared bat *Plecotus auritus*	x	x	x	x	x		
Marine mammals (Applicable to Site)							
Grey seal Halichoerus grypus	X	X		X	X		

[22] UK BAP | JNCC - Adviser to Government on Nature Conservation

[23] Biodiversity | Biodiversity | East Lothian Council

[24] Wildlife and Countryside Act 1981 (legislation.gov.uk)

[25] Scottish Biodiversity List | NatureScot

[26] The Conservation of Habitats and Species Regulations 2017 (legislation.gov.uk)

[27] The Habitats Directive - Environment - European Commission (europa.eu)

[28] Protection of Badgers Act 1992 (legislation.gov.uk)

Table 5.6: TWIC Records of Notable Species within the Desk Study Area							
Species	UKBAP[22]	LBAP[23]	WCA[24]	Scottish Biodiversity List[25]	Habitat Regulations Species[26]	Habitats Directive Species (EPS)[27]	Protection of Badgers Act[28]
Common seal Phoca vitulina	x	x		x	x		
Amphibians							
Common toad *Bufo bufo*	x			x			
Common frog Rana temporaria	x			x			

Phase 1 Habitat Survey

5.4.7 An Extended Phase 1 Habitat survey of the Site was undertaken in November 2020 which recorded the following:

- A dominance of open amenity grassland habitats;
- Tall ruderal scrub and woodland habitat with potential to support nesting birds;
- Intertidal areas of rocky shoreline;
- Mature woodland with potential to support bat roosts (no bat roost potential trees identified); and
- Vegetation and landforms with potential to provide badger sett locations (although no setts identified).

5.4.8 All habitat types and protected species signs that were recorded within the study area are detailed in Technical Appendix 5.2 and shown on Figures 5.2 and 5.3.

5.4.9 From where the Site begins at the coast it is dominated by amenity grassland habitat intersected by the John Muir Way footpath. The coastal area is intertidal with boulders and rocks, reinforced by a seawall in parts. The Site then extends across the B1348 (Edinburgh Road), including more areas of amenity grassland and Cockenzie substation. Directly behind the substation to the south is a footpath lined with hawthorn *Crataegus monogyna* scrub, bordering an arable crop field. The Site then extends eastwards towards the B6371. The Site to the south is then bordered by coal bunds associated with the former coal storage yard area. Within the Site the existing service road is lined with areas of scrub (hawthorn dominant) with notable stands of mixed woodland situated at the very eastern end of the Site. These mixed woodlands are dominated by maple *Acer campestre* and sitka spruce *Picea sitchensis.* Other notable habitats recorded outwith the Site include the embankments directly to the south. These embankments are covered in scattered scrub, dominated by hawthorn and bramble *Rubus fruticosus*. Full descriptions of habitats can be found in Technical Appendix 5.2.

5.4.10 No groundwater dependent ecosystem (GWDTE) habitats were recorded.

5.4.11 No habitats specified in the notification for the SSSI are present within the Site (see Table 5.5). Intertidal habitat present consists of rocky shore and sand/mud areas.

Protected Species

5.4.12 No signs of protected species were recorded during the ecology survey. No protected species listed with TWIC records (Table 5.6) were recorded on Site during the ecology survey.

5.4.13 There is habitat suitable for badgers within the Site including woodland stands and dense scrub areas. Although no signs of this species (such as setts or evidence of foraging) were recorded there is still potential for this species to utilise these favourable habitats areas.

5.4.14 Mature trees were inspected for bat roost potential, none of which had suitable features.

5.4.15 There was evidence of deer *Cervidae sp*. and rabbit *Oryctolagus cuniculus* on Site (determined by droppings). Kestrel *Falco tinnunculus* and sparrowhawk *Accipiter nisus* were observed hunting on Site briefly.

5.4.16 No ponds suitable for great crested newt were identified on Site.

5.4.17 The only protected feature notable for this Site would be the potential for nesting birds within woodland and scrub habitats. The potential impact on this feature will be assessed within this chapter and mitigation options detailed (i.e. avoidance of site clearance during breeding bird season).

Future Baseline

5.4.18 The future baseline would be defined by similar land use as present. In this instance the area would most likely persist largely of amenity grassland, marginal areas of tall ruderal habitat, stands of mixed woodland and areas of dense and scattered scrub.

Summary of Importance of Ecological Features

5.4.19 A summary of the ecological features identified as being sensitive to the Proposed Development and that have been 'scoped in' to the assessment is given in Table 5.7, together with the justification for their inclusion.

Table 5.7: Sensitivity of Ecological Assets

Receptor	Importance/Sensitivity	Justification
Coastal Habitat	National	SSSI designation -the Site covers a 0.6 ha of coast which is covered by the Firth of Forth SSSI designation as shown on Figure 5.1. This represents 0.008 % of the total SSSI area. The coastal habitat within the Site consists of intertidal rocky shore with boulders along with a small area of mud/sand. Although this habitat type is not specifically noted within the SSSI notification[29] disruption or alteration may impact the connectivity of the SSSI as a whole. The shore area is also important habitat for many wading bird species (some of which are listed within the SSSI notification) which forage the intertidal zones such as oystercatcher (recorded during survey), ringed plover *Charadrius hiaticula,* knot *Calidris canutus* and dunlin *C. Alpina alpina.* Impact on protected bird species has been assessed within Chapter 6: Ornithology.
Woodlands (semi-natural broadleaved and mixed woodland)	Site	Woodland provides habitat for a broad range of species, such as birds and bats. This habitat type occurs within the Site and study area. Although woodland is common within the study area and in the local area, this assessment considers it to be of local importance for the sake of nature and biodiversity conservation, given the urbanised nature of the local area (e.g. developments and infrastructure) and proximity to designated sites.
Scrub habitat	Site	Scrub habitat provides habitat and foraging opportunities for a range of species. This habitat is common within the Site and study area, namely along footpaths, tracks and along the sides of the coal bund. This assessment considers it to be of site importance,

[29] SSSI_Citation_8163.pdf

Table 5.7: Sensitivity of Ecological Assets		
Receptor	Importance/Sensitivity	Justification
		providing foraging opportunities and habitat for invertebrates, terrestrial mammals and birds at site level.
Breeding birds	Site	Habitats are considered to be suitable to support breeding bird species common to the local area and, as such, breeding birds are considered to be of local importance.

5.5 Assessment of Likely Effects

Potential Construction Effects

5.5.1 The assessment of likely effects associated with construction is based on the activities described in Chapter 2: Proposed Development Description.

Statutory Designated Nature Conservation Site

5.5.2 The Proposed Development covers a small section (0.6 ha) of coastline designated under the Firth of Forth SSSI (see Figure 5.1), representing 0.008% of the total SSSI area. The installation of one shore end export cable would cross the Mean Low Water Spring (MLWS) mark (under 10m water depth) and run underground through the intertidal area to the transition joint bay (See Figure 2.1) within the SSSI area.

5.5.3 As the cable is to be installed using a trenchless installation method there would be no habitat disturbance in the SSSI area and no likely significant effects on the SSSI.

Habitats

5.5.4 Construction activities have the potential to: degrade or destroy terrestrial habitat either directly through excavation, compaction or modification (e.g. vegetation removal); or indirectly as a result of dewatering or from the accidental release of fuels and/or other chemicals.

5.5.5 With a trenchless installation technique, there would be no likely significant effects on habitats within the intertidal zone associated with the shore end export cable.

5.5.6 The construction of the transition joint bay (where the shore end export cable would interface with the onshore export cable) would likely result in temporary, short-term loss of amenity grassland habitat that would be restored via appropriate landscaping and planting after construction.

5.5.7 The construction of the onshore export cable corridor, required to join together the cables from the transition joint bay with the proposed substation and the existing Cockenzie substation) would result in the loss of scrub, amenity grassland, tall ruderal and semi improved grassland habitats. This will be short term, temporary habitat loss, restored once cables are installed. The scrub habitat (Target Note 19, Figures 5.2 and 5.3) has potential to support nesting birds.

5.5.8 The construction of the onshore substation and its associated platform would result in the long term loss of broadleaved woodland, amenity grassland, tall ruderal and semi improved grassland habitats. The footprint would be approximately 22,000 m^2. The construction of the substation would likely require the removal the area of broadleaved woodland (Target Note 9, Figures 5.2 and 5.3); however the majority of the Site is currently existing hardstanding

(associated with a former gas holder) and in use as a car wash. There is evidence of the woodland being used by nesting birds (old nest observed during ecology survey).

5.5.9 Three construction compounds/working areas will be constructed for the landfall works, onshore export cable and substation. These will vary in size (see Section 2.3.24, Chapter 2). These will result in the temporary, short term loss of amenity grassland, tall ruderal and semi improve grassland habitats providing these compounds are restored with landscape planting post construction.

5.5.10 The construction of access tracks and haul roads from the east of the Site will result in the removal of woodland, scrub and semi-improved grassland habitats, resulting in permanent loss of habitat. The permanent loss of woodland and scrub habitats would negatively impact the Sites biodiversity overall if mitigation (i.e. avoidance or replanting) is not carried out.

Protected species

5.5.11 Artificial lighting disrupts the natural patterns of foraging and flight in bats. 24-hour artificial lighting at the landfall site may cause disturbance to foraging and/or commuting bats in the local area resulting in a significant effect during construction.

Nesting birds

5.5.12 Removal of scrub, tall ruderal and mixed woodland stands would result in the loss of habitat suitable for nesting birds. If these habitats are cleared within the nesting bird season (March-August inclusive) then there is a risk of disturbance or destruction of active nests, which constitutes an offence under the Wildlife and Countryside Act, 1981.

Potential Operational Effects

5.5.13 Lighting of the onshore substation during periods of bat activity (i.e. from dusk to dawn) may cause a disturbance to foraging and/or commuting bats in the local area. Nevertheless, it is proposed that these lights will be motion activated. This will minimise the period by which the Site is illuminated artificially between dusk and dawn, therefore this effect is not likely to be significant.

Potential Cumulative Effects

5.5.14 No cumulative effects are predicted. The offshore export cable is considered to be Associated Development. The offshore export cable is the subject of a separate consenting (marine licence) and EIA process[30] under the Marine (Scotland) Act 2010, covering the cable from the Mean High Water Springs (MHWS) seaward. A vessel or other plant and equipment that can operate in the near-shore environment will be required to be stationed approximately 700 m to 1100 m offshore during the cable installation and landfall works to support cable pulling, jointing, laying and cable trenching/burial. Given that these works are offshore they are unlikely to cause significant cumulative effects in combination with the Proposed Development to the terrestrial ecology assessed as part of this chapter.

[30] The offshore export cable is subject of screening opinion issued by Marine Scotland Licensing and Operations Team (MS-LOT) on behalf of the Scottish Ministers confirming that the offshore export cable is not EIA development.

5.6 Mitigation

Mitigation Pre-Construction

Protected Species

5.6.1 Pre-construction surveys would be undertaken before site preparation and construction works get underway. Surveys focusing on habitat suitable for species such as badger- namely woodland and scrub areas- would be undertaken to ensure protected species have not started utilising these areas. A walkover survey of these suitable habitat areas by a qualified ecologist would determine this.

Mitigation during Construction

Designated Sites

5.6.2 It is not predicted that there will be a significant effect on the integrity of the SSSI. However as this is a protected area, disturbance to intertidal habitat within the SSSI will be minimised by an appropriate cable installation method and appropriate restoration post installation. An ecologist may be present on Site during this stage of construction to supervise works within the protected area, working as an Ecological Clerk of Works (ECoW).

Habitats

5.6.3 It is likely that areas of scrub and woodland would need to be removed for the following components of the Proposed Development:

- Onshore export cable area would require removal of scrub habitat (Target Note 19, Figures 5.2 and 5.3).
- Onshore substation platform would require removal of broadleaved woodland (Target Note 9, Figures 5.2 and 5.3); and
- Temporary access/haulage route areas may require the removal of woodland and scrub areas (Figure 5.2).

5.6.4 Removal of these habitats should be avoided as much as feasible, if this is not possible then micro-siting of site infrastructure/features should be determined to avoid habitat removal. Loss of woodland or scrub would be compensated by post-construction landscape planting including native species such as;

- silver birch *Betula pendula*;
- field maple;
- hazel Corylus avellana;
- holly Ilex aquifolium; and
- rowan Sorbus aucuparia.

Protected Species

5.6.5 The disturbance effect on foraging/commuting bats caused by 24-hour artificial lighting at the landfall point (during construction) would be minimised by mitigation techniques as recommended by EUROBATS guidance[31]. These bat friendly lighting design measures include;

[31] EUROBATS (2018) Guidelines for Consideration of Bats in Lighting Projects: Guidelines nr. 8. Available at:https://cdn.bats.org.uk/pdf/Resources/EUROBATSguidelines8_lightpollution.pdf?mtime=20181113114256&focal=none

- Dimming- adapt a dimming strategy based on human activities (i.e. dim lighting in areas which are not being worked in during the night), keeping illuminate levels as low as possible as per EU standards (i.e. not going over minimum illuminance required for works);
- Avoid light trespass- prevent light trespass over 0.1 lx on surrounding surfaces by using fully shielded luminaries, preventing illumination at or above horizontal and minimising lighting height;
- Adapt lamp spectra- Avoid lamps emitting wavelengths below 540 nm (blue and UV ranges) and with a correlated colour temperature >2700 K.

Nesting birds

5.6.6 The removal of vegetation, namely scrub and woodland habitat, would need to occur outside the breeding bird season (March-August, inclusive). If this is not possible, a nesting bird survey would need to be undertaken by a suitably qualified ecologist prior to vegetation clearance. The time gap between nesting bird check and vegetation removal cannot exceed 48 hours. If nests are found, then a suitable buffer (typically 10 m) will need to be applied around any nests recorded within the Site. Works would not be permitted in the protective buffer zone until the chicks have fledged and the nest is confirmed to be inactive by a suitably qualified ecologist.

Mitigation during Operation

5.6.7 If it is not possible to minimise or avoid the loss of woodland or scrub, the loss of this habitat type should be offset through compensatory planting post-construction with planting including native species such as;

- silver birch;
- field maple;
- hazel;
- sessile oak *Quercus robur*;
- holly;
- rowan; and
- hawthorn.

5.6.8 No other mitigation measures during operation are foreseen regarding the ecology of the Site.

Additional Good Practice Measures

Habitats

5.6.9 Habitat loss caused by the construction of onshore infrastructure could be further offset via further compensatory planting and landscaping where appropriate across the Site, not just in areas of felled woodland or scrub. Additional planting would enhance the sites biodiversity and enrich areas currently dominated by low diversity amenity grassland. This would encourage habitat heterogeneity, providing habitat, foraging and shelter for local wildlife. Planting designs should incorporate native scrub and tree species mentioned above (Section 5.6.5).

Protected species

5.6.10 Care should be taken during the construction phase to secure construction areas overnight, making it safe for terrestrial mammals which may pass through or forage within the Site at

night. Trenches or pits should be covered over to prevent mammals such as badger or deer from falling in an becoming trapped. Alternatively means should be provided to provide ramps to allow the animal to get out if it becomes trapped (i.e. form an earth ramp or provide wooden planks).

5.7 Assessment of Residual Effects

5.7.1 There are no significant residual effects expected from this Proposed Development in terms of ecology.

5.8 Summary

5.8.1 Table 5.8 provides a summary of the potential effects, mitigation proposed and the residual effects taking account of the mitigation. No likely significant effects are identified.

Table 5.8: Summary of Potential Significant Effects of the Proposed Development

Likely Significant Effect	Mitigation Proposed	Means of Implementation	Outcome/Residual Effect
Pre-Construction			
Presence of protected species within the site	Pre-construction walkover surveys of suitable habitats (woodland and scrub) to identify if protected species have started utilising these areas in the time between initial survey and construction beginning.	It is anticipated that a suitably worded planning condition will require the provision of an ECoW to monitor compliance with this mitigation commitment.	Not significant
Construction			
Loss of habitat – woodland and scrub	▪ Avoid removing woodland and scrub habitat or micro siting infrastructure where possible. ▪ Compensatory planting post construction with native species rich planting design to compensate for any habitat loss and enhance overall biodiversity of Site.	▪ It is anticipated that a suitably worded planning will require a detailed landscaping scheme to be submitted for the approval of ELC, incorporating proposals to compensate for any loss of woodland or scrub habitat.	Not significant
Disturbance to foraging and commuting bats (from 24 lighting of landfall)	▪ Bat friendly lighting designing including methods such as dimming, minimal light trespass and adapted lamp spectra.	▪ It is anticipated that a suitably worded planning condition will require the provision of final lighting design for the approval of ELC.	Not significant
Disturbance to breeding birds	▪ No vegetation removal to occur within the breeding season (March- August, inclusive). If this cannot be avoided a suitably qualified ecologist will need to	▪ It is anticipated that a suitably worded planning condition will require the provision of an ECoW to monitor compliance with this mitigation commitment.	Not significant

Table 5.8: Summary of Potential Significant Effects of the Proposed Development			
Likely Significant Effect	Mitigation Proposed	Means of Implementation	Outcome/Residual Effect
	survey areas of vegetation before clearance to check for active nests.		
Operation			
▪ Disturbance to bats caused by artificial lighting from onshore substation between dusk and dawn (bat activity period)	▪ Lights will be motion activated minimising period of illumination at night.	▪ It is anticipated that a suitably worded planning condition will require the provision of final lighting design for the approval of ELC.	Not significant

6 Ornithology

6.1 Introduction

6.1.1 This chapter considers the likely significant effects on ornithological receptors associated with the construction, operation and decommissioning of the Proposed Development. The effects associated with the construction phase of the Proposed Development on ornithological receptors can be considered to be representative of reasonable worst-case decommissioning effects, therefore a separate assessment of the decommissioning phase has not been undertaken as part of this assessment.

6.1.2 The specific objectives of the chapter are to:

- describe the ornithological baseline;
- describe the assessment methodology and significance criteria used in completing the impact assessment;
- describe the potential effects, including direct, indirect and cumulative effects;
- describe the mitigation measures proposed to address likely significant effects; and
- assess the residual effects remaining following the implementation of mitigation.

6.1.3 The assessment has been carried out by Chris Rodger (MCIEEM), RPS. The assessment of ornithological effects follows the guidance produced by CIEEM[1]. This sets out the process for assessment as a series of stages.

6.1.4 Describing the ornithological baseline in the Zone of Influence (ZoI) through survey and desk study:

- Identifying Important Ornithological Features (IOFs): these are the species of the highest ornithological importance present in the ZoI;
- Determining the nature conservation importance of the IOF present within the ZoI;
- Identifying and characterising the potential impacts on these IOF, based on the nature of the construction, operation and decommissioning activities associated with the Proposed Development;
- Determining the magnitude of the impacts including consideration of the sensitivity of the ornithological feature and the duration and reversibility of the effect;
- Determining the significance of the impacts based on the interaction between the effect magnitude/ duration, the likelihood of the effect occurring and the nature conservation value of the IOF;
- Identifying embedded mitigation that will counteract or avoid adverse impacts;
- Determining the residual impact significance after the effects of mitigation have been considered, including a description of any legal and policy consequences;
- Determining potential cumulative effects; and
- Identification of any monitoring requirements.

6.1.5 This chapter is supported by the following figures and technical appendix (a full list of the Figures appears at the end of this chapter):

- Figure 6.1: Designated Sites In Close Proximity;

[1] CIEEM(2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester.

- Figure 6.2: Designated Sites Within the Firth of Forth;
- Figure 6.3: Intertidal and Near Shore Bird Survey Areas;
- Figure 6.4: Terrestrial Bird Survey Areas;
- Figure 6.5: WeBS High Tide Count Sectors;
- Figure 6.6: WeBS Low Tide Count Sectors;
- Figures 6.7.1- to 6.7.52:Intertidal and Nearshore Survey Results;
- Figures 6.8.1- to 6.8.64:Terrestrial Bird Survey Results;
- Figure 6.9: Key Roosting and Feeding Area;
- Technical Appendix 6.1: Nearshore and Intertidal, and Terrestrial Bird Surveys; and
- Technical Appendix 6.2: Habitat Regulations Assessment (HRA) Screening.

6.1.6 Figures and the technical appendix are referenced in the text where relevant.

6.2 Scope of Assessment

6.2.1 This report details the results of intertidal and near shore coastal, and terrestrial bird surveys undertaken to inform the assessment of the Proposed Development, as described in Chapter 2: Development Description.

6.2.2 The surveys were designed to assess the use of the intertidal and near shore coastal habitats within the onshore export cable development zone and landfall site (the point where the Offshore Export Cables connect to the Onshore Export Cables). The survey focussed particularly on the qualifying species of coastal/ marine designated sites of nature conservation interest associated with the Firth of Forth (shown in Figures 6.1 and 6.2). Given the coastal location of the Proposed Development and the wide-ranging foraging behaviour of seabirds, consideration was given to designated sites up to 40 km from the Site. These were:

- Firth of Forth Special Protection Area (SPA) and Wetland of International Importance (Ramsar Site);
- Forth Islands SPA;
- Imperial Dock Lock, Leith SPA; and
- The Outer Firth of Forth and St. Andrews Bay SPA.

6.2.3 The findings of these surveys have been used to inform the Environmental Impact Assessment (EIA) for the Proposed Development, and the Habitats Regulations Appraisal (HRA) required in relation to the above designated sites.

6.2.4 This chapter considers the potential for likely significant effects on the qualifying species of the SPAs and the additional bird species assessed to be a sensitive IOF of international, national or regional importance.

6.2.5 The chapter acknowledges the need to assess potential effects on qualifying populations of SPAs and other IOF within the Firth of Forth in-combination with other plans and projects. This includes those developments associated with other Forth and Tay offshore wind farms and the Blindwells New Town development.

6.2.6 The scope of the assessment has been informed by consultation responses summarised in Table 6.1 and the following guidelines/ policies:

- Environmental Impact Assessment Directive 85/337/EEC (the EIA Directive)[2];
- Directive 2009/147/EC on the Conservation of Wild Birds (the Birds Directive)[3];
- Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the Habitats Directive)[4];
- The Conservation (Natural Habitats &c.) Amendment (Scotland) Regulations 2012, relating to reserved matters in Scotland[5];
- Wildlife and Countryside Act 1981 (as amended)[6];
- The Nature Conservation Act (Scotland) Act 2004[7];
- The Wildlife and Natural Environment (Scotland) Act (2011)[8];
- Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017, which transpose the EIA Directive into the Scottish planning system;
- Planning Circular 1/2017 – Environmental Impact Assessment regulations (Scottish Government 2017);
- PAN 51: Planning Environmental Protection and Regulation (revised 2006);
- PAN 60: Planning for Natural Heritage (Scottish Government 2000);
- Nature Conservation: Implementation in Scotland of the Habitats and Birds Directives: Scottish Executive Circular 6/1995 as amended (June 2000);
- Scottish Planning Policy;
- The State of the UK's Birds 2020[9];
- Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM 2018)[10];
- Bird Monitoring Methods[11]; and
- Birds of Conservation Concern (BoCC) 4: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man[12].

Consultation

6.2.7 The scope of the assessment has been informed by consultation responses summarised in Table 6.1.

[2] European Commission (1985). Directive 85/337/EEC of the European Parliament and of the Council on the assessment of the effects of certain public and private projects on the environment.

[3] European Commission (2009). Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds

[4] Department for Environment, Food and Rural Affairs (Defra)(2001). European Community Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora. First report by the United Kingdom under Article 17 on implementation of the Directive from June 1994 to December 2000. Defra Bristol.

[5] Her Majesty's Stationery Office (HMSO) (1994). The Conservation (Natural Habitats, &c.) Regulations 2012

[6] HMSO (1981). Wildlife & Countryside Act (1981), Chapter 69 As Amended

[7] HMSO (2004). Nature Conservation (Scotland) Act 2004.

[8] HMSO (2011). Wildlife and Natural Environment (Scotland) Act 2011.

[9] Burns F, Eaton MA, Balmer DE, Banks A, Caldow R, Donelan JL, Douse A, Duigan C, Foster S, Frost T, Grice PV, Hall C, Hanmer HJ, Harris SJ, Johnstone I, Lindley P, McCulloch N, Noble DG, Risely K, Robinson RA, Wotton S (2020) The State of the UK's Birds. The RSPB, BTO, WWT, DAERA, JNCC, NatureScot, NE and NRW, Sandy, Bedfordshire.

[10] CIEEM(2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester.

[11] Gilbert, G, Gibbons, D.W & Evans, J (1998) Bird Monitoring Methods. RSPB, Sandy.

[12] Aebischer N, Brown A, Eaton MA, Gregory R, Hearn R, Lock L, Musgrove A, Noble D, Stroud D (2015) Birds of Conservation Concern (BoCC) 4: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man. British Birds 108. 708-746

6.2.8 Table 6.1 summarises the consultation responses received regarding ornithology and provides information on where and/ or how they have been addressed in this assessment. The following organisations made comment on ornithology:

- NatureScot; and
- Marine Scotland.

6.2.9 Full details on the consultation responses can be reviewed in Technical Appendix 1.1: Consultation Register.

Table 6.1: Consultation Responses

Consultee and Date	Consultation	Issue Raised	Response/ Action Taken	Where issue is Addressed in EIA Report
NatureScot and Marine Scotland September 2020	Ornithology Monitoring Strategy for the project	Marine Scotland agreed with the Applicant's Ornithology Monitoring Strategy that no new surveys would be needed to assess cable laying effects on birds offshore, from the Seagreen Offshore Wind Farm to the nearshore area (1.5 km from the MHWM). As suggested in Seagreen (2020), aerial surveys and the data collected for the Outer Forth and St. Andrew's Bay Complex proposed Special Protection Area (pSPA) designation provide a sufficiently comprehensive baseline, considering the nature of the cable laying and operation process along this offshore corridor. NatureScot also agreed that no new surveys were needed to assess the offshore cable laying effects. NatureScot however suggested that up to two years of winter-bird surveys would be required in order to assess the effects of the cable from 1.5 km offshore to onshore.	Ornithology Monitoring Strategy followed. RPS submitted details of Lothian SOC data to NatureScot (Malcolm Fraser) on 16 November 2020 to demonstrate the level of data available for the area.	Survey methodologies are detailed in Section 6.3
NatureScot November 2020	Submission of EIA in March 2021	NatureScot responded noting that the Applicant are seeking to submit a planning application in February 2021, despite the risk of having an incomplete season of wintering survey work, which means the information to inform HRA may be inadequate. However, NatureScot accepted that this project probably carries a low risk to the SPA bird populations and will probably not lead to adverse effects on site integrity. This view was based on: • an almost identical project, at the same location, reached this conclusion within the last few years (i.e. Inch Cape onshore grid connection); and • all the data previously collected and analysed shows that bird usage of this location	Submission moved to March 2021 to cover full non–breeding season. Inch Cape survey data considered as well as WeBS data.	WeBS data can be found in Section 6.4 of EIA Report and Section 1.4 of TA 6.1

Table 6.1: Consultation Responses				
Consultee and Date	Consultation	Issue Raised	Response/ Action Taken	Where issue is Addressed in EIA Report
		is relatively stable and consistent. NatureScot therefore recommended that, if the Applicant pursue the February deadline, information to inform HRA is based on the following: 1. the September to February survey work for the 2020-21 wintering season; 2. WeBS data for the wintering period for the last e.g. 5-10 years; and 3. data from the Inch Cape project. NatureScot explained that when these data sources are collated, it may be possible to reach a defensible conclusion to the HRA process. However, NatureScot strongly recommended t continue to survey for the remainder of the wintering season, and prepare information to inform HRA that is based on this full season of work. NatureScot highlighted that if there were issues with the analysis in February, it would be likely to object to the proposal until at least a single full season of survey work is included in the information to inform HRA. There were potential significant risks in accepting information to inform HRA without even a single complete season of project-specific survey work. However NatureScot concluded it may be possible for this specific proposal at this specific location, to conclude no adverse effect on site integrity, for the reasons outlined above.		
NatureScot November 2020	Number of monthly surveys required.	NatureScot clarified that one survey a month was sufficient.	1 survey a month completed	

Potential Effects Scoped Out

6.2.10 The scope of this assessment takes account of the committed mitigation measures both incorporated into the design and those standard construction and decommissioning mitigation measures incorporated into the Proposed Development, as described in Chapter 2: Development Description, and Technical Appendix 2.2: Outline Construction Environmental Management Plan. No other issues have been scoped out of the assessment.

6.3 Assessment Methodology and Significance Criteria

Method of Baseline Characterisation

Extent of the Study Area

6.3.1 The intertidal and near shore coastal bird survey area extended for approximately 6 km along the East Lothian coast from Prestonpans Sea Front at Ox Rocks (NT 38288 74352) to the eastern end of Seton Sands (NT43301 76480) in order to cover the full area originally under investigation for potential cable landfall sites (see Chapter 3: Site Alternatives and Design Evolution). Given the extent of this survey area it was segregated into five discrete count sectors (Sectors A-E) (Figure 6.3), identified as follows:

- Sector A: Prestonpans Sea Front; Ox Rocks (NT 38288 74352) to Lidl Supermarket (NT 39045 74987);
- Sector B: Former Cockenzie Power Station Seafront; Lidl Supermarket (NT 39045 74987) to Cockenzie Harbour (NT 39678 75626);
- Sector C: Cockenzie and Port Seton Sea Front; Cockenzie Harbour (NT 39678 75626) to Wrecked Craigs, Seton Sands West (NT 40808 75976);
- Sector D: Seton Sands West; Wrecked Craigs, Seton Sands West (NT 40808 75976) to Seton Sands Holiday Village (NT 41954 75889); and
- Sector E: Seton Sands: Seton Sands Holiday Village (NT 41954 75889) to Seton Sands East (NT43301 76480).

6.3.2 Inland/ terrestrial bird populations were assessed across four sectors, encompassing the full area originally considered for cable landfall, substation footprint and cable servitude (Figure 6.4). These can be identified as follows

- Sector 1-A: Site of former Cockenzie Power Station and existing substation;
- Sector 1-B: Site former Coal Storage Area;
- Sector 2-B: Area following route of existing A198, encompassing cable servitude route for alternative Port Seton landfall site; and
- Sector 2-A: Site of alternative Port Seton landfall site.

6.3.3 The Site, encompassing the proposed cable landfall site, onshore export cable corridor, substation footprint and access corridor (Figure 6.3 and 6.4) lies within intertidal/ near shore Sector A, near the boundary with Sector B land/ terrestrial Sectors A and B.

6.3.4 Intertidal/ near shore Sectors B and C are also considered in order to identify any potentially important foraging or roosting areas within 500 m of the proposed cable landfall site. Consequently, Sectors A-C combined are considered to represent the 'survey area' for intertidal/ near shore ornithological receptors.

6.3.5 It is considered that the data for inland/ terrestrial Sectors A and B are adequate for the assessment of potential effects for inland /terrestrial ornithological receptors.

Desk Study

6.3.6 A desk study was undertaken to collate relevant information on all sites with designated ornithological features (SPAs/ Ramsar Sites/ SSSIs/ SINCs) where there may exist ecological connectivity between the Site and qualifying bird populations.

6.3.7 A search for all designated sites within a 40 km radius of the Site was made utilising online sources, allowing the identification of all designated sites with qualifying ornithological

interests. The search radius of 40 km is in excess of the published connectivity distances, across which any SPA bird populations may have interaction with the Site. The online sources used to obtain this information were;

- SNH Sitelink[13];
- JNCC website[14]; and
- Defra Magic website[15].

6.3.8 In addition, information from both confidential and public domain survey data, scientific publications, grey literature and ES/EIA/Consultations for nearby developments was searched to build understanding of bird communities in and around the Site.

6.3.9 A key source of additional survey data comes from the BTO Wetland Bird Survey (WeBS). Count data was obtained from the BTO for the sectors which most closely corresponded to count sectors A, B and C. The Preston Grange to Port Seton sector was determined to represent a comparable area of survey to the survey area covered during baseline surveys (Sectors A-C), the extent of which are shown in Figure 6.5. For this sector, monthly high tide count data was obtained for the five year period 2014/15 to 2018/19. In addition, low tide count data for the entire Firth of Forth was obtained for the winter 2003/04 (the most recent count available).

6.3.10 Primary sources of contextual data include the following (additional sources are referenced in footnotes):

- Birds in South-east Scotland 2007-13[16] ;
- The Birds of Scotland. Scottish Ornithologists Club[17] ;
- Population estimates of birds in Great Britain and the United Kingdom (4th report of the Avian Populations Estimate Panel)[18] ;
- Population estimates of wintering waterbirds in Great Britain[19] ;
- Bird Atlas 2007-11: the Breeding and wintering Birds of Britain and Ireland [20];
- Lothian Scottish Ornithologist 2010-2020 bird records;
- Birds of Conservation Concern (BoCC) 4: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man[21] ; and

[13] Available at http://gateway.snh.gov.uk/sitelink/index.jsp [Accessed 14.01.21]

[14] Available at https://www.jncc.gov.uk [Accessed 14.01.21]

[15] Available at https://magic.defra.gov.uk/ [Accessed 14.01.21]

[16] Murray R, Andrews I & Holling, M [eds] (2018). Birds in South-east Scotland 2007-13. The Scottish Ornithologists' Club, Aberlady

[17] Forrester RW, Andrews IJ, McInerny CJ, Murray RD, McGowan RY, Zonfrillo,B, Betts, MW, Jardine DC, and Grundy DS [eds.] (2007). The Birds of Scotland. The Scottish Ornithologists' Club, Aberlady.

[18] Woodward I, Aebischer N, Burnell D, Eaton M, Frost T, Hall C, Stroud D. (2020). Population estimates of birds in Great Britain and the United Kingdom. British Birds. 113: 69-104.

[19] Frost T, Austin G, Hearn R, McAvoy S. Robinson A, Stroud D, Woodward I, & Wotton S. (2019) Population estimates of wintering waterbirds in Great Britain. British Birds, 112: 130-145

[20] Murray R, Andrews, I and Holling M. [eds] (2018). Birds in South-east Scotland 2007-13. The Scottish Ornithologists' Club, Aberlady

[21] Eaton MA, Brown, AF, Noble, DG, Musgrove, AJ, Hearn, RD, Aebischer, NJ, Gibbons DW, Evans A, and Gregory RD. (2015) Birds of Conservation Concern (BoCC) 4: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man. British Birds, 108: 708-746

- The Status of UK SPAs in the 2000s: the Third Network Review.[22].

Field Survey

6.3.11 Each survey sector extended out to 1.5 km from the Mean High Water Springs (MHWS) mark. To identify the distribution of birds, the count sectors were segregated into three distance bands; 0 m - 500 m, 500 m - 1 km and 1 km - 1.5 km (Figure 6.3). This was the same methodology used for the Inch Cape EIA field surveys[23], which were also completed by RPS. The value of this consistent approach is that it gives added depth and robustness to the baseline data available for the assessment.

6.3.12 Surveys of each sector were conducted by a surveyor at approximately monthly intervals between July 2020 and March 2021. During each survey the number of birds present along the foreshore and near shore coastal waters was counted and ascribed to one of the three distance bands. Observations of bird species (including the numbers of each species in a given location and behaviour – see below) were plotted onto a field map using standard BTO species codes and notation.

6.3.13 Surveys were scheduled to cover a range of different tidal conditions (high, low and mid-tide; spring and neap tides) throughout the survey programme. Survey methods were based on the high tide (core count) methodology of the BTO/JNCC/RSPB/WWT WeBS scheme [24]. This involved the surveyor counting birds from vantage points along the coast using binoculars and a telescope. In addition to the location and number of birds, notes were also made on their behaviour.

6.3.14 Field records were transferred to a Geographic Information System (GIS). This produced accurate information on the distribution of birds within the study area and enabled maps to be produced so that areas of ornithological importance could be identified. It also allowed data to be compared to the Inch Cape fieldwork from 2012 to 2013[25].

6.3.15 Weather conditions including wind speed (using the Beaufort Scale), cloud cover (estimated as eighths or octas of the sky), visibility and temperature were also recorded as well as sources of disturbance to birds encountered during surveys. Details of the intertidal and near shore coastal bird survey effort is presented in Table 6.1.1 of Technical Appendix 6.1.

Criteria for the Assessment Effects

Criteria for Assessing the Sensitivity of Receptors

6.3.16 The identification of important ornithological features and assessing their level of importance is guided by a range of criteria, as defined in Table 6.2. These criteria are a guide and not definitive; ornithologists should apply judgment based on knowledge of the region and bird populations involved.

[22] Stroud DA, Bainbridge, IP, Maddock A, Anthony S, Baker H, Buxton N, Chambers D, Enlander I, Hearn, RD, Jennings, KR, MaIOF R, Whitehead S and Wilson JD. – on behalf of the UK SPA & Ramsar Scientific Working Group [eds](2016). The status of UK SPAs in the 2000s: the Third Network Review. JNCC, Peterborough.

[23] Inch Cape Offshore Limited (ICOL) (2018). Inch Cape Offshore Wind Farm Environmental Statement, Technical Appendix 6C: ornithology Intertidal and Nearshore Bird Surveys (2012/2013). Prepared by RPS on behalf of ICOL.

[24] Musgrove A, Langston R, Baker H and Ward R. (2003). Estuarine Waterbirds at Low Tide: The WeBS Low Tide Counts 1992–93 to 1988–99. WSG/BTO/WWT/RSPB/JNCC, Thetford.

[25] Inch Cape Offshore Limited (ICOL) (2018). Inch Cape Offshore Wind Farm Environmental Statement, Technical Appendix 6C: ornithology Intertidal and Nearshore Bird Surveys (2012/2013). Prepared by RPS on behalf of ICOL.

Table 6.2: Approach to Valuing Ornithological Receptors	
Level of Importance	Example of IOF
International	Species listed as qualifying feature of an internationally designated site (SPA/ Ramsar Site, including candidate sites). Birds listed as Annex I/ Schedule I. This includes birds outside of protected areas, particularly when clear connectivity with internationally designated populations or where population at levels with sufficient conservation importance to meet criteria for SPA selection.
National	A species listed as a qualifying feature of a nationally designated site (e.g. SSSI).
Regional	A bird species present in regionally-important numbers, e.g. more than 1% of regional or Natural Heritage Zone population. Birds that are subject to conservation action plans e.g. Scottish Biodiversity List/ UKBAP/ LBAP. Birds that form part of the cited interests of a Local Nature Reserve, or some local–level site designation.
District	Bird species where a significant proportion (greater than 1%) of the sub-region/ district population uses the Site.
Local	A bird species that is of nature conservation value in a local context only, with insufficient value to merit a formal designation (e.g. Red and Amber-listed BoCC species).
Negligible	Common and widespread species of little or no conservation importance (green-listed BoCC species).

6.3.17 For the purposes of this assessment, the important populations described in Table 6.2 are graded as High/ Medium and Low sensitivity as follows;

- High: Site population is of International/ national importance
- Medium: Site population is Regional/ District importance
- Low: local: Site population is Local / Negligible importance

6.3.18 Whilst it is important to assess the importance or value of the species found during baseline surveys, the most critical consideration with regards to the EIA is the importance of the Site for these species at a population level. This is because it is impacts on the bird population using the Site of the Proposed Development that is required to be assessed by the EIA process.

6.3.19 Therefore, in the following assessment, for each IOF present at the Site, there is a value given as Site level of importance from international through to negligible. The Site level of importance is a function of the species value in combination with the size of population occupying or reliant on the Site. For example, if an internationally important species has been recorded at a site only once, or only over-flying the survey area, then the Site level of importance would be considered negligible.

Criteria for Assessing the Magnitude of Change

6.3.20 The magnitude of change is described in the EIA Report as a quantitative value as far as is practicable. For example, magnitude of change can be quantified as a percentage decline of a population or as area of habitat from which birds will be displaced.

6.3.21 The magnitude of change from a given development will differ between species and populations, and therefore assessing the magnitude requires consideration of birds' behavioural sensitivity, population size and condition (among other considerations, notably (relevant to this site), and the degree or habituation to pre-existing background levels of human activity – walkers, dog walkers, cyclists, adjacent road traffic and off-road motorbikes). Examples include different species' responses to disturbance, and the greater vulnerability of small, declining and isolated populations to the impacts of additional pressures.

6.3.22 In addition, the magnitude of an impact is influenced by the duration of the impact, irreversibility and cumulative effects of other impacts. With regard to duration of impact, it can be defined as permanent (beyond 25 years duration), long-term (15 to 25 years), medium-term (5 to 15 years) and short-term (up to 5 years). Again, knowledge of the populations' ability to recover from impacts is required to assess the duration of the effect. For example, mortality events for species with small population sizes and low reproductive output (such as raptors) will take considerably longer than abundant and widespread species that have high output and will fill vacant territories and replace numbers rapidly (e.g. small passerines such as skylark and meadow pipit).

6.3.23 Consideration of the above factors allows quantification as to the magnitude of effect. Table 6.3 presents magnitude at four levels, from major to negligible and this is the scale by which effect or change is quantified in this chapter. Note that the magnitude of effect is sometimes referred to as magnitude of change, as the level of effect can be quantified in terms of change in population, range etc. Note that some of the lower magnitudes of effect can be applied to beneficial (positive) impacts.

Table 6.3: Defining the Magnitude of Effect on Important Ornithological Features

Magnitude	Typical Descriptors of Effect
Major	Would cause the loss of a major proportion or whole feature/ population, or cause sufficient damage to a feature so as to immediately compromise long-term viability. Irreversible. For example, more than 20% decline in population an area is able to support in the long-term.
Moderate	Effects that are detectable in short and longer-term but which should not alter the long-term viability of the feature/ population, for example 10-% to 20% decline in population an area is able to support.
Minor	Minor effects, ether sufficiently small-scale or short-duration cause no long-term decline in feature/ population, for example less than 10% decline in population an area is able to support.
Negligible	A potential impact that is not expected to affect the feature/ population in any meaningful way, with no detectable decline in population/ distribution. Any change from baseline conditions predicted at <1%.

Criteria for Assessing Cumulative Effects

6.3.24 Within the European legislative framework, the Habitats Regulations (EC Directive 92/43/EEC) require an assessment of in-combination effects of development projects of features within Special Protection Areas (SPA). Under UK law the consideration of cumulative effects of projects is integrated into the Environmental Impact Assessment (EIA) Regulations (EC Directive 97/11/EC), of which it forms an essential feature.

6.3.25 An assessment of the cumulative impacts on SPA qualifying features identified in this chapter is required by including the additive effects from adjacent developments.

6.3.26 Cumulative impact assessment (CIA) requires the availability of EIA Report chapters and appraisals for adjacent developments which have concluded effects on the same IOF populations assessed as subject to effects in this chapter. This includes sites that are operational, consented, or for which a valid application has been submitted.

6.3.27 Varying degrees of access to these appraisals, and their differing degrees or detail or completeness, complicates the ability to undertake a thorough review of all impacts for cumulative impact assessment. Even where the appraisals are available, survey periods and methods may differ following changes to guidance and legislation over time. Furthermore, some schemes may have been in operation for many years, and therefore contemporary data is not available.

6.3.28 For cumulative impacts on avian receptors, NatureScot guidance will be followed[26] [27].

Criteria for Assessing Significance

6.3.29 Having followed the process of assessing the importance of bird populations and quantifying the magnitude of impact (through consideration of the sensitivity of the population and duration of effect), the final stage of the EIA process is to establish the significance of the impact.

6.3.30 CIEEM (2018) guidance requires a determination of whether an effect is significant or not significant. Significance of an effect is determined by a combination of the magnitude of the effect and the importance of the population/ feature.

6.3.31 This chapter uses the definition of a significant effect, as defined by the EIA Regulations, as an effect that threatens the integrity of a designated ornithological feature of international importance, such the viability of SPA populations of breeding raptors.

6.3.32 CIEEM discourages the use of matrices for determination of significant effects, advising professional judgement is to be used. However, a matrix for determining significant effects is often requested, and it is often useful in illustrating the process behind determination of significance.

6.3.33 Table 6.4 shows the matrix used here for determination of significance. This is a generic matrix (for all EIA considerations) and notes have been added to illustrate the considerations for ornithological features.

6.3.34 As can be seen from the matrix, significant effects would require the outcome of a high-level magnitude of change on populations of birds with high levels of importance. For a hypothetical example, were a development to effect on the breeding population of an SPA-qualifying bird species (high sensitivity) and result in a long-term decline of 25% (substantial magnitude), then the effect would be Major (significant).

Table 6.4: Matrix for Determination of Significant Impacts

		Magnitude of Change			
		Major	Moderate	Minor	Negligible
Sensitivity	High	Major	Major/ Moderate	Moderate	Slight
	Medium	Major/ Moderate	Moderate	Moderate/ Minor	Minor
	Low	Moderate	Moderate/ Minor	Minor	Minor/ Negligible

Sensitivity: Conservation importance of bird population
High: Site population is of International / national importance
Medium: Site population is Regional / District importance
Low: local: Site population is Local / Negligible importance
Magnitude of change: Size of effect on population/feature. Assessed with consideration of sensitivity of species/ feature to impact, duration of effect and ability of species/ feature to recover (among other factors)
Significant impacts are in dark shading

Limitations and Assumptions

6.3.35 The assessment of likely significant effects is based as much as possible on published scientific research and the most current known population data. When empirical data is lacking or insufficient, the judgement of experienced ornithologists with detailed knowledge or bird behaviour and ecology is required. Any assumptions made during this assessment are clearly

[26] RPS (2010). Assessment methodology for determining cumulative impacts of wave and tidal marine renewable energy devices on marine birds. Scottish Natural Heritage Archive Report No. 050.

[27] SNH (2012). Assessing the cumulative impact of onshore wind energy developments. Scottish Natural Heritage, Battleby.

stated. With regard to uncertainty in the magnitude of adverse effects, the precautionary principle is applied; i.e. lack of full scientific certainty should not be used as a reason for postponing or failing to take measures to mitigate these adverse effects.

6.4 Baseline Conditions

Current Baseline

Designated Sites

6.4.1 The desk study identified the following four international sites within 40 km of the Proposed Development (Figure 6.1 and 6.2). These sites are:

- Firth of Forth Special Protection Area (SPA) and Wetland of International Importance (Ramsar Site);
- Forth Islands SPA;
- Imperial Dock Lock, Leith SPA; and
- Outer Firth of Forth and St. Andrews Bay SPA.

6.4.2 Further details of each of these SPAs can be found in the Technical Appendix 6.1.

6.4.3 The SPA qualifying species that were either recorded using the Site during baseline surveys or were reported from the Site in desk study sources are described in Section 1.3.

6.4.4 The cable landfall corridor does directly overlap the Firth of Forth SPA where it crosses the area between the Mean Low Water Spring (MLWS) and Mean High Water Spring (MLHS) high tide (Figure 6.1).

6.4.5 It also overlaps the Outer Firth of Forth and St. Andrews Bay SPA below MLWS (Figure 6.1).

6.4.6 The Firth of Forth SPA and the recently-designated Outer Firth of Forth and St Andrews Bay Complex SPA encompasses all internationally and nationally important bird populations using the wider Firth of Forth, including the qualifying interests of the Firth of Forth Islands and Imperial Dock Lock, Leith SPA.

6.4.7 The Outer Firth of Forth and St Andrews Bay Complex SPA also includes protection of non-wintering populations of seabirds within the Firth of Forth (whereas the Forth Islands SPA or the Imperial Dock Lock, Leith SPA form protected areas for breeding colonies).

6.4.8 Therefore, an assessment of potential indirect effects on Firth of Forth Islands and Imperial Dock Lock, Leith SPAs is *de facto* achieved by consideration of the qualifying populations of the Outer Firth of Forth and St Andrews Bay Complex SPA and Firth of Forth SPA. Consequently, this assessment focuses on potential effects on the qualifying features of these two SPAs.

6.4.9 The qualifying species of the Outer Firth of Forth and St Andrews Bay Complex SPA and Firth of Forth SPA, on which the following assessment shall focus, are listed in Tables 6.5, 6.6 and 6.7 on the following pages.

Table 6.5: Qualifying Species of the Outer Firth of Forth and St Andrews Bay Complex SPA			
Feature	Feature Type	Population	Recorded in Survey Area?
Non-breeding Wildfowl, Divers and Grebes (waterfowl assemblage)			
Red-throated diver	Annex I[1]	851 individuals (5.0% GB population)	Yes
Slavonian grebe	Annex I[1]	30 individuals (2.7% GB population)	Yes
Eider	Migratory[2]	21,546 individuals (2.1% of biogeographic/ 35.9% GB population)	Yes
Long-tailed duck	Migratory[3]	1,948 individuals (17.7% GB population)	Yes
Common scoter	Migratory[3]	4,677 individuals (4.7% GB population)	Yes
Velvet scoter	Migratory[3]	775 individuals (31% GB population)	Yes
Common goldeneye	Migratory[3]	589 individuals (31% GB population)	Yes
Red-breasted merganser	Migratory[3]	431 individuals (5.1% GB population)	Yes
Waterfowl assemblage	Mixed	>20,000 individual birds	
Non-breeding Seabirds			
European shag	Migratory[2]	2,426 individuals (2.2% GB population)	Yes
Common guillemot	Migratory[4]	21,969 individuals (above threshold of 2,000 individuals)	Yes
Razorbill	Migratory[4]	5,481 individuals (above threshold of 2,000 individuals)	Yes
Herring gull	Migratory[2]	12,313 individuals (1.7% GB population)	Yes
Black-headed gull	Migratory[2]	26,835 individuals (1.2% GB population)	Yes
Common gull	Migratory[2]	14,647 individuals (2.1% GB population)	Yes
Black-legged kittiwake	Migratory[4]	3,191 individuals (above threshold of 2,000 individuals)	Yes
Little gull	Annex I[1]	126 individuals (above threshold of 50 individuals)	No (recorded in Sector D1)
Seabird assemblage (non-breeding)	Mixed	>20,000 individual birds	
Breeding Seabirds			
Arctic tern	Annex I[5]	8.8% GB population	Yes
Common tern	Annex I[5]	1.0% GB population	Yes
European shag	Migratory[6]	4.6% GB population/ 1.7% of biogeographic population	Yes
Northern gannet	Migratory[6]	10,945 individuals (1.4% of biogeographic/ 2.7% GB population)	Yes
Atlantic puffin	Migratory[7]	61,086 individuals (5.3% GB population)	No
Black-legged kittiwake	Migratory[7]	12,020 individuals (1.6% GB population)	Yes

Table 6.5: Qualifying Species of the Outer Firth of Forth and St Andrews Bay Complex SPA			
Feature	Feature Type	Population	Recorded in Survey Area?
Manx shearwater	Migratory[8]	2,885 individuals (above threshold of 2,000 individuals)	No
Common guillemot	Migratory[8]	28,123 individuals (above threshold of 2,000 individuals)	Yes
Herring gull	Migratory[7]	3,044 individuals (1.1% GB population)	Yes
Seabird assemblage (breeding)	Mixed	>20,000 individual birds	Yes
[1] = Annex I species; non-breeding populations of European Importance. Qualifies under Article 4.1.		[5] = Annex I species; breeding populations of European Importance. Qualifies under Article 4.1	
[2]= Species with non-breeding populations of European Importance. Qualifies under Article 4.2.		[6]= Species with breeding populations of European Importance. Qualifies under Article 4.2.	
[3]= Species with non-breeding populations of National Importance (>1% GB population); named qualifier of assemblage). Qualifies under Article 4.2.		[7]= Species with non-breeding populations of National Importance (>1% GB population); named qualifier of assemblage) Qualifies under Article 4.2	
[4]= Species with non-breeding populations of National Importance (>2000 individuals); named qualifiers of assemblage. Qualifies under Article 4.2.		[8]= Species with non-breeding populations (>2000 individuals); named qualifiers of assemblage. Qualifies under Article 4.2.	

Table 6.6: Qualifying Species of the Firth of Forth SPA			
Feature	Feature Type	Population	Recorded in Survey Area?
Non-breeding Waders and Wildfowl, Divers and Grebes (waterfowl assemblage)			
Red-throated diver	Annex I[1]	90 individuals (2.0% GB population)	Yes
Slavonian grebe	Annex I[1]	84 individuals (21% GB population)	Yes
Golden plover	Annex I[1]	2,949 individuals (1% GB population)	Yes
Bar-tailed godwit	Annex I[1]	1,974 individuals (4% GB population)	Yes
Sandwich tern	Annex I[1]	1,617 individuals (6% GB population)	Yes
Pink-footed goose	Migratory[2]	10,852 individuals (6% Biogeographic population)	No (recorded during terrestrial surveys)
Shelduck	Migratory[2]	4,509 individuals (2% Biogeographic population)	No(recorded in Sector B1 during terrestrial survey)
Knot	Migratory[2]	9,258 individuals (3% Biogeographic population)	No (occasional in Sector D1 and E1)
Redshank	Migratory[2]	4,341 individuals (3% Biogeographic population)	Yes
Turnstone	Migratory[2]	860 individuals (3% Biogeographic population)	Yes
Scaup	Migratory[3]	437 individuals (4% Biogeographic population)	No
Great-crested grebe	Migratory[3]	720 individuals (7% GB population)	Yes

Table 6.6: Qualifying Species of the Firth of Forth SPA			
Feature	Feature Type	Population	Recorded in Survey Area?
Cormorant	Migratory[3]	682 individuals (5% GB population)	Yes
Curlew	Migratory[3]	1,928 individuals (2% GB population)	Yes
Eider	Migratory[3]	9,400 individuals (13% GB population)	Yes
Long-tailed duck	Migratory[3]	1,045 individuals (4% GB population)	Yes
Common scoter	Migratory[3]	2,880 individuals (8% GB population)	Yes
Velvet scoter	Migratory[3]	635 individuals (21% GB population)	Yes
Goldeneye	Migratory[3]	3,004 individuals (18% GB population)	Yes
Red-breasted merganser	Migratory[3]	670 individuals (7% GB population)	Yes
Oystercatcher	Migratory[3]	7,846 individuals (2% GB population)	Yes
Ringed plover	Migratory[3]	328 individuals (1% GB population)	Yes
Grey plover	Migratory[3]	724 individuals (2% GB population)	No(recorded in terrestrial sector 2-A)
Dunlin	Migratory[3]	9,514 individuals (2% GB population)	No (occasional in Sector D1 and E1)
Mallard	Migratory[4]	2,564 individuals (0.5% GB population)	No (recorded in Sector D1 and terrestrial sectors)
Lapwing	Migratory[4]	4,148 individuals (0.3% GB population)	No (recorded in Sector E1 and terrestrial sector 2-B)
Wigeon	Migratory[4]	2,139 individuals (0.78% GB population)	No (recorded in Sector D1 and terrestrial sector 2-B)
Waterfowl assemblage	Mixed	>20,000 individual birds	
[1] = Annex I species; non-breeding populations of European Importance. Qualifies under Article 4.1.			
[2]= Species with non-breeding populations of European Importance. Qualifies under Article 4.2.			
[3]= Species with non-breeding populations of National Importance (>1% GB population); named qualifier of waterfowl assemblage). Qualifies under Article 4.2.			
[4]= Species with non-breeding populations of National Importance (>2000 individuals); named qualifiers of waterfowl assemblage. Qualifies under Article 4.2.			

6.4.10 There are two additional seabird species for which the breeding population is a qualifying interest of the Forth Islands SPA (which are not named qualifying features of the Outer Firth of Forth and St Andrews Bay Complex SPA). Cormorant and lesser black-backed gull are both designated as of European importance on the Forth Islands SPA citation (these are assumed to be components of the breeding seabird assemblage of the Outer Firth of Forth and St Andrews Bay Complex SPA).

Table 6.7: Qualifying Species of the Forth Islands SPA that are not listed on the Outer Firth of Forth and St Andrews Bay Complex SPA			
Feature	Feature Type	Population	Recorded in Survey Area?
Breeding Seabirds			
Lesser black-backed gull	Migratory[1]	1,500 pairs (1.2% biogeographic population)	Yes
Cormorant	Migratory[1]	200 pairs (2.8% GB population)	Yes
[1]= Species with non-breeding populations of National Importance (>1% GB population); named qualifier of waterfowl assemblage). Qualifies under Article 4.2.			

Terrestrial Bird Survey Results

6.4.11 In total 46 Red and Amber-listed Birds of Conservation Concern were recorded across the survey area, comprising 20 Red-listed species and 26 Amber-listed species. Red and Amber-listed species are presented in Tables 6.8 and 6.9 respectively.

6.4.12 Many of the Red and Amber-listed species were qualifying features of the Firth of Forth SPA and Outer Firth of Forth and St Andrews Bay SPA. These records were mainly of birds roosting adjacent to the coastline and their numbers are discussed in the context of SPA populations. An exception is a particularly large count of 877 black-headed gull in sector 2-B in November 2020 but this aggregation was of gulls following a tractor ploughing winter stubble.

6.4.13 Counts of Red and Amber-listed birds are summarised in Table 6.8 and Table 6.9. With the exception of the coastal species (mainly SPA qualifiers), these are largely agricultural species; farmland passerines and grey partridge. With the exception of linnet, these species were mainly found within Sector 2-B and at low density. Populations of tree sparrow, yellowhammer, and grey partridge were consistently encountered at broadly the same locations throughout surveys and were not widespread throughout the Site (during the non-breeding season).

6.4.14 Other Amber-listed species included small numbers of wildfowl, including gadwall, teal, mallard and wigeon. These were all found on small pools within sector 2-A and have no predicted effects from the Proposed Development.

6.4.15 Species such as snipe, lapwing, woodcock and stonechat were found to use the site during hard-weather events (when freezing conditions or snow cover force movement away from more preferred locations). In addition, golden plover were found to use the near-shore Sectors C and D in large numbers following heavy snow in February (with 206 recorded on 12 February).

6.4.16 Terrestrial surveys of the Site encompass the period July 2019 to March 2020. Therefore, the breeding bird assessment uses a combination of survey results and desk study data in order to determine the baseline.

6.4.17 Therefore, the surveys conclude that, with the exception of the SPA qualifying species assessed elsewhere in this chapter, the non-breeding bird assemblage is of local importance. In addition, the majority of Red-listed and Amber-listed species were encountered to the east of the Site, where effects are considered negligible (effects on SPA-qualifying species are assessed separately). Therefore, the Red and Amber-listed species listed in Tables 6.8 and 6.9 are not considered to be sensitive IOFs and are not discussed further in this chapter.

Table 6.8: Monthly Counts of BoCC Red-Listed Species Recorded

Species	Sector	Jul' 20	Aug' 20	Sep' 20	Oct' 20	Nov' 20	Dec' 20	Jan' 21	Feb' 21	Mar' 21
Curlew	1a	0	0	0	1	0	0	5	0	0
	1b	0	0	0	0	0	0	1	0	0
	2b	0	0	0	55	0	0	15	0	32
Fieldfare	1a	0	0	0	0	0	0	0	1	0
	1b	0	0	0	0	6	0	0	0	0
	2a	0	0	0	0	0	0	0	6	0
	2b	0	0	0	0	3	1	0	0	0
Grey Wagtail	1b	0	0	0	1	1	0	0	0	0
	2b	1	0	0	0	2	0	0	0	0
Herring Gull	1a	151	5	10	38	20	2	5	0	19
	1b	2	0	0	0	0	4	0	2	0
	2b	14	13	13	30	59	89	5	0	1
House Sparrow	1a	9	0	7	12	7	0	6	4	8
	1b	1	0	2	3	0	0	0	0	0
	2b	6	2	0	1	2	1	5	5	2
	Incidental	0	0	4	0	0	0	2	0	1
Lapwing	2b	0	0	0	0	0	0	19	24	0
Linnet	1a	15	19	80	3	51	0	0	0	0
	1b	5	0	0	1	0	0	1	0	0
	2a	0	0	0	0	0	0	5	2	0
	2b	41	164	35	3	0	0	17	0	0
	Incidental	1	0	0	0	0	0	0	0	0
Lesser Redpoll	1b	0	0	0	0	0	0	7	0	0
	2b	0	0	0	0	0	30	0	0	0
Long-tailed duck	2a	0	0	0	0	0	0	2	0	0
Mistle Thrush	1a	0	0	0	0	1	0	4	0	0
	1b	0	0	0	0	1	1	0	2	0
	2b	1	0	4	2	3	5	57	0	0
Grey Partridge	2b	2	11	3	14	12	0	12	26	4
	Incidental	0	0	0	11	10	0	0	0	0
Redwing	1a	0	0	0	0	1	0	0	0	0
	1b	0	0	0	1	31	42	0	0	0
	2b	0	0	0	1	17	19	0	0	2
Ringed Plover	1a	13	0	34	0	17	0	2	0	8
Shag	Incidental	0	0	0	0	0	0	1	0	0
Skylark	1a	0	0	0	5	0	0	0	0	0

Table 6.8: Monthly Counts of BoCC Red-Listed Species Recorded

Species	Sector	Jul' 20	Aug' 20	Sep' 20	Oct' 20	Nov' 20	Dec' 20	Jan' 21	Feb' 21	Mar' 21
	1b	0	0	0	6	0	0	6	0	0
	2a	0	0	0	0	0	0	5	0	0
	2b	5	0	0	0	9	0	20	0	34
Starling	1a	23	7	8	0	4	0	0	0	0
	1b	10	0	13	5	0	2	1	0	0
	2b	0	40	23	5	2	75	1	0	0
Song Thrush	1a	0	0	0	0	0	2	1	3	0
	1b	1	0	1	1	1	1	0	0	1
	2b	2	0	1	1	2	0	3	2	5
Tree Sparrow	1a	0	0	0	0	0	0	2	0	2
	2b	8	21	31	1	0	2	1	0	0
	Incidental	4	0	2	0	0	0	0	5	0
Woodcock	1b	0	0	0	0	0	0	0	2	0
	2b	0	0	0	0	0	0	0	1	0
Yellowhammer	1b	0	0	0	1	0	0	0	0	0
	2a	0	0	0	0	0	0	0	2	0
	2b	4	1	3	1	0	0	0	1	0

Table 6.9: Monthly Counts of BoCC Amber-Listed Species Recorded

Species	Sector	Jul' 20	Aug' 20	Sep' 20	Oct' 20	Nov' 20	Dec' 20	Jan' 20	Feb' 20	Mar' 20
Bar-tailed Godwit	2a	0	0	0	0	0	0	7	0	0
Bullfinch	1a	0	0	0	0	1	0	0	6	3
	1b	0	0	1	2	5	0	2	1	6
	2a	0	0	0	0	0	0	3	2	0
	2b	2	1	0	0	1	5	0	1	0
Black-headed Gull	1a	16	10	7	5	9	0	7	0	41
	2a	0	0	0	0	0	0	3	0	0
	2b	4	0	1	13	877	26	17	0	1
	Incidental	0	2	0	0	1	0	0	0	0
Common Gull	2a	0	0	0	0	0	0	4	0	0
	2b	0	0	0	3	0	0	26	5	0
	1a	2	1	0	0	2	2	28	0	29
	1b	0	0	0	0	0	0	2	1	0
Dunnock	1a	0	0	0	0	0	0	1	0	2

Table 6.9: Monthly Counts of BoCC Amber-Listed Species Recorded										
Species	Sector	Jul' 20	Aug' 20	Sep' 20	Oct' 20	Nov' 20	Dec' 20	Jan' 20	Feb' 20	Mar' 20
	1b	1	0	3	2	3	0	1	0	5
	2b	5	0	3	1	0	3	2	1	4
	Incidental	0	1	0	0	0	0	0	1	0
	2a	0	35	0	0	0	0	0	0	0
Eider	Incidental	34	102	0	0	0	0	15	0	0
	1a	0	0	0	0	0	0	0	1	0
	2b	0	0	0	3	4	3	0	0	0
Gadwall	1a	12	0	0	0	0	0	0	0	0
	2b	0	0	0	0	0	0	0	0	2
Great Black-backed Gull	2b	0	0	0	0	0	1	0	0	0
	Incidental	1	0	0	0	1	0	1	0	0
	1a	0	0	0	0	53	0	0	0	1
Grey Plover	2a	0	0	0	0	0	0	1	0	0
Goldeneye	1a	0	1	0	0	0	0	0	0	0
House Martin	1b	2	0	0	0	0	0	0	0	0
	2b	17	1	0	0	0	0	0	0	0
	Incidental	2	0	0	0	0	0	0	0	0
	1a	1	0	0	0	0	1	0	0	0
Kestrel	1b	1	0	0	1	0	0	1	0	0
	2b	4	0	0	0	0	1	0	0	0
	1a	1	0	0	0	0	0	0	0	0
Lesser Black-backed Gull	2b	1	0	0	0	0	0	0	0	0
	2b	0	0	0	16	17	20	0	0	0
Mallard	1a	0	0	1	0	0	0	0	0	2
	2b	0	0	0	0	0	0	0	0	9
Meadow Pipit	2b	2	0	0	0	1	2	0	0	0
Mute Swan	2b	0	0	0	2	0	0	1	2	0
Oystercatcher	2a	0	0	0	0	0	0	2	0	0
	2b	9	0	0	6	6	5	6	5	0
	Incidental	0	7	0	0	0	0	0	0	0
	1a	0	0	0	0	0	47	93	5	8
Pink-footed Goose	1b	0	0	123	0	0	0	0	0	0
	2b	0	0	45	0	0	0	0	0	0
	1a	0	0	0	0	3	0	94	0	0
Purple Sandpiper	1b	0	0	0	1	0	0	0	0	0
Reed Bunting	2b	9	1	3	3	1	1	2	5	2

Table 6.9: Monthly Counts of BoCC Amber-Listed Species Recorded										
Species	Sector	Jul' 20	Aug' 20	Sep' 20	Oct' 20	Nov' 20	Dec' 20	Jan' 20	Feb' 20	Mar' 20
	1a	0	0	4	0	3	6	0	1	0
	1b	0	0	0	0	0	0	0	3	1
Redshank	2b	1	1	0	0	0	0	4	11	1
Stock Dove	2b	0	0	0	0	4	0	0	0	0
Sandwich Tern	Incidental	0	5	0	0	0	0	0	0	0
	1a	0	0	3	0	6	0	0	0	0
Shelduck	Incidental	0	0	0	0	0	0	3	0	0
Turnstone	1a	0	0	0	0	0	0	3	8	0
	2b	0	0	0	0	4	0	0	0	0
Wigeon	2a	0	0	0	0	0	0	22	0	0
	2b	0	0	0	0	16	3	0	0	12

Important Ornithological Feature (IOF)

IOF OF INTERNATIONAL IMPORTANCE: SPA FEATURES

6.4.18 Tables 6.6 to 6.7 show that the majority of qualifying species of the Outer Firth of Forth and St Andrews Bay Complex SPA and Firth of Forth SPA were recorded within the survey area during baseline surveys. These are bird populations of international importance (populations of European significance) and national importance (populations of UK significance). As they are all named qualifiers of the SPAs, these species are considered high sensitivity IOF of international importance.

6.4.19 In addition, those few species not recorded within Sectors A, B or C were either recorded in the adjacent sectors or are known to at least occasionally use the survey area (from WeBS data, Lothian Bird Recorder search records and surveyor knowledge of site).

6.4.20 Therefore, all populations designated as qualifying interests of the St Andrews Bay Complex SPA and Firth of Forth SPA are considered high sensitivity IOF of international importance.

6.4.21 The qualifying species are quite distinct in their habitat, ecology and period during which they are present in the Firth of Forth (breeding/ non-breeding season). Therefore, for the assessment of possible effects, these species shall be grouped as follows;

- Non-breeding wader populations (Firth of Forth SPA populations);
- Non-breeding diver, grebe, sea duck and seabird populations (Firth of Forth and Outer Firth of Forth and St Andrews Bay Complex SPA populations); and
- Breeding seabird populations from adjacent SPAs (Forth Islands SPA/ Imperial Dock Lock, Leith SPA); by consideration of those populations described in the St Andrews Bay Complex SPA.

IOF OF INTERNATIONAL IMPORTANCE: NON-BREEDING WADER POPULATIONS (SPA FEATURES)

6.4.22 The peak counts of waders during baseline surveys, alongside the peak counts for the equivalent WeBS sector between 2014 and 2019 are presented in Table 6.10. For context, these count data are presented as a percentage of the qualifying populations of the Firth of

Forth SPA. The WeBS Sector fit closely to the survey area however, extends further along the coastline to east and west (Figure 6.5).

Table 6.10: Peak Counts of Firth of Forth SPA-qualifying Waders during Baseline Surveys and WeBS 2014-19

Species	Firth of Forth SPA Population[1]	Peak Count Baseline Survey[2]	Baseline % of Designated Population	Peak Count WeBS[3]	Mean Peak WeBS[4]	WeBS % of Designated Population
Golden plover	2,949	1	0.03%	37	7	0.24%
Bar-tailed godwit	1,974	2	0.10%	4	1	0.05%
Knot	9,258	0	0.00%	5	1	0.01%
Redshank	4,341	23	0.53%	29	11	0.25%
Turnstone	860	56	6.51%	54	20	2.33%
Curlew	1,928	2	0.10%	18	6	0.31%
Oystercatcher	7,846	121	1.54%	194	56	0.71%
Ringed plover	328	21	6.40%	23	9	2.74%
Grey plover	724	(1)	(0.14%)	1	0	0.00%
Dunlin	9,514	0	0.00%	3	1	0.01%

Figures in parenthesis are counts of birds within Sectors A-C from terrestrial surveys only

[1] Designated population; Firth of Forth SPA

[2] Peak Count Baseline survey; six monthly counts July-December 2020; Sectors A/B/C

[3] Peak count for WeBS sector Preston Grange to Port Seton, period 2014-2019

[4] Mean of annual peak count WeBS sector Preston Grange to Port Seton, period 2014-2019 Rounded up/down

IOF OF INTERNATIONAL IMPORTANCE: NON-BREEDING WATERFOWL POPULATIONS (SPA FEATURES)

6.4.23 Non-breeding waterfowl numbers using the survey area are displayed as a proportion of the qualifying populations of the Firth of Forth SPA in Table 6.11. Numbers using the survey area are expressed as the peak counts of non-breeding waterfowl recorded during baseline surveys, alongside the mean peak counts for the equivalent WeBS sector between 2014 and 2019.

Table 6.11: Peak Counts of Firth of Forth SPA-qualifying Waterfowl during Baseline Surveys and WeBS 2014-19

Species	Firth of Forth SPA Population[1]	Peak Count Baseline Survey[2]	Baseline % of Designated Population	Peak Count WeBS[3]	Mean Peak WeBS[4]	WeBS % of Designated Population
Red-throated diver	90	18	20.00%	8	3	3.33%
Slavonian grebe	84	5	6.00%	2	1	1.19%
Pink-footed goose	10,852	(123)	(1.13%)	0	0	0.00%
Shelduck	4,509	(3)	(0.07%)	2	0	0.00%
Great-crested grebe	720	1	0.14%	1	0	0.00%
Eider	9,400	438	4.66%	228	131	1.39%

Table 6.11: Peak Counts of Firth of Forth SPA-qualifying Waterfowl during Baseline Surveys and WeBS 2014-19

Species	Firth of Forth SPA Population[1]	Peak Count Baseline Survey[2]	Baseline % of Designated Population	Peak Count WeBS[3]	Mean Peak WeBS[4]	WeBS % of Designated Population
Long-tailed duck	1,045	5	0.48%	13	1	0.10%
Common scoter	2,880	185	6.42%	0	0	0.00%
Velvet scoter	635	9	1.42%	54	10	1.57%
Goldeneye	3,004	50	1.66%	50	10	0.33%
Red-breasted merganser	670	12	1.79%	43	9	1.34%
Mallard	2,564	0	0.00%	3	1	0.04%
Wigeon	2,139	0	0.00%	43	13	0.61%
Scaup	437	0	0.00%	0	0	0.00%
Sandwich tern	1,617	43	2.66%	85	46	2.85%
Figures in parenthesis are counts of birds within Sectors A-C from terrestrial surveys only						
[1] Designated population; Firth of Forth SPA						
[2] Peak Count Baseline survey; six monthly counts July-December 2020; Sectors A/B/C						
[3] Peak count for WeBS sector Preston Grange to Port Seton, period 2014-2019						
[4] Mean of annual peak count WeBS sector Preston Grange to Port Seton, period 2014-2019 Rounded up/down						

6.4.24 Non-breeding waterfowl numbers using the survey area are displayed as a proportion of the qualifying populations of the Outer Firth of Forth and St Andrews Bay Complex SPA in Table 6.12. Numbers using the survey area are expressed as the peak counts of non-breeding waterfowl recorded during baseline surveys within the survey area, alongside the mean peak counts for the equivalent WeBS sector between 2014 and 2019.

Table 6.12: Peak Counts of Forth-St Andrews SPA-Qualifying Waterfowl During Baseline Surveys and WeBS 2014 to 19

Species	Forth-St Andrews SPA Population[1]	Peak Count Baseline Survey[2]	Baseline % of Designated Population	Peak Count WeBS[3]	Mean Peak WeBS[4]	WeBS % of Designated Population
Red-throated diver	851	18	2.12%	8	3	0.35%
Slavonian grebe	30	5	16.67%	2	1	3.33%
Eider	21,546	438	2.03%	228	131	0.61%
Long-tailed duck	1,948	5	0.26%	13	1	0.05%
Common scoter	4,677	185	3.96%	0	0	0.00%
Velvet scoter	775	9	1.16%	54	10	1.29%

Table 6.12: Peak Counts of Forth-St Andrews SPA-Qualifying Waterfowl During Baseline Surveys and WeBS 2014 to 19

Species	Forth-St Andrews SPA Population[1]	Peak Count Baseline Survey[2]	Baseline % of Designated Population	Peak Count WeBS[3]	Mean Peak WeBS[4]	WeBS % of Designated Population
Common goldeneye	589	50	8.49%	50	1	0.17%
Red-breasted merganser	431	12	2.78%	43	13	3.02%

[1] Designated population; Outer Firth of Forth and St Andrews Bay SPA

[2] Peak Count Baseline survey; six monthly counts July to December 2020; Sectors A/B/C

[3] Peak count for WeBS sector Preston Grange to Port Seton, period 2014-2019

[4] Mean of annual peak count WeBS sector Preston Grange to Port Seton, period 2014 to 2019 Rounded up/ down

IOF OF INTERNATIONAL IMPORTANCE: NON-BREEDING SEABIRD POPULATIONS (SPA FEATURES)

6.4.25 Non-breeding seabird numbers using the survey area are displayed as a proportion of the qualifying populations of the Firth of Forth SPA in Table 6.13. Numbers using the survey area are expressed as the peak counts of non-breeding waterfowl recorded during baseline surveys, alongside the mean peak counts for the equivalent WeBS sector between 2014 and 2019.

6.4.26 Note that all the peak counts from baseline surveys and WeBS are from the non-breeding season (September to November) or early post-breeding/ migration season (August peak for kittiwake).

Table 6.13: Peak Counts of Forth-St Andrews SPA-Qualifying Seabirds (non-breeding) During Baseline Surveys and WeBS 2014 to19

Species	Forth-St Andrews SPA Population[1]	Peak Count Baseline Survey[2]	Baseline % of Designated Population	Peak Count WeBS[3]	Mean Peak WeBS[4]	WeBS % of Designated Population
European shag	2,426	62	2.56%	62	31	1.28%
Common guillemot	21,969	69	0.31%	No data	No data	No data
Razorbill	5,481	9	0.16%	No data	No data	No data
Herring gull	12,313	316	2.57%	494	269	2.18%
Black-headed gull	26,835	56	0.21%	87	74	0.28%
Common gull	14,647	13	0.09%	80	40	0.27%
Black-legged kittiwake	3,191	19	0.60%	3	2	0.06%
Little gull	126	0	0.00%	0	0	0.00%

[1] Designated population; Outer Firth of Forth and St Andrews Bay SPA

[2] Peak Count Baseline survey; six monthly counts July to December 2020; Sectors A/B/C

[3] Peak count for WeBS sector Preston Grange to Port Seton, period 2014 to 2019

[4] Mean of annual peak count WeBS sector Preston Grange to Port Seton, period 2014 to 2019 Rounded up/ down

IOF OF INTERNATIONAL IMPORTANCE: BREEDING SEABIRD POPULATIONS (SPA FEATURES)

6.4.27 The breeding season for the seabird assemblage of the Firth of Forth is between March and August (this includes, for some species, pre-breeding colony attendance and post-fledging period). For gannet, this extends to September, when the majority of chicks fledge. Baseline surveys, starting in July 2020, do not adequately cover the breeding season. The WeBS survey data does not include counts for most of the breeding seabird species which are qualifying features of the Outer Firth of Forth and St Andrews Bay SPA. The count data available from the two sources are presented in Table 6.14.

Table 6.14: Available Counts of Forth-St Andrews SPA-qualifying Seabirds (breeding) During Baseline Surveys Conducted During Breeding Season and WeBS 2014-19

Month	March		April		May		June		July		August		September	
Survey	B	W	B	W	B	W	B	W	B	W	B	W	B	W
Arctic tern	n/s	n/d	n/s	n/d	n/s	0	n/s	n/d	0	n/d	n/d	n/d	0	0
Common tern	n/s	n/d	n/s	n/d	n/s	0	n/s	n/d	4	n/d	0	19	0	5
Sandwich tern	n/s	n/d	n/s	n/d	n/s	0	n/s	n/d	26	n/d	43	85	25	31
European shag	n/s	n/d	n/s	7	n/s	n/d	n/s	n/d	7	n/d	17	n/d	39	41
Cormorant	n/s	8	n/s	3	n/s	8	n/s	n/d	1	32	9	23	60	42
Northern gannet	n/s	n/d	n/s	n/d	n/s	n/d	n/s	n/d	105	n/d	31	n/d	89	n/d
Atlantic puffin	n/s	n/d	n/s	n/d	n/s	n/d	n/s	n/d	0	n/d	0	n/d	0	n/d
Black-legged kittiwake	n/s	n/d	n/s	n/d	n/s	n/d	n/s	n/d	3	n/d	19	3	10	0
Manx shearwater	n/s	n/d	n/s	n/d	n/s	n/d	n/s	n/d	0	n/d	0	n/d	0	n/d
Common guillemot	n/s	n/d	n/s	n/d	n/s	n/d	n/s	n/d	3	n/d	1	n/d	11	n/d
Herring gull	n/s	n/d	n/s	n/d	n/s	n/d	n/s	n/d	198	n/d	37	18	119	494
Lesser black-backed gull	n/s	n/d	n/s	n/d	n/s	n/d	n/s	n/d	11	n/d	4	232	1	6

B= Baseline surveys,

W = WeBS sector Preston Grange to Port Seton, peak counts for period 2014 to 2019

n/s = no survey undertaken (baseline).

n/d = no data or no count undertaken (WeBS)

6.4.28 Although baseline data is lacking for most of the seabird breeding season, including the main chick rearing period, it is considered unlikely that the Proposed Development would have any effects on these qualifying features. This is because;

- With the exception of Herring Gull, and lesser black-backed gull, none of these seabirds breed within 10 km of the Site;

- With the exception of Herring Gull, all these species are obligate marine foragers and therefore the Proposed Development is unlikely to affect foraging opportunities. European shag, Arctic tern and Common tern are the only species likely to forage in the near shore zone, the remaining species are highly pelagic foragers; and
- The near shore area of disturbance is small in size and distant from breeding colonies and seabirds have a great deal of flexibility in their foraging behaviour.

6.4.29 Therefore, it is expected that adverse effects on breeding seabirds would be negligible and they are scoped-out of further consideration in this assessment.

OTHER IOF (NOT DESIGNATED): NON-BREEDING WADER POPULATIONS

6.4.30 Waders of conservation concern (listed as Red or Amber by BOCC4) that were recorded during baseline survey are presented in Table 6.15. The table also assesses the conservation value and IOF sensitivity of these non-breeding populations within the geographical context of the Firth of Forth. Note that the Firth of Forth is taken here to represent a regional population for non-breeding waders.

Table 6.15: Counts of Wader Species which have Conservation Value but do not Qualify for Adjacent SPAs During Baseline Surveys and from WeBS data 2014 to 19

Species	Red-listed	Amber-listed	Peak Count; Baseline Survey	Peak Count; WeBS[1]	GB Population (non-breeding)[2]	Regional Population (Forth)[3]	IOF Status
Purple sandpiper		WDMP[1] (-33%)	10	2	9,700	64	Regional importance
Common sandpiper		BDMP	1	0	52	n/a	Not significant
Lapwing	BDP		0 (flock of 350 over sector E/24 in terrestrial sector 2-B)	2	620,000	3,330	Not significant
WDMP[1]: Population decline of non-breeding population; moderate (>25% but <50%) in last 25 years. Qualifies as Amber-list							
BDP: Population decline of breeding population; severe (>50%). Qualifies as Red-list. Not relevant to this assessment							
BDMP: Population decline of breeding population; moderate (>25% but <50%). Qualifies as Amber list. Not relevant to this assessment							
[1] = WeBS sector Preston Grange to Port Seton, peak counts for period 2014 to 2019							
[2] = From Frost *et al.* (2019) and Woodward *et al.* (2020)							
[3] = From WeBS Firth of Forth low tide count data (2003/04). Supplied by BTO.							

OTHER IOF (NOT DESIGNATED): NON-BREEDING WATERFOWL POPULATIONS

6.4.31 Non-breeding waterfowl of conservation concern (listed as Red or Amber by BOCC4) that were recorded during baseline survey are presented in Table 6.16. The table also assesses the conservation value and IOF level of these non-breeding populations within the geographical context of the Firth of Forth. Note that the Firth of Forth is taken here to represent a regional population for non-breeding waterfowl.

6.4.32 Although the Firth of Forth population of red-necked grebe are not designated, it is the conclusion of this assessment that the population is of national importance, including birds using the survey area (>1% of the UK population of 57 individuals).

Table 6.16: Counts of Waterfowl Species which have Conservation Value but do not Qualify for Adjacent SPAs During Baseline Surveys and from WeBS data 2014 to 19

Species	Red-listed	Amber-listed	Peak Count; Baseline Survey	Peak Count; WeBS[1]	GB Population (non-breeding)[2]	Regional Population (Forth)[3]	IOF Status
Red-necked grebe	WDP[1] (-72%)	WR (57 individuals)	0 (3 in Sector E)	1	59	6	National importance
Black-necked grebe	BR (32-51)	WR (130 individuals)	1 (Sector A1)	0	120	2	Regional importance
Great Northern Diver		VU	0 (1 in Sector D)	1	4,300	1	Regional importance
Gadwall		WI	0 (7 in Sector D)	0	31,000	No count	Local importance
Mute swan		WI	1 (1 in Sector D)	3	50,000	79	Not significant

WDP[1]: Population decline of non-breeding population; severe (>50%) in last 25 years. Qualifies as Red-list

WR: Winter rarity; non-breeding population of <900 individuals qualifies as Amber-list

BR: Breeding rarity: breeding population of <300 individuals qualifies as Amber-list

VU: Threatened in Europe: Vulnerable

WI: UK holds internationally-important non-breeding populations (>20% of European population)

[1] = WeBS sector Preston Grange to Port Seton, peak counts for period 2014 to 2019

[2] = From Frost *et al.* (2019) and Woodward *et al.* (2020)

[3] = From WeBS Firth of Forth low tide count data (2003/04). Supplied by BTO.

IOF: IDENTIFICATION OF SITE IMPORTANCE

6.4.33 Whilst it is important to assess the conservation value of the species found on the Site, the most critical consideration with regard to the EIA is the importance of the population size using the Site. This is because it is impacts on the bird population using the Site of the Proposed Development that is required to be assessed by the EIA process.

6.4.34 Consequently, the Site level of importance is a function of the species value in combination with size of population occupying or reliant on the Site.

6.4.35 It is the convention to select sites used by one percent or more of the population when identifying sites which support important bird populations at a European or national scale. This assessment shall adopt similar thresholds in order to identify whether the survey area supports important populations of SPA species (site importance). Those species recorded at numbers above 1% of the qualifying SPA population are presented in Table 6.17.

6.4.36 The Site is identified as of international importance for the SPA species found at significant population levels (>1% of the designated population).

Table 6.17: Species for which the Site is of International Importance (Supporting >1% of SPA Population)

	Species	SPA	Designated Population	% of Qualifying Population	Species
				Peak Count: Baseline Surveys	Mean Peak Count: WeBs
Non-breeding waders	Turnstone	Firth of Forth	860	6.51% (56)	2.33% (20)
	Oystercatcher	Firth of Forth	7,846	1.54% (121)	0.71% (56)
	Ringed plover	Firth of Forth	328	6.40% (21)	2.74% (9)
Non-breeding waterfowl	Red-throated diver	Firth of Forth	90	20.00% (18)	3.33% (8)
	Slavonian grebe	Firth of Forth[2]	84	6.00% (5)	1.19% (1)
	Eider	Firth of Forth	9,400	4.66% (438)	1.39% (131)
	Pink-footed goose	Firth of Forth	10,852	1.13% (123)[3]	0.00% (0)
	Common scoter	Firth of Forth	2,880	6.42% (185)	0% (0)
	Velvet scoter	Firth of Forth[2]	635	1.42% (9)	1.57%(10)
	Goldeneye	Firth of Forth	3,004	1.66% (50)[4]	0.57% (17)
	Red-breasted merganser	Firth of Forth[2]	670	1.79% (12)	1.34% (9)
	Sandwich tern	Firth of Forth	1,617	2.66% (43)	2.85% (46)
Non-breeding seabirds	European shag	Outer Firth of Forth and St Andrews Bay Complex	2,426	2.56% (62)	1.28% (31)
	Cormorant	Firth of Forth	682	10.26% (70)[1]	5.13% (35)
	Herring gull	Outer Firth of Forth and St Andrews Bay Complex	12,313	2.57% (316)	2.18% (269)

[1] The peak count of cormorant of 70 individuals includes a count of 55 individuals in flight. With this record removed, the mean monthly peak September to December is still significant at 19.75 individuals (2.90% of Firth of forth SPA population)

[2] The populations of red-throated diver, slavonian grebe, eider, common scoter, velvet scoter and red-breasted merganser are also >1% of designated populations of the Outer Firth of Forth and St Andrews Bay Complex

[3] Pink-footed goose was only recorded in flight over the Site during near-shore surveys. This is also true of terrestrial surveys, with the exception of a single group of 39 birds loafing on agricultural ground to the north of Sector 2-B in March. Effects on pink-footed goose are therefore expected to be negligible.

[4] Goldeneye were mainly absent from the near-shore area of Sectors A-C. The count of 50 individuals was on a single date (12/02/21), with 49 in Sector A and 1 in Sector C.

6.4.37 The assessment of site importance in Table 6.17 uses the designated SPA populations, as described in the SPA Citation for the Firth of Forth. The Site was classified in October 2001 and the qualifying populations are based on 5-year mean peak counts between either 1993/93 to 1997/98 or 1992/93 to 1996/97. There has been some quite large population change subsequent to classification and SNH/ NatureScot have provided updated figures for qualifying populations, based on mean peak counts from 2010/11 to 2014/15.

6.4.38 Non-breeding wader and waterfowl numbers using the survey area are displayed as a proportion of the updated populations for the qualifying features of the Firth of Forth SPA in Table 6.17.

6.4.39 The numbers of qualifying species within the survey area form mainly a higher proportion of the updated SPA population, as numbers of several qualifying species have declined markedly since classification in 2001. The declines have been particularly marked for non-breeding waterfowl and consequently, the number of long-tailed duck and great-crested grebe recorded within the Site are greater than 1% of the updated SPA population. Therefore, for the purposes of this assessment, the Site is identified as of international importance for long-tailed duck and great-crested grebe. The updated SPA population of long-tailed duck remains of national significance (>1% of the UK population of 13,000 individuals), whereas the updated population of great-crested grebe supported by the SPA falls below the levels for nationally-important population (<1% of the UK population of 17,000 individuals).

6.4.40 The population change of non-breeding waders supported by the Firth of Forth SPA differs widely between species. However, the species for which the Site supports populations of >1% or more of the SPA population remains the same when using the updated population data as when using the population at classification (oystercatcher, turnstone and ringed plover).

6.4.41 As described in Tables 6.15 and 6.16, the Site is also identified as supporting significant populations of the following non-SPA species; red-necked grebe (the Site is of national importance), great northern diver and purple sandpiper (the Site is of regional importance).

6.4.42 Possible effects of those species for which the Site has been identified as of international, national and regional importance are considered in the following assessment.

6.4.43 Due to the differing ecology of waders and waterfowl, the assessment shall separately consider the possible effects on these two groups.

Table 6.18: Peak Counts of Qualifying Species from Baseline Surveys and WeBS Data as Proportion of SPA Population at Time of Classification (2001) and Updated Populations (2018)

	Species	SPA Classified Population (2001)	Updated Population (2018)	Baseline Survey		WeBS Counts	
				% 2001 Population	% 2018 Population	% 2001 Population	% 2018 Population
	Golden plover	2,949	1,125	0.03%	0.08%	0.24%	0.62%
	Bar-tailed godwit	1,974	1,614	0.10%	0.12%	0.05%	0.06%
	Knot	9,258	4,590	0.00%	0.00%	0.01%	0.02%
	Redshank	4,341	4,058	0.53%	0.57%	0.25%	0.27%
	Turnstone	860	945	6.51%	5.93%	2.33%	2.12%
	Curlew	1,928	3,337	0.10%	0.06%	0.31%	0.18%
	Oyster-catcher	7,846	7,102	1.54%	1.70%	0.71%	0.79%
	Ringed plover	328	952	6.40%	2.21%	2.74%	0.95%
	Grey plover	724	411	0.14%	0.24%	0.00%	0.00%
	Dunlin	9,514	6,409	0.00%	0.00%	0.01%	0.02%

Table 6.18: Peak Counts of Qualifying Species from Baseline Surveys and WeBS Data as Proportion of SPA Population at Time of Classification (2001) and Updated Populations (2018)

	Species	SPA Classified Population (2001)	Updated Population (2018)	Baseline Survey		WeBS Counts	
				% 2001 Population	% 2018 Population	% 2001 Population	% 2018 Population
Non-breeding waterfowl	Red-throated diver	90	68	20.00%	26.47%	3.33%	4.41%
	Slavonian grebe	84	32	6.00%	15.63%	1.19%	3.13%
	Pink-footed goose	10,852	21,375	1.13%	0.57%	0.00%	0.00%
	Shelduck	4,509	3,475	0.07%	0.09%	0.00%	0.00%
	Great-crested grebe	720	78	0.14%	1.28%	0.00%	0.00%
	Eider	9,400	5,506	4.66%	7.95%	1.39%	2.38%
	Long-tailed duck	1,045	177	0.48%	2.82%	0.10%	0.56%
	Common scoter	2,880	1,249	6.42%	14.81%	0.00%	0.00%
	Velvet scoter	635	623	1.42%	1.44%	1.57%	1.61%
	Goldeneye	3,004	1249	1.66%	4.00%	0.33%	0.80%
	Red-breasted merganser	670	279	1.79%	4.30%	1.34%	3.23%
	Mallard	2,564	1.342	0.00%	0.00%	0.04%	0.07%
	Wigeon	2,139	2.889	0.00%	0.00%	0.61%	0.45%
	Scaup	437	22	0.00%	0.00%	0.00%	0.00%

POSSIBLE EFFECTS ON IOF FOR WHICH THE SITE IS OF INTERNATIONAL, NATIONAL OR REGIONAL IMPORTANCE

NON-BREEDING WADERS

6.4.44 The distribution and behaviour of the important wader populations using the baseline survey sectors A, B and C are shown in Table 6.19. Note that all records are within distance zone 1 (0-500 m), as all areas of shoreline/intertidal zone are within this zone.

Table 6.19: Distribution and Behaviour of non-breeding Waders of International and Regional Importance During Baseline Surveys

		Sector A	Sector B	Sector C	No Sector	Feeding	Flight	Roosting
Turnstone (237 individuals, 37 records)	N	42	79	108	8	99	12	126
	%	18%	33%	46%	3%	42%	5%	53%
Oystercatcher (542 individuals, 50 records)	N	33	89	308	112	196	57	289
	%	6%	16%	57%	21%	36%	11%	53%

Table 6.19: Distribution and Behaviour of non-breeding Waders of International and Regional Importance During Baseline Surveys								
		Sector A	Sector B	Sector C	No Sector	Feeding	Flight	Roosting
Purple sandpiper	N	8	22	8	1	8	0	31
(39 individuals, 10 records)	%	21%	56%	21%	3%	36%	11%	53%
Total individuals	N	83	190	424	121	303	69	446
(N=818)	%	10%	23%	52%	15%	37%	8%	55%
Note: there may be slightly fewer records/ individuals than data presented in Technical Appendix/ elsewhere as counts outside sectors were omitted from analysis								

6.4.45 Sector A, where there is direct overlap with the Site, has the lowest numbers of waders, although it should be noted that many of the waders recorded in Sector B were within the site of the former Cockenzie Power Station and therefore close to the Site.

6.4.46 There was a high proportion of birds recorded as roosting (58%), and this is even greater when Sector A is considered alone (70.5%) and Sectors A and B combined (63%). For waders recorded as feeding in Sector B, this almost entirely comprised birds feeding at high tide within the high tide refuge of the former power station (ringed plover and oystercatcher) or adjacent amenity grassland (oystercatcher and curlew).

6.4.47 Therefore, the majority of usage by non-wintering waders in the vicinity of the Site is by roosting or feeding birds at high tide. This area represents poor feeding opportunities at low tide, with very high recreation levels on the intertidal area and much of the shoreline comprising steep sea wall/rock armour along the north boundary of the former power station. An exception is the far west of Sector A, where the rocky shoreline around Ox Rocks provides relatively disturbance-free low tide feeding opportunities, particularly for purple sandpiper and turnstone.

6.4.48 Although feeding opportunities are limited by disturbance, Sectors A and B provide several disturbance-free high tide roosting opportunities for waders. Three main roost locations were regularly utilised (Figure 6.9). These are;

- Steep rocky shoreline, east end of Prestonpans waterfront (c.NT391751) (online with cable landfall location);
- Within the fenced area of former Cockenzie Power Station (c.NT394755); and
- Harbour wall, Cockenzie Harbour (c.NT340676).

6.4.49 Counts of roosting waders at these three locations are presented in Table 6.20.

Table 6.20: Counts of Roosting Waders at Three High-tide Roost Locations in Sectors A, B and C														
	Jul	Aug	Sep	Oct	Oct (B)	Nov	Nov (B)	Dec	Dec (B)	Jan	Jan (B)	Feb	Feb (B)	Mar
	27-Jul	23-Aug	22-Sep	30-Oct	25-Oct	16-Nov	26-Nov	09-Dec	18-Dec	12-Jan	26-Jan	12-Feb	13-Feb	01-Mar
Roost Location 1: NT391751														
Oyster-catcher	0	0	0	5	18	0	26	54	0	6	6	2	4	0
Turnstone	0	0	0	19	0	8	5	0	0	12	2	11	5	29
Purple sandpiper	0	0	0	0	0	0	0	0	0	6	0	8	0	8
Redshank	0	0	0	0	0	0	0	0	0	1	1		1	2

Table 6.20: Counts of Roosting Waders at Three High-tide Roost Locations in Sectors A, B and C

	Jul	Aug	Sep	Oct	Oct (B)	Nov	Nov (B)	Dec	Dec (B)	Jan	Jan (B)	Feb	Feb (B)	Mar
	27-Jul	23-Aug	22-Sep	30-Oct	25-Oct	16-Nov	26-Nov	09-Dec	18-Dec	12-Jan	26-Jan	12-Feb	13-Feb	01-Mar
Ringed plover	0	0	0	0	0	0	17	0	0	0	16	7	0	0
Curlew	0	0	0	0	0	0	0	1	0	0	1	0	0	0
Roost 1Totals	0	0	0	24	18	8	48	55	0	25	26	28	10	39
Roost Location 2: NT394755														
Ringed plover	12	0	0	7	0	0	0	0	0	21	0	2	0	0
Roost Location 3: NT397676														
Oystercatcher	0	0	0	34	0	37	10	0	20	24	4	2	1	8
Turnstone	0	0	0	0	0	1	0	0	0	9	0	1	3	0
Redshank	0	0	0	0	0	18	3	0	6	8	0	13	10	4
Roost 2Totals	0	0	0	34	0	56	13	0	26	41	4	16	14	12
(B) = Roost counted during BBS/ terrestrial bird survey														

6.4.50 Therefore, it is anticipated that potential effects of the Proposed Development on non-breeding wader populations shall mainly relate to disturbance of roost locations.

NON-BREEDING WATERFOWL (DIVERS, GREBES AND SEA DUCK)

6.4.51 The distribution and behaviour of the important wildfowl populations using the baseline survey sectors a, B and C are shown in Table 6.21.

Table 6.21: Distribution and Behaviour of Non-breeding Waterfowl of International Importance During Baseline Surveys

		Sector			Distance			Behaviour[1]			
		A	B	C	0-500	500-1000	1000-1500	FE	FL	RO	RL
Red-throated diver	N	9	16	16	31	10	0	17	11	13	0%
(n=41 individuals, 35 records)	%	22%	39%	39%	76%	24%	0%	41%	27%	32%	0
Slavonian Grebe	N	4	2	3	9	0	0	9	0	0	0%
(n=9 individuals, 9 records)	%	44%	22%	33%	100%	0%	0%	100%	0%	0%	0
Eider	N	193	368	1015	1168	332	76	279	28	1136	133
(n=1,576 individuals, 126 records)	%	12%	23%	64%	74%	21%	5%	18%	2%	72%	8%
Velvet scoter	N	19	2	8	9	20	0		19	10	0
(n=29 individuals, 17 records)	%	66%	7%	28%	31%	69%	0%	0%	66%	34%	0
Common scoter	N	5	44	186	8	227	0	2	50	183	0
(n=235 individuals, 12 records)	%	2%	19%	79%	3%	97%	0%	1%	21%	78%	0%
Goldeneye	N	49	0	1	50	0	0	0	0	50	0
(n=50 individuals, 3 records)	%	98%	0%	2%	100%	0%	0%	0%	0%	100%	0%
Red-breasted merganser	N	11	10	22	39	4	0	21	6	16	0

Table 6.21: Distribution and Behaviour of Non-breeding Waterfowl of International Importance During Baseline Surveys

		Sector			Distance			Behaviour[1]			
		A	B	C	0-500	500-1000	1000-1500	FE	FL	RO	RL
(n=43 individuals, 28 records)	%	26%	23 %	51%	91%	9%	0%	49%	14 %	37%	0%
Long-tailed duck	N	8	1	8	16	1	0	8	6	3	0
(n=17 individuals, 12 records)	%	47%	6%	47%	94%	6%	0%	47%	35 %	18%	0%
Great-crested grebe	N	2	0	0	2	0	0	1	0	1	0
(n=2 individuals, 2 records)	%	100 %	0%	0%	100 %	0%	0%	50%	0%	50%	0%
Total individuals	N	300	443	1259	1332	594	76	337	120	1412	133
(N=2002)	%	15%	22 %	63%	67%	30%	4%	17%	6%	71%	7%

[1] FE= Feeding/FL=Flight/RO=Roosting/loafing (on water)/RL = Roosting on land

6.4.52 The data shows that Sector A has the lowest relative density of waterfowl of the three sectors. (15% of 2,002 birds). All great-crested grebe and 98% of goldeneye were recorded in Sector A, although this relates to only few individuals (2 records of single great-crested grebe) and a single count of 49 goldeneye (this species normally aggregating to the west, around Morrison's Haven and the River Esk). The high proportion of velvet scoter, is mainly due to birds in flight (90% of records).

6.4.53 Distance band 1 (0 m to 500 m) was most frequently used (67% of 2,002 birds). This may not be a true reflection of the relative densities across distance bands, as the detection of birds decreases with distance. This is particularly the case for birds on the water and is compounded by the low vantage points and when there are higher sea states at time of survey.

6.4.54 Divers, grebes and sea duck using distance zones 1-2 will be subject to disturbance during the cable-laying and landfall works between the MHLW and Transition Joint Bay.

6.4.55 It should be noted that the cable corridor and landfall point is at the boundary between Sectors A and B, with the approach from the north east. Therefore, potential disturbance effects may occur across all three sectors. It is assumed here that the potential effects on divers, grebes and sea duck beyond the limit of this assessment (effectively the shore end cable, near the MLWS mark) has been assessed and any effects identified will be considered in the cumulative impact assessment for this chapter.

6.4.56 Non-breeding sandwich tern are designated as a qualifying feature for the Firth of Forth SPA due to the large post-breeding aggregations throughout the Forth (from colonies throughout eastern UK, Belgium and Holland). The peak count of 43 individuals represents 2.7% of the designated population (1,617 individuals) and is therefore of international significance. It should be noted that non-breeding sandwich tern are also a designated feature of the Forth Islands SPA and the peak count of 43 individuals represents 4.9% of the designated population (440 pairs). All but one of the 25 records involved birds in flight or feeding, with a single record of 8 individuals roosting (in Sector C). This reflects the observation the survey area was not a location where sandwich tern form significant roosts of adult and young birds (when they arrive in the Forth, young birds are still dependent on food provisioning by parent birds). These roost locations are known to lie to the west and east of the survey area (at Fisherrow Sands and Port Seton Sands respectively, with the latter in Sector D). Therefore, despite high numbers of sandwich tern, the birds using the Site for foraging are unlikely to suffer significant

effects from disturbance during construction. Therefore, there are no likely significant effects predicted for sandwich tern.

NON-BREEDING SEABIRDS

6.4.1 The distribution and behaviour of the important non-breeding seabird populations using the baseline survey sectors A, B and C are shown in Table 6.22.

Table 6.22: Distribution and Behaviour of Non-breeding Seabirds of International Importance During Baseline Surveys

Species	Sector				Distance				Behaviour[1]			
	A	B	C	I[2]	0-500	500-1000	1000-1500	I	FE	FL	RO	RL
European shag (n=200 individuals, 79 records)	48	116	36	0	195	5	0	0	48	52	1	99
	24%	58%	18%	0%	98%	3%	0%	0%	24%	26%	<1%	50%
Cormorant	85	69	43	0	151	46	0	0	37	89	8	63
(n=197 individuals, 86 records)	43%	35%	22%	0%	77%	23%	0%	0%	19%	45%	4%	32%
Herring gull	273	130	1267	140	882	776	12	140	275	198	482	855
(n=1,810 individuals, 168 records)	15%	7%	70%	8%	49%	43%	1%	8%	15%	11%	27%	47%
Total individuals	406	315	1346	140	1228	827	12	140	360	339	491	1017
(n=2,207)	18%	14%	61%	6%	56%	37%	1%	6%	16%	15%	22%	46%

[1] FE= Feeding/FL=Flight/RO=Roosting/loafing (on water)/RL = Roosting on land
[2] Roosting herring gull at former power station; outside Sector boundaries/distance bands

6.4.2 Both shag and herring gull were recorded as roosting in large numbers (at 50% and 47% of observed behaviour). Although flight was the most frequently observed behaviour by cormorant, this is greatly influenced by a single flight of 55 individuals (28% of total). If this event is omitted from the analysis, the largest behavioural category for cormorant is roosting on land.

6.4.3 The high proportion of roosting birds is a reflection of the two regular roost locations for these species within 500 m of the Site (Figure 6.9). Both of these are associated with the former power station, with shag and cormorant regularly roosting on the jetty (alongside regular great black-backed gull and occasionally kittiwake) and herring gull regularly roosting on the hardstand of the former power station (occasionally associated with few individuals of other gull species). Counts of these two roosts are presented in Table 6.23.

6.4.4 The considerably higher numbers of herring gull in sector C (61%) was due to many birds attending Port Seton Harbour (where fish are landed).

Table 6.23: Counts of Roosting Non-breeding Seabirds (and waders) at the Three High-tide Roost Locations in Sectors A, B and C

	Jul	Aug	Sep	Oct	Oct (B)	Nov	Nov (B)	Dec	Dec (B)	Jan	Jan (B)	Feb	Feb (B)	Mar
	06/07(B) +27/07	23/08	22/09	21+30/10	25/10	16/11	26/11	09/12	18/12	12/01	26/01	12/02	13/02	01/03
Roost Location NT 393 757														
Shag	0[A]	9	29	7[1]/21[2]	0	7	0	3	0	1	1	3	0	6
Cormorant	6[A]	8	25	2[1]/6[2]	0	19	1	1	0	0	0	2	0	11

Table 6.23: Counts of Roosting Non-breeding Seabirds (and waders) at the Three High-tide Roost Locations in Sectors A, B and C

	Jul	Aug	Sep	Oct	Oct (B)	Nov	Nov (B)	Dec	Dec (B)	Jan	Jan (B)	Feb	Feb (B)	Mar
	06/07(B) +27/07	23/08	22/09	21+30/10	25/10	16/11	26/11	09/12	18/12	12/01	26/01	12/02	13/02	01/03
GB-backed gull	1[A]	1	0	1[1]/1[2]	0	0	1	0	0	0	1	1	0	2
Herring gull	1[A]	4	0	3[1]/0[2]	0	0	0	1	0	0	3	1	0	2
Kittiwake	0[A]	12	0	0[1]/0[2]	0	0	0	0	0	0	0	0	0	0
Roost Totals	7[A]	34	54	13[1]/28[2]	0	26	2	5	0	1	5	7	0	21
Roost Location: NT 395 754														
Herring gull	73[B]	0	0	35	29	60	0	10	0	22	2	0	0	0
LB-backed gull	10[B]	0	0	0	0	0	0	0	0	0	0	0	0	0
Oystercatcher	0[B]	0	0	0	8	48	0	0	0	4	1	0	0	0
Curlew	0[B]	0	0	0	0	1	0	0	0	0	0	0	0	0
Common gull	0[B]	0	0	0	0	0	0	12	0	0	0	0	0	0
Roost Totals	83[B]	0	0	35	29	109	0	22	0	26	3	0	0	0

[A] = 27/07, [B] =06/07 (B)

Two near shore counts undertaken in October; [1] =21/10, [2] = 30/10

(B) = Roost counted during BBS/terrestrial bird survey

6.4.5 Seabirds using distance zones 1-2 will be subject to disturbance during the cable-laying and landfall works between the MHLW and Transition Joint Bay. There is also a likelihood that gulls, shag and cormorant using the roost locations described above shall be subject to disturbance during the construction works.

6.4.6 It should be noted that the cable corridor and landfall point is at the boundary between Sectors A and B, with the approach from the north east. Therefore, potential disturbance effects may occur across all three sectors. It is assumed here that the potential effects on divers, grebes and sea duck beyond the limit of this assessment (effectively the shore end cable, near the MLWS mark) has been assessed and any effects identified will be considered in the cumulative impact assessment for this chapter.

FORAGING WADERS AND GULLS WITHIN THE CONSTRUCTION CORRIDOR

6.4.7 The area of amenity grassland along the cable servitude corridor which runs between the indicative substation footprint and landfall point was frequently used by foraging oystercatcher and curlew, particularly at high tide. Oystercatchers were also seen to occasionally forage within the former power station footprint, with some overlap with the indicative substation footprint (Table 6.23 and 6.24).)

Table 6.24: Counts of Feeding Oystercatcher and Curlew within the Cable Servitude Corridor

	Oct	Nov	Nov	Dec	Dec	Jan	Feb	Mar
	25/10 (B)	16-Nov	26/11 (B)	09-Dec	18/12 (B)	12-Jan	12-13 Feb	01-02-Mar
Oystercatcher	57	0	2	0	0	24	0	0
Curlew	1	0	0	0	0	1	0	0
Totals	58	0	2	0	0	25	0	0

(B) = Counted during BBS/ terrestrial bird survey

Note: The cable servitude corridor was snow-covered and had many people sledging during February surveys. Ground investigation works (drilling) by Raeburn was being undertaken within the cable servitude corridor January to March.

6.4.8 Foraging birds were only seen using the area of amenity grassland to the north of the Edinburgh Road. This area is to be reinstated following cable-laying and therefore no loss of foraging habitat is anticipated. Consequently, the only anticipated effects for foraging oystercatcher and curlew comprises disturbance of short duration.

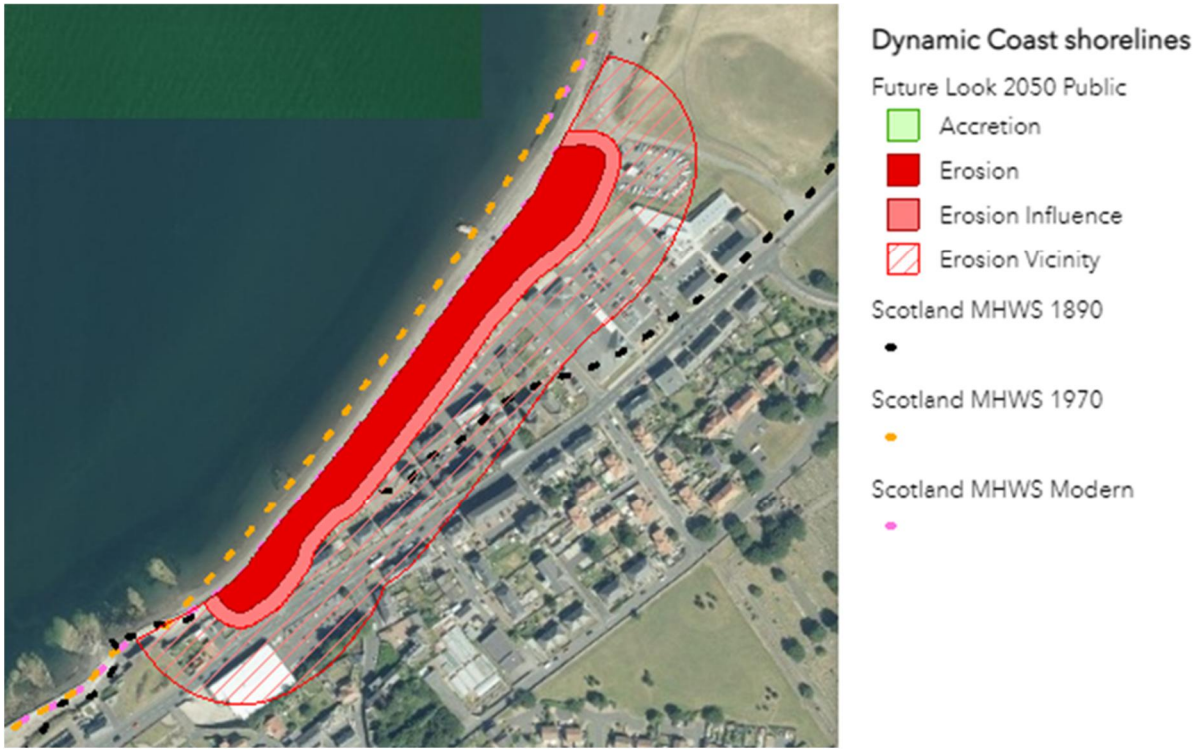
6.4.9 Disturbance effects on waders foraging within the cable servitude corridor from ground investigation works (drilling) was observed in January. On 26 January, a flock of oystercatcher (40) and curlew (2) were flushed from their foraging area at the onset of drilling (at the Prestonpans beach car park). The birds flew and settled on Prestonpans beach.

Future Baseline

6.4.10 The majority of the coastal stretch in the vicinity of the Site has been 'fixed' by sea defences. This can be seen by the extensive sea walls created for land reclamation during the construction of Cockenzie Power Station and adjacent ash lagoons. Elsewhere, sea defences are further set back from more extensive areas of intertidal habitat, such as the seafront at Prestonpans. In the East Lothian Shoreline Management Plan[28], ELC have stated that the objective for the coastline in the vicinity of the Site is to 'hold the line' – i.e. maintain existing sea defences in their current position. This creates the scenario of 'coastal squeeze' along the shoreline, whereby natural processes of erosion and deposition are prevented by the sea defences. In the face of sea level rise and increased storm events, the normal response of coastlines and coastal habitat would be to effectively migrate landward. However, this is not possible due to sea defences and therefore the coastal habitat becomes 'squeezed' due to erosion at the landward edge and inability to redistribute by natural processes further inland. Eventually, the combination of hard engineering on retreating beaches will lead to loss of intertidal habitats and modification of subtidal zone habitats. It is these habitats on which the qualifying features of the Firth of Forth SPA and Outer Firth of Forth and St Andrews Bay Complex SPA are dependent. Modelling [29] predicts the scenario described above to occur within the study area; the beach at Prestonpans is predicted to disappear due to erosion by 2050, with the shoreline adjusted so as to be hard against the sea wall at the edge of Lidl supermarket and associated residential buildings (Figure below).

[28] www.eastlothian.gov.uk (accessed 21.01.21)

[29] https://www.dynamiccoast.com/ (accessed 21.01.21)



6.4.11 There are extensive new housing developments within the vicinity of the Site, including the Blindwells New Town development of at least 16,000 homes under construction and plans for an additional 16,000 (within 2 km of the Site). This will bring additional pressures from recreation on the IOF on the Site (particularly feeding and roosting waders). However, it is anticipated that SPA-qualifying wader populations in the area will greatly benefit from the planned restoration of the eastern ash lagoon at Musselburgh. This plan is to create an area of shallow flooded ground ('scrapes') on the former ash lagoon, providing both feeding and roosting habitat for the wader populations. However, the intertidal feeding grounds adjacent to the lagoons (Fisherrow Sands) may be impacted by plans for increased sea defences along the Fisherrow waterfront.

6.4.12 Therefore, the natural processes whereby the coastal and estuarine habitats in the vicinity of the Site might adapt to rising sea levels and climate change is in conflict with the need to safeguard socio-economic interests. Hard-engineered coastal defences may in the near future compromise the sustainability of intertidal habitats on which the SPA qualifying features are dependent. Habitat creation by natural process and/or managed realignment elsewhere within the Firth of Forth may allow SPA-wide populations to persist but the viability of these populations in the vicinity of the Site looks rather unlikely.

Summary of Sensitive Receptors

Table 6.25: Summary of Receptor Sensitivity

Receptor	Sensitivity	Justification
SPA qualifying feature: Non-breeding waders; Oystercatcher, ringed plover, turnstone.	High (Site population is of International importance)	The survey area supports >1% of designated SPA- population (Firth of Forth SPA).
SPA qualifying feature: Non-breeding waterfowl;	High (Site population is of International importance)	The survey area supports >1% of designated SPA population (Firth of

Table 6.25: Summary of Receptor Sensitivity		
Receptor	Sensitivity	Justification
Red-throated diver, Slavonian grebe, eider, common scoter, velvet scoter, goldeneye, red-breasted merganser.		Forth SPA and Outer Firth of Forth and St Andrews Bay Complex SPA).
SPA qualifying feature: Non-breeding waterfowl; Long-tailed duck, great crested grebe.	High (Site population is of International importance)	The survey area supports >1% of the updated Firth of Forth SPA population (2010/11 to 2014/15).
SPA qualifying feature: Non-breeding seabirds; Shag, cormorant, herring gull.	High (Site population is of International importance)	The survey area supports >1% of designated SPA population (Firth of Forth and Outer Firth of Forth and St Andrews Bay Complex SPA).
Red-necked grebe.	High (Site population is of National importance)	The survey area regularly supports >1% of UK national population.
Purple sandpiper, great-northern diver, black-necked grebe	Medium (Site population is of Regional importance)	The survey area regularly supports >1% of regional population (Firth of Forth).
Note: Pink-footed goose (SPA qualifying feature: Non-breeding waterfowl) was recorded at 1.13% of the of designated Firth of Forth SPA population (0.57% of updated population). This only pertained to birds flying over the Site and potential effects on this species are considered negligible. Therefore pink-footed goose is not considered as a sensitive receptor.		

6.5 Assessment of Likely Effects

IOF: Potential Effects

6.5.1 As described above, the predicted effects for the assessed IOF at the Site comprises disturbance of short-duration during construction. Other effects of habitat loss and/ or population decline (breeding or non-breeding population) are considered to be absent or negligible. These effects are considered highly improbable because;

- The intertidal area at the proposed landfall is subject to high recreational use and is used by IOF wader species for feeding in very low numbers (mainly turnstone; a species very tolerant of human disturbance). As HDD or other trenchless installation techniques will be used in the intertidal area, there will be limited effects on the extent or condition of intertidal habitat during construction or operation. Therefore, effects by loss of intertidal foraging habitat for waders will be negligible;
- Oystercatcher and very small numbers of curlew forage on the amenity grassland along the onshore export cable corridor. There will be temporary exclusion of birds from this area during construction, although the amenity grassland shall be easily reinstated following works. This foraging area is used occasionally by a small number of birds and the likelihood of any significant effects on the wader populations is negligible;
- Aside from the installed subsea cable, there are no permanent installations or other effects anticipated within the near shore marine environment. Any bathymetric effects on the installed cable route are not considered in this EIA Report. Therefore, no long-term effects are anticipated for the designated wintering waterfowl and seabird populations; and
- No designated breeding populations (seabirds) are within a distance from the Site where effects on breeding performance are considered likely (either direct impacts on breeding site or indirect effects on foraging adults).

6.5.2 Therefore, discussion and assessment of potential effects on IOF shall be focussed on the effects of disturbance during construction.

Potential Effects of Disturbance

6.5.3 The potential responses to disturbance by estuarine birds include the following behaviours[30]:

- Redistribution of birds (either short-term or complete avoidance/ abandonment);
- Reduced food intake; either due to reduced foraging time or by displacement from high quality foraging sites;
- Increased energy expenditure due to energetic cost of being flushed from roost/ feeding sites and, where occurring, redistribution to new locations;
- Physiological cost from increased stress; and
- Direct mortality and breeding failure (trampled/ disturbed nests).

6.5.4 As stated above, disturbance at high-tide roost sites is considered the most likely effect for non-breeding waders in the vicinity of the Site. Whilst this disturbance would not incur costs by reduced feeding, regular disturbance of wader high-tide roosts has been shown to lead to population declines even if suitable feeding conditions remain available[31].

6.5.5 The response of roosting (and feeding) waders to disturbance at the Site is difficult to predict, as studies have revealed that this is affected by the species involved, type of disturbance, degree of habituation, availability of alternative roost/ feeding locations, and other factors such as the individual bird's condition and need for feeding or resting.

6.5.6 Kirby *et al.*[32] studied disturbance effects on waders roosting at the Dee Estuary, including oystercatcher and ringed plover. Roosting oystercatcher exhibited a 'medium' response to disturbance (redistributing to alternative roosts outside the study area but within the estuary) and ringed plover exhibited a 'low' response (staying at the same roost or moving a short distance within the study area).

6.5.7 Several studies show that the behavioural response to disturbance is mediated significantly by habituation to the source of disturbance. For example, Urfi *et al.*[33] found that oystercatcher 'escape distance' (distance at which birds take flight on approach of people) reduced when people are present more frequently. However, habituation to one source of regular disturbance would not necessarily lead to greater tolerance of novel disturbance, such as construction activity.

6.5.8 Whilst the high levels of disturbance at the Site may lead to some habituation by waders, it is clear that at this location, and at other locations on the Firth of Forth, wader roosts are selected at locations where disturbance is minimised. In Sectors A, B and C, roosts were all at locations where access by people and dogs is difficult (harbour walls, steep slopes and fenced-off areas). While it would appear that there are alternative safe sites in the vicinity (particularly sea walls at the former power station, or at the ash lagoons between Preston Pans and Musselburgh), these sites may not be assumed to be suitable or incur additional

[30] Liley D, Underhill-Day J, Panter C, Marsh P and Roberts J. (2015). Morecambe Bay Bird Disturbance and Access Management Report. Unpublished report by Footprint Ecology for the Morecambe Bay Partnership

[31] Catry T, Alves JA, Andrade J, Costa H, Dias MP, Fernandes P, Leal A, Lourenco PM, Martins RC, Muniz F, Pardal, S, Rocha A, Santos CD, Encarnacao V and Granadeiro JP (2011). Long-term declines of wader populations at the Tagus estuary, Portugal: a response to global or local factors? Bird Conservation International, 21, 438–453.

[32] Kirby JS, Clee C and Seager V. (1993). Impact and extent of recreational disturbance to wader roosts on the Dee Estuary: Some preliminary results. Wader Study Group Bulletin, 68, 53–58.

[33] Urfi AJ, Goss-Custard JD and Durell, S.E.A. le V. (1996). The ability of oystercatchers Haematopus ostralegus to compensate for lost feeding time: Field studies on individually marked birds. Journal of Applied Ecology, 33, 873–883.

costs for waders using them. Disturbance at high-tide roosts is an identified issue within the Firth of Forth SPA, where considerable human recreational activity (in particular dog walking) is concentrated along the high water mark and thus overlaps with aggregations of roosting waders.

6.5.9 Studies at major construction sites within estuaries has been demonstrated to lead to reduced densities of wintering waders and wildfowl (teal, oystercatcher, curlew and redshank) at Cardiff Bay[34]. Within the Firth of Forth, the construction of the Clackmannanshire Bridge resulted in the displacement of feeding redshank from adjacent mudflats and cormorants from a low tide roost[35].

6.5.10 Noise is often a significant source of construction-related disturbance, particularly where activities such as piling are undertaken. Most studies have found that irregular and loud sounds cause the greatest disturbance, although the disturbance effect may be reduced if relatively quieter sounds occur ahead of the louder sounds[36]. This same study also found that the strength of reaction to noise and other disturbance was greater when large numbers of birds are closely aggregated (such as roosting birds).

6.5.11 Furness et al[37] ranked the sensitivity of seabirds to the effects of disturbance related to offshore wind development. The sensitivity ranking was based on combined scores for sensitivity to disturbance, habitat flexibility and conservation importance. Divers were the most sensitive of all seabirds assessed, closely followed by scoters, eider and slavonian grebe. Divers in particular were assessed to show a strong escape response and large escape distance when approached, combined with a strong reliance on specific habitat features when foraging (sheltered shallow water over soft substrates). Therefore, disturbance to these species may cause significant energetic and reduced foraging costs. Shag, cormorant, sandwich tern and great crested grebe were assessed to be less sensitive than divers and sea duck, being of moderate sensitivity whereas herring gull was scored as among the least sensitive, exhibiting much tolerance to disturbance and utilising a broad range of habitats.

Potential Construction Effects

6.5.12 On the basis of the research discussed above, the IOF using the Site are scored as either moderate or high sensitivity to the effects of disturbance during construction at roost or foraging locations.

6.5.13 Despite high sensitivities to disturbance, the effects of disturbance shall be of short duration, operate over a limited spatial range and will potentially affect relatively few individuals. In addition, there is apparently suitable alternative roost and foraging locations within a short distance of the location of proposed construction activity. Resultantly, the predicted magnitude of change for all species is predicted as minor or negligible.

6.5.14 Resultantly, for all species, the effects of disturbance during construction are predicted to be moderate or minor/ negligible and not significant.

6.5.15 The impact matrix for the IOF assessed here is presented in Table 6.26.

[34] Burton NHK, Armitage MJS, Musgrove AJ and Rehfisch MM (2002). Impacts of manmade landscape features on numbers of estuarine waterbirds at low tide. EnvironmentalAssessment, 30, 857–864.

[35] Dwyer RG (2010). Ecological and anthropogenic constraints on waterbirds of the Forth Estuary: population and behavioural responses to disturbance. PhD thesis, Exeter University.

[36] Kusters E and van Raden H (1998). On the influence of military shooting ranges on the birds of the Wadden Sea. Zeitschrift fur Jagdwissenschaft, 44, 221–236.

[37] Furness B, Wade H. (2013). Vulnerability of Scottish Seabirds to Offshore Wind Turbines. J.Environ. Manag. 119, 56-66

Table 6.26: Impact Assessment for Construction Effects on IOF						
Species	Effect	Sensitivity to Effect	Magnitude of Change	Receptor Sensitivity	Impact	Significance of Impact
SPA qualifying feature: Non-breeding waders; Oystercatcher, ringed plover, turnstone.	Disturbance; at locations of small roosts. Short duration	High	Minor	High	Moderate	Not significant
SPA qualifying feature: Non-breeding waders; Oystercatcher	Disturbance; at foraging locations. Short duration	Low	Negligible	High	Minor/ Negligible	Not significant
SPA qualifying feature: Non-breeding waterfowl; Red-throated diver, slavonian grebe, eider, common scoter, velvet scoter.	Disturbance; at foraging locations. Short duration	High	Minor	High	Moderate	Not significant
SPA qualifying feature: Non-breeding waterfowl; Great-crested grebe, Long-tailed duck, sandwich tern	Disturbance; at foraging locations. Short duration	Moderate	Minor	High	Moderate	Not significant
Non-breeding waterfowl; Red-necked grebe.	Disturbance; at foraging locations. Short duration	Moderate	Minor	High	Moderate	Not significant
SPA qualifying feature: Non-breeding seabirds Shag, cormorant, herring gull.	Disturbance; at locations of small roosts. Short duration	Moderate	Minor	High	Moderate	Not significant
SPA qualifying feature: Non-breeding seabirds Shag, cormorant,	Disturbance; at foraging locations. Short duration	Moderate	Minor	High	Moderate	Not significant
Non-breeding waterfowl; Great-northern diver	Disturbance; at foraging locations. Short duration	High	Minor	Medium	Moderate/ Minor	Not significant
Non-breeding waders; Purple sandpiper	Disturbance; at locations of small roosts. Short duration	Moderate	Minor	Medium	Moderate/ Minor	Not significant

Potential Operational Effects

6.5.16 The permanent above ground structure (substation) is to be sited on an area of amenity grassland and built ground, at a distance of approximately 500 m from the boundary of the Firth of Forth SPA and Firth of Forth and Outer St Andrews Bay complex SPA (MHWS). It is separated from the adjacent SPAs by the Edinburgh Road.

6.5.17 Surveys recorded only occasional herring gull in the vicinity of the substation footprint.

6.5.18 Therefore, it is anticipated that the operational effects on sensitive IOF will be negligible and not significant.

Potential Cumulative Effects

6.5.19 The following section describes the potential in-combination effects relevant to populations of IOF using the Site..

6.5.20 Cumulative effects refer to effects upon avian receptors arising from the Proposed Development when considered alongside other proposed developments and activities. The proposed developments that have comparable effects and which therefore lead to additive effects on the IOF assessed here are listed in Table 6.27.

Table 6.27: Proposed Developments Considered to Cumulative Effects

Project	Project Description	Status	Comments
Inch Cape offshore wind	Three elements; i. Offshore turbine array ii. Offshore cable export route (Offshore Transmission works; OfTW) iii. Onshore Cable Transmission Works (OnTW)	Consented	Cable landfall and onshore transmission works immediately adjacent to this Proposed Development (at site of former power station, Cockenzie)
Neart na Gaoithe (NNG) offshore wind	Three elements; i. Offshore turbine array ii. Offshore cable export route iii. Onshore Cable Transmission Works	Consented	Cable export route has landfall at Thorntonloch (overlap with SPAs considered in this assessment).
Seagreen Phase I	Three elements; i. Offshore turbine array ii. Offshore cable export route iii. Onshore Cable Transmission Works	Consented	Cable export and landfall route to Carnoustie (Tayside). Therefore connectivity with populations assessed here is limited (although both sites fall within the Outer Firth of Forth and St Andrews Bay Complex SPA)
Seagreen 1A	Two elements; i. Offshore cable export route (for 36 of the consented 115 turbines) ii. Onshore Cable Transmission Works	Proposed	This assessment is for the onshore cable transmission works for Seagreen 1A.
Seagreen Phase II and III (Berwick Bank and Marr Bank)	Proposed offshore turbine arrays.	Proposed	Potential effects of these developments (offshore turbine arrays) are not considered to be comparable to the Proposed Development; not considered further.

6.5.21 As the purpose of cumulative impact assessment is to consider projects with comparable effects, this assessment does not consider the cumulative effects on avian populations arising from the offshore turbine arrays and offshore elements of the cable export routes of the projects listed in Table 6.27. Rather, this assessment is focussed on assessing the effects on near-shore and intertidal bird populations arising from the other proposed developments in-

combination with possible effects arising from the Seagreen 1A onshore transmission works (i.e. the Proposed Development).

6.5.22 The cumulative effects of the wind farm turbine arrays and associated infrastructure is assessed in detail in the Environmental Statements/ Environmental Impact Assessment Reports and HRA for these projects. These effects, including collision mortality, habitat loss and barrier effects are largely focussed on effects on pelagic seabirds (auks, gannet, gulls), with inshore species either scoped-out or considered to be subject to negligible impacts (when assessment is of these populations using offshore areas). Conversely, this assessment concludes that there will be no significant impacts on pelagic seabird populations arising from the Proposed Development, which is limited to the near-shore and intertidal zone. Therefore, cumulative impacts on near-shore and intertidal species are considered here, with cumulative effects on seabirds scoped-out. Considerable information on the individual and in-combination effects on pelagic seabird populations from the offshore wind installations can be found in the respective EIA and ES chapters.

6.5.23 Table 6.28 summarises the conclusion of potential effects on near-shore and intertidal IOF from those projects that may have in-combination effects with the Proposed Development. These were assessed during the EIA and HRA for those projects.

Table 6.28: Potential Effects on Intertidal and Near-shore Avian Receptors Arising from Related Developments

Project	Assessment	VOR	Comments
Inch Cape offshore wind.	Environmental Statement (whole project)[38].	Considers effects on near-shore and intertidal IOF from cable export and onshore transmission works as negligible.	Assessment considered certain near-shore species of high sensitivity to disturbance (red-throated diver, common scoter, velvet scoter, goldeneye). Concluded that the spatial extent of disturbance is small in relation to available foraging areas and of short duration.
Inch Cape offshore cable transmission works (OfTW) and onshore transmission works (OnTW); cumulative assessment.	Environmental Statement (whole project) and consented onshore transmission (OnTW) ES[39].	Both ES considered potential for cumulative disturbance effects from the offshore cable works and the onshore cable installation works (inland from the MLWS). The Conclusion that the in-combination disturbance to near-shore and intertidal birds would be negligible.	The conclusion is based on the following assessment of in-combination effects; i. The offshore works requiring a single cable-laying vessel, travelling at low speed and requiring only few vessel movements during construction; ii. The limited spatial overlap between the OfTW and OnTW works; and iii. The limited extent to which intertidal and near-shore birds may be displaced (within 500 m) by the simultaneous construction activities associated with the OfTW and OnTW.
Neart na Gaoithe (NNG) offshore wind; landfall and onshore element.	Environmental statement Chapter 8: Terrestrial and Inter-tidal Ecology and Ornithology[40].	Near shore/intertidal species not assessed.	Although the intertidal area is covered by the assessment, there is no mention of intertidal or near-shore bird species in this assessment (only terrestrial species). Note that these species are not assessed in ES for offshore elements of this project

[38] Inch Cape Offshore Limited Offshore Environmental Statement (2011). Online: https://tethys.pnnl.gov/sites/default/files/publications/inch2011.pdf [Accessed 20/02/21].

[39] Inch Cape Onshore Transmission Works ES: Chapter 06: Ecology

[40] Environmental statement Chapter 8: Terrestrial and Inter-tidal Ecology and Ornithology. Online: https://nngoffshorewind.com/files/onshore-environmental-statement/Chapter-8---Ecology-and-Ornithology.pdf [Accessed 20/02/21].

Table 6.28: Potential Effects on Intertidal and Near-shore Avian Receptors Arising from Related Developments			
Project	Assessment	VOR	Comments
			(scoped-out of NNG offshore ES Ornithology: Chapter 12[41])
Seagreen Phase I	Seagreen Phase I ES: Chapter 10: Ornithology [42]	Effects on intertidal /near-shore avian receptors scoped-out of ES[43] due to no significant effects. An HRA was undertaken for the Firth of Tay and Eden Estuary SPA, concluding no significant effects[44]. No assessment undertaken for the Outer Firth of Forth and St Andrews Bay Complex SPA.	Cable export and landfall route to Carnoustie (Tayside). Therefore connectivity with populations assessed here is limited (although both sites fall within the Outer Firth of Forth and St Andrews Bay Complex SPA). Winter Vantage Point surveys conducted twice-monthly in intertidal/near-shore area. Surveys identified a number of inshore/intertidal avian receptors (divers/seaduck/waders). Avian receptors included 34 species of conservation concern, of which 16 were SPA or Ramsar qualifying species.

6.5.24 Based on the available information, related projects in the vicinity of the Proposed Development are predicted to have negligible or minor effects on the IOF assessed here. These projects are anticipated to affect a similar assemblage of intertidal and near-shore species, mainly through construction-phase disturbance of short-duration and limited spatial extent. Indirect effects on availability of food or other resources are concluded as negligible or minor.

6.5.25 Therefore, the cumulative effects are assessed as follows;

- Related projects conclude minor or negligible short-term effects of disturbance during construction for intertidal and near-shore IOF;
- The construction works of these projects are temporally, and largely spatially separated.
- Therefore, the in-combination effects on intertidal and near-shore IOF is assessed to be minor and not significant.

Other Potential Cumulative Effects

6.5.26 The extensive new housing development at Blindwells New Town, comprising at least 16,000 homes under construction and plans for an additional 16,000 homes (within 2 km of the Site) will bring additional pressures from recreation on the Site's IOF (particularly feeding and roosting waders). Potentially, impacts of increased recreation pressures may be ameliorated by appropriate management, an issue which East Lothian Council are currently consulting on[45].

[41] Neart Na Gaoithe Offshore Wind Farm Environmental Statement; Chapter 12: Ornithology. Online: https://nngoffshorewind.com/files/offshore-environmental-statement/Chapter-12---Ornithology.pdf [Accessed 20/02/21].

42 Seagreen Phase I ES: Chapter 10: Ornithology. Online: https://marine.gov.scot/sites/default/files/chapter_10_-_ornithology.pdf [Accessed 20/02/21].

43 Seagreen Phase 1 Offshore Project Habitat Regulations Appraisal. October 2013. Online: http://marine.gov.scot/datafiles/lot/SG_FoF_alpha-bravo/Seagree_Phase1_Offshore_Project_Addendum/Part%202/A4MR-SEAG-Z-DEV275-SRP-233%20Part%202%20-%20Seagreen%20Phase%201%20Offshore%20Project%20HRA.pdf

[44] Non-Technical Summary (NTS) of the Revised Environmental Statement (ES) produced as part of the application process for the renewal of the Planning Permission in Principle (PPP) for the Seagreen Phase 1 Onshore Transmission Works. https://www.angus.gov.uk/sites/default/files/2017-07/433_App2.pdf

[45] eastlothianconsultations.co.uk/policy-partnerships/land-management-rules-2021/consultation

6.5.27 In light of the access management measures that East Lothian Council are proposing, and the longer timescale over which housing occupation would increase the risk of recreational disturbance it is not considered that any cumulative effects would arise.

6.6 Mitigation

Mitigation during Construction

6.6.1 The only effect predicted to have a moderate (though not significant) impact is disturbance during construction. The greatest magnitude of change is anticipated for non-breeding waterfowl foraging in near shore waters and for roosting aggregations of waders at high tide. Therefore, the following mitigation describes methods that will reduce disturbance for these IOF, which are additional to standard practice construction environmental management, as outlined in the Construction Environmental Management Plan (Technical Appendix 2.2).

6.6.2 The most highly sensitive IOF are non-breeding populations and therefore measures to reduce disturbance around the nearshore area shall be undertaken as far as is practical during the period between September and April.

6.6.3 Noise from construction activities has been identified as a significant source of disturbance for roosting (and breeding) birds. Methods to attenuate noise from drilling will be utilised, notably the use of sound walls and any modification of drilling rigs that would reduce noise levels. Drilling works undertaken in the vicinity of roosting birds or near occupied nests of sensitive species will be supervised by a suitably qualified and experienced ECoW to determine if additional measures may be required. It is assumed here that no significant noise-creating activities will be undertaken in the marine environment (drilling, piling etc).

6.6.4 Near-shore vessel-based activities should aim to reduce disturbance to foraging seabirds and waterfowl, particularly if works coincide with the winter period when divers, grebes and sea duck will be present. Vessels should operate at the lowest speed that is practical and minimise the area in which they operate.

6.6.5 The breeding bird assemblage of the Site is currently considered to be less sensitive than the non-breeding populations. To minimise impacts on breeding bird species, suitable nesting habitat (such as scrub and trees) that need to be cleared for works should be removed before the breeding season begins. Where this is not possible, vegetation must be surveyed by a suitably qualified and experienced Ecological Clerk of Works (ECoW) prior to removal.

Mitigation During Operation

6.6.6 No mitigation measures are required for the operational phase of the Proposed Development.

6.7 Assessment of Residual Effects

Residual Construction Effects

6.7.1 Mitigation measures will not entirely eliminate disturbance effects on all IOF. However, even before mitigation the magnitude of effects is predicted to be moderate at worst and not significant. If care is taken to minimise disturbance as prescribed, any residual effects are anticipated to be negligible.

Residual Operational Effects

6.7.2 No residual effects are anticipated for the Proposed Development.

Residual Cumulative Effects

6.7.3 Mitigation measures will not entirely eliminate disturbance effects on all IOF. However, even before mitigation the magnitude of cumulative effects is predicted to be minor and not significant. If care is taken to minimise disturbance during construction of Seagreen 1A, then additive effects from this project will further reduce cumulative impacts on IOF.

6.7.4 Baseline surveys show that roosting waders use locations within the construction footprint of both the Proposed Development and the adjacent Inch Cape onshore transmission works (for the latter, this is primarily the footprint of the former power station). Therefore, if construction works for both projects occurs simultaneously, this may affect the ability of birds to find alternative roost locations (although may potentially reduce the overall duration of disturbance). This also applies to IOFs using the near-shore area, although these species are less constrained in availability of alternative sites to use.

6.7.5 Although no residual effects for the Inch Cape onshore transmission works were identified during the EIA for this project, baseline surveys for Seagreen 1A have identified that a small number of ringed plover, gulls and, occasionally, other waders use this area for roosting. Therefore, a residual effect is likely to be a loss of these roost locations. However, these roosts involve few individuals and therefore there are likely to be capacity for alternative roost locations within the immediate vicinity. In addition, abandonment of the Site by these species is not a certainty; if undisturbed (fenced) areas of unvegetated hard-stand remain in this area, roosting and breeding ringed plover may persist as they will habituate to high levels of human activity. Herring gull will roost in a wide range of locations, including built-up areas. Therefore, the residual effect is concluded to be minor and not significant.

6.8 Summary

6.8.1 Baseline surveys of the ornithological interests of the Site and analysis of available data from other sources was undertaken. This indicates that several bird species regularly using the survey area are components of qualifying populations of adjacent SPAs. These populations therefore comprise sensitive Important Ornithological Features (IOF) for which an assessment of potential effects has been undertaken.

6.8.2 The most sensitive IOF, of international importance, are those species for which numbers using the Site represent >1% of the qualifying population of the SPAs. The species and SPA qualifying interest to which they belong are;

- Non-breeding waders (Firth of Forth SPA); Oystercatcher, ringed plover and turnstone;
- Non-breeding waterfowl (Firth of Forth SPA and Outer Firth of Forth and St Andrews Bay Complex SPA); Red-throated diver, slavonian grebe, eider, common scoter, velvet scoter, red-breasted merganser, long-tailed duck and great-crested grebe; and
- Non-breeding seabirds (Firth of Forth SPA and Outer Firth of Forth and St Andrews Bay Complex SPA); Shag, cormorant, herring gull.

6.8.3 Additional species assessed to be using the Site at nationally-important numbers (high sensitivity) comprised red-necked grebe, with populations of purple sandpiper assessed to be of regional importance (medium sensitivity).

6.8.4 The only predicted effects on sensitive IOF are disturbance during construction. Species regarded as particularly sensitive to disturbance are non-breeding waders at high-tide roosts, shag and cormorant roosts and non-breeding waterfowl foraging in the near shore area.

6.8.5 The effects of disturbance during construction are predicted to be of limited duration and affect low numbers of IOF, representing very small proportions of the qualifying populations. Therefore, the effects are concluded to lead to at most a minor magnitude of change, and moderate impact (not significant).

6.8.6 Mitigation measures to reduce effects of disturbance of sensitive IOF during construction are prescribed.

Table 6.29: Summary of Potential Significant Effects of the Proposed Development

Likely Significant Effect	Mitigation Proposed	Means of Implementation	Outcome/ Residual Effect
Construction			
Disturbance of internationally important populations of non-breeding waders, waterfowl and seabirds (SPA populations)	Minimisation of disturbance, particularly during non-breeding season September to March. Reduction of disturbance from noise through use of sound walls and drilling rig modifications to reduce noise levels. Reduction of disturbance from near-shore vessel based operations through minimisation of vessel speeds and area of operation. Construction activity to be advised by suitably qualified and competent ornithologist. If construction during breeding bird season, pre-construction surveys and nest checks required.	Sound walls and drilling rig modifications to reduce noise levels. Minimisation of boat speeds and area of operation. Construction activity to be advised by suitably qualified and competent ornithologist.	Not significant
Operation			
None predicted	None proposed/required	N/A	N/A
Cumulative			
None predicted	Standard practice construction environmental management.	As outlined in the Construction Environmental Management Plan [TA 2.1]	Not significant

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7 Hydrology, Hydrogeology and Ground Conditions

7.1 Introduction

7.1.1 This chapter considers the likely significant effects on hydrology, hydrogeology and geology associated with the construction, operation and decommissioning of the Proposed Development. The effects associated with the construction phase of the Proposed Development on hydrology, hydrogeology and ground conditions can be considered to be representative of reasonable worst-case decommissioning effects, therefore a separate assessment of the decommissioning phase has not been undertaken as part of this assessment.

7.1.2 The specific objectives of the chapter are to:

- describe the hydrology, hydrogeology and ground conditions baseline;
- describe the assessment methodology and significance criteria used in completing the impact assessment;
- describe the potential effects, including direct, indirect and cumulative effects;
- describe the mitigation measures proposed to address likely significant effects; and
- assess the residual effects remaining following the implementation of mitigation.

7.1.3 The geology and hydrogeology assessment has been carried out by Diane McGuigan of Ramboll, a senior hydrogeology and contaminated land specialist with over 10 years' experience. The hydrology assessment has been carried out by Briony McIntosh, of Ramboll and reviewed by Christopher Day, of Ramboll who is a senior hydrologist with over 10 years' experience in hydrological impact assessments.

7.1.4 This chapter is supported by the following figures and technical appendices:

- Figure 7.1: Local Hydrology;
- Figure 7.2: Hydrogeology;
- Figure 7.3: Bedrock Geology;
- Figure 7.4: Drift Geology;
- Figure 7.5: Soil Plan; and
- Figure 7.6: Peatland Classification.
- Technical Appendix 7.1 – Phase I Environmental Assessment.

7.1.5 Figures and technical appendices are referenced in the text where relevant.

7.2 Scope of Assessment

7.2.1 This chapter considers the potential for likely significant effects on:

- Hydrology and Flood Risk;
- Private Water Supplies (PWS);
- Groundwater Dependent Terrestrial Ecosystems (GWDTE);
- Hydrogeology; and
- Geology, Soils and Peat.

7.2.2 The assessment is based on the Proposed Development as described in Chapter 2: Development Description.

Consultation

7.2.3 The scope of the assessment has been informed by the following guidelines/policies:

- Environmental Protection Act 1990: Part IIA;
- Contaminated Land (Scotland) Regulations 2000 (SSI 2000/178) as amended;
- Planning Advice Note (PAN) 33: Development of Contaminated Land;
- Land Contamination: Risk Management (LCRM), guidance document (published by the Environment Agency on 8th October 2020 following withdrawal of The Model Procedures for the Management of land Contamination (CLR11);
- Water Framework Directive (2000/60/CE) (WFD);
- EC Groundwater Directive (80/68/EEC);
- Water Environment and Water Services (Scotland) Act 2003 which is implemented through the Water Environment (Controlled Activities) (Scotland) Regulations 2011;
- Water Environment (Miscellaneous) (Scotland) Regulations 2017;
- Flood Risk Management (Scotland) Act 2009;
- Water Supply (Water Quality) (Scotland) Regulations 2001;
- Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017;
- Public Water Supplies (Scotland) Regulations 2014 (as amended 2017);
- Public and Private Water Supplies (Miscellaneous Amendments) (Scotland) Regulations 2015;
- Water Environment (Drinking Water Protected Areas) (Scotland) Order 2013;
- SEPA's River Basin Management Plans (RBMP);
- SEPA's Pollution Prevention Guidelines (PPGs);
- Groundwater Protection Policy for Scotland (SEPA Policy No. 19);
- Scottish Government (2012) River Crossings and Migratory Fish;
- Scottish Planning Policy 2014 (SPP); and
- East Lothian Council Local Development Plan (LDP) 2018.

7.2.4 A pre-application consultation request was submitted to East Lothian Council (ELC) on the 26 November 2020, addressed to officers in the Environmental Health department and Flooding/Structures department. At the time of writing (March 2021) no response had been received.

Potential Effects Scoped Out

7.2.5 The scope of this assessment takes account of the committed mitigation measures both incorporated into the design and those standard construction and decommissioning mitigation measures incorporated into the Proposed Development, as described in Chapter 2: Proposed Development, and Technical Appendix 2.1: Outline Construction Environmental Management Plan. Table 7.1 summarises the issues scoped out of the assessment:

Table 7.1: Issues Scoped Out of EIA	
Potential Effect	Basis for Scoping Out
GWDTE	The ecological survey (Chapter 5: Ecology) did not find evidence of any GWDTE habitats. Therefore, no further assessment of the hydrogeological impact on these habitats is considered necessary on this basis.
Flood Risk Assessment	There is a small watercourse/ drainage feature at the southern boundary of the Site but the Site is not at risk of fluvial flooding. The western corner of the Site is at risk of coastal flooding however, the shore end export cable will be buried and therefore is not vulnerable to flood risk. Some areas of the Site, in its pre-development context, are identified to be potentially at risk of pluvial flooding but the detailed design will incorporate good practice surface water management and surface water runoff would be reduced to an equivalent greenfield rate. The drainage network would be designed to accommodate a 1 in 100 annual probability event (including an appropriate climate change allowance) without causing flooding of vulnerable areas (although some managed surface water ponding in external areas may be permitted). Therefore, no Flood Risk Assessment is considered necessary.
Private Water Supplies	East Lothian Council confirmed that it holds no records of PWS within a 2 km radius of the Site and therefore they have been scoped out from any further assessment.

7.3 Assessment Methodology and Significance Criteria

Method of Baseline Characterisation

Extent of the Study Area

7.3.1 The study area within this chapter initially extended to a 2 km radius from the Site boundary although hydrological issues are typically considered at a catchment scale and the study area has been extended to watercourses with downstream hydraulic connectivity with the Site.

Desk Study

7.3.2 The following baseline sources of information have been used to determine the baseline conditions of the Site:

- Historical Ordnance Survey map extracts;
- Ordnance Survey 1:10,000 scale mapping;
- SEPA River Basin Management Plan (RBMP) Water Environment Hub[1];
- SEPA Flood Maps[2];
- NatureScot Site Link[3];
- Hutton Institute National Soil Map of Scotland[4] 1:25,000 scale;

[1] SEPA River Basin Management Plan (RBMP) Water Environment Hub https://www.sepa.org.uk/data-visualisation/water-environment-hub/ [Accessed Dec 2020]

[2] SEPA Flood Maps https://map.sepa.org.uk/floodmap/map.htm [Accessed Dec 2020]

[3] NatureScot Site Link Map https://sitelink.nature.scot/map [Accessed Dec 2020]

[4] Hutton Institute (2013), National Soil Map of Scotland http://map.environment.gov.scot/Soil_maps/?layer=1 [Accessed Dec 2020]

- Scotland's Soils Carbon and Peatland Map 2016[5];
- British Geological Survey (BGS) Geology of Britain viewer[6] and Geoindex (Onshore)[7]; Groundwater Vulnerability Map of Scotland; and
- Hydrogeological Map of Scotland[8].

Field Survey

7.3.3 No field surveys were conducted as part of the geological, hydrogeological and hydrological assessment.

Criteria for the Assessment Effects

Criteria for Assessing the Sensitivity of Receptors

7.3.4 Effects on water and geological resources are described as beneficial, neutral or adverse and are considered with reference to the value or sensitivity of the receptor, as described in Table 7.2: Sensitivity of Environmental Resource.

Table 7.2: Sensitivity of Environmental Resource

Sensitivity of Receptor	Definition	Typical Criteria
High	▪ International or national level of importance; ▪ Receptor with a high quality and rarity, regional or national scale and limited potential for substitution/ replacement.	▪ SSSI designated for geological or geomorphological features; ▪ High likelihood of fluvial flooding in the sub catchment - defined as 1:10 probability in a year; ▪ EC Designated Salmonid/ Cyprinid fishery; ▪ Surface Water Framework Directive (WFD) class 'High'; ▪ Scottish Government Drinking Water Protected Areas; ▪ Aquifer providing regionally important resource such as abstraction for public water supply, abstraction for private water supply; ▪ Supporting a site protected under EC or UK habitat legislation / species protected by EC legislation; ▪ Protected Bathing Water Area; ▪ Active floodplain; ▪ Highly Groundwater Dependent Terrestrial Ecosystems; ▪ Average peat depth >1 m within the sub catchment.
Medium	▪ Regional, county and district level importance;	▪ Geological features present that are Regionally Important Geological and Geomorphological Sites (RIGS);

[5] Scottish Government (2016), SNH Carbon and Peatland Map 2016 http://map.environment.gov.scot/Soil_maps/?layer=10 {Accessed Dec 2020]

[6] British Geological Survey (2020), Geology of Britain Viewer https://www.bgs.ac.uk/map-viewers/geology-of-britain-viewer/ [Accessed Dec 2020]

[7] British Geological Survey (2020), Geoindex (Onshore) https://mapapps2.bgs.ac.uk/geoindex/home.html?_ga=2.4206067.171024966.1607860152-236971712.1579013279 [Accessed Dec 2020]

[8] British Geological Survey Hydrogeological Map of Scotland http://www.largeimages.bgs.ac.uk/iip/hydromaps.html?id=scotland.jp2 [Accessed Dec 2020]

Table 7.2: Sensitivity of Environmental Resource		
Sensitivity of Receptor	Definition	Typical Criteria
	▪ Receptor with a medium quality and rarity, regional scale and limited potential for substitution/replacement.	▪ Medium likelihood of fluvial/ tidal flooding in the sub catchment - defined as a 1:200 probability in a year; ▪ Groundwater WFD Class 'Good or Moderate'; ▪ Moderately productive aquifer classification by BGS; ▪ Surface water WFD class 'Good' or 'Moderate'; ▪ Aquifer providing water for agricultural or industrial use; ▪ Local or regional ecological status/ locally important fishery; ▪ Contains some flood alleviation features; ▪ Average peat depth >0.5 m within the sub catchment; ▪ Moderately Groundwater Dependent Terrestrial Ecosystems.
Low	▪ Local importance; ▪ Receptor is on-site or on a neighbouring site with a low quality and rarity, local scale; ▪ Environmental equilibrium is stable and is resilient to changes that are greater than natural fluctuations, without detriment to its present character.	▪ No geological features present that are protected (as SSSI/ RIGS); ▪ Areas with altered geology and soils (e.g. quarries); ▪ Surface water WFD class 'Poor'; ▪ Unproductive strata/ no abstractions for water supply. ▪ Sporadic fish present; ▪ No flood alleviation features; ▪ Sewer; ▪ Average peat depth <0.5 m within the sub catchment.

Criteria for Assessing the Magnitude of Change

7.3.5 The size or magnitude of each impact will be determined as a predicted deviation from the baseline conditions during construction and operation, as described in Table 7.3: Magnitude of Impact on Receptor.

Table 7.3: Magnitude of Impact on Receptor	
Magnitude of Impact	Criteria
High	High alteration/ change in the quality or quantity of and/ or to the physical or biological characteristics of environmental resource.
Medium	Medium alteration/ change in the quality or quantity of and or to the physical or biological characteristics of environmental resource.
Low	Low alteration/ change in the quality or quantity of and/ or to the physical or biological characteristics of environmental resource.
Negligible	Negligible alteration/ change in the quality or quantity of and/ or to the physical or biological characteristics of environmental resource.

Criteria for Assessing Significance

7.3.6 The significance of the impacts upon the baseline environment will be defined as a function of the sensitivity of receptor and the magnitude of change (as shown in Table 7.4), taking into

account any mitigation proposed. Differentiations between categories, and thus the final significance ratings, are based upon professional judgement. Major to moderate impacts would be classified as significant.

Table 7.4: Significance Criteria

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

Limitations and Assumptions

7.3.7 This assessment makes use of opensource and publicly available data resources, complimented by further surveys specific to the Site. The assessment of potential impacts within this chapter is reliant on the accuracy of the public data, which is considered robust and sufficient to enable this assessment to be completed.

7.3.8 An intrusive site investigation remains to be undertaken to provide further detail on the site-specific ground conditions beneath the Site.

7.4 Baseline Conditions

Current Baseline

7.4.1 Detailed description of the geological, hydrogeological and hydrological conditions are included in Technical Appendix 7.1: Phase I Environmental Assessment. The ground conditions beneath the Site would be further informed by an intrusive Site investigation which would be undertaken prior to construction and would include assessment of the geological, hydrogeological and mining conditions as well as an assessment of the potential for contaminated soils and groundwater to be present which could require additional mitigation measures to be implemented as part of the Proposed Development.

Hydrology

7.4.2 There are no significant watercourses within 2 km of the Site (see Figure 7.1).

7.4.3 A 900 mm – 1050 mm pipe/ culvert known as the Bankton Adit culvert does however run along the western margin of the Site. This culvert is under consideration as part of the East Lothian Council's "Climate Resilience Zone" strategy[9] to be naturalised into an open watercourse.

7.4.4 The Site is located on the southern shore of the Firth of Forth in a marine setting. The coastal waterbody into which the Proposed Development will run is the "Leith docks to Port Seton" waterbody (RBMP ID 200034[1]). The waterbody is designated as being in overall Poor condition; downgraded on the basis of its physical condition which is heavily modified to provide subsidence and flooding protection. However, further downstream, the "Port Seton to

[9] Open optimised environments. Climate Evolution: A vision for a place-based transition to climate resilience in east Lothian. May 2020. https://eastlothianconsultations.co.uk/housing-environment/climatevolution/supporting_documents/191381_Strategy%20and%20Action%20Plan%20Report%20v4_200514.pdf [Accessed Dec 2020].

Eyebroughty" section of the Firth of Forth (RBMP ID 200034[1]) is designated as being of overall Good condition, as a result of High physical condition and good water quality.

Hydrogeology

7.4.5 The Hydrogeological Map of Scotland[8] records the Marine Beach Deposits and the Raised Marine Deposits as a concealed aquifer with limited or local potential. According to SEPA's water environment hub database, these deposits belong to the Gullane and East Linton Sand and Gravel which has an overall classification of 'Poor' under the Water Framework Directive classification scheme due to historical mining and quarrying activities.

7.4.6 The Carboniferous bedrock is classified as a moderately productive aquifer. These strata are part of the RBMP Dalkeith groundwater body (ID 150552[1]) which is classified as being in Poor overall condition downgraded on the basis of water quality.

7.4.7 According to the SEPA Flood Maps[2] the Site has a low likelihood of groundwater flooding. The BGS Hydrogeological and Groundwater Vulnerability Maps of Scotland (1:625,000) the bedrock formation is considered moderately productive (Figure 7.2). The aquifer is multi-layered with low yields except where disturbed by mining.

Soils and Geology

7.4.8 The bedrock beneath the Site comprises a sequence of Carboniferous sedimentary rocks of the Clackmannan Group (Figure 7.3) including sandstones, siltstones, mudstones, limestones, seat earths and coal seams.

7.4.9 Historical borehole records available to view on the BGS Geoindex[7] suggest the depth to bedrock could be in the region of 2 m below ground level (m bgl)

7.4.10 As referenced in Technical Appendix 7.1: Phase I Environmental Assessment, historical underground coal mineworkings are recorded beneath the Site at depths from 19 m bgl to 110 m bgl.

7.4.11 Seven mine entries are recorded to be located within the Site boundary, or within 100 m of the Site boundary.

7.4.12 According to the BGS[7] Onshore Geoindex Made Ground is shown to be present beneath the Onshore Export Cable Development Zone and is likely associated with the historical refuse tip recorded in this area. Historical borehole records also record the presence of Made Ground, (colliery refuse) beneath the Substation Development Zone and the Temporary Construction Compound Development Zone.

7.4.13 The natural superficial deposits comprise Marine Beach Deposits (shingle, sand, silt and clay) and Raised Marine Deposits (shingle, sand, silt and clay with organic debris). The southern and eastern areas are shown to be underlain by Glacial Till (Figure 7.4).

7.4.14 The National Soils Map of Scotland[4] indicated the Site is split between an area of built up (non-soil) land in the west, and brown soils in the east (Figure 7.5). The SNH Carbon and Peatland mapping 2016[5] mirrors this split with half the Site located within a 'non-soil' area and the eastern half in a mineral soil area (Figure 7.6).

Contaminated Land

7.4.15 There is potential for contaminants to be present in the Made Ground, natural superficial soils and groundwater due to the historical activities that are recorded within the boundaries of the Site and in the study area. Historical land uses recorded within the Site boundary included the

Preston Links Colliery; mineral railway lines; a gas works and gasholder; a refuse tip; electricity substations and infrastructure associated with the neighbouring former Cockenzie Power Station. Potential contaminants associated with these sources could include heavy metals, total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons, (PAH) volatile organic compounds (VOCs), semi-volatile organic Compounds (SVOCs), polychlorinated biphenyls (PCBs), phenols, cyanide, sulphates and asbestos.

Sewer and Water Supply Infrastructure

7.4.16 Sewer and water supply asset plans indicate:

- A number of water distribution mains are located within the Site. A mains supply runs beneath Edinburgh Road in a southwest to northeast direction through and parallel to the western boundary of the Site, and two more mains flow northwest beneath the Site to join this mains supply;
- A combined sewer overflow (CSO) runs southeast to northwest beneath the Site and discharges into the Firth of Forth; and
- A main sewer also runs beneath Edinburgh Road in a southwest to northeast direction through and parallel to the western margin of the Site.

Future Baseline

7.4.17 There is potential for climate change to impact on future baseline conditions. Climate change studies predict a decrease in summer precipitation and an increase in winter precipitation alongside slightly higher average temperatures. This suggests that there may be greater pressures on private water supplies in summer months in the future. However, summer storms are predicted to be of greater intensity. Therefore, peak fluvial flows associated with extreme storm event may also increase in volume and velocity. These climate change factors have been taken into account when considering the potential for likely significant effects.

7.4.18 It is acknowledged that East Lothian Council, working in partnership with the Scottish Government, the Lothian Drainage Partnership, SEPA, Scottish Water and NatureScot published a 'Vision and Action Plan' for a place-based transition to climate resilience in East Lothian[10] and there is an aspiration to restore the Bankton Adit culvert to an open channel on the southern boundary of the Site. This has been considered as an additional potential pathway for hydrological connectivity from the Site to the Firth of Forth.

Summary of Sensitive Receptors

7.4.19 The sensitivity of the receptors discussed in the baseline conditions above, as well as the reason for their classification have been summarised in Table 7.5.

Table 7.5: Summary of Receptor Sensitivity

Receptor	Sensitivity	Justification
Geology (soils, superficial deposits, bedrock)	Low	▪ No geological or geomorphological designations. ▪ Areas with altered geology and soils (e.g. wide spread Made Ground).
Superficial Aquifer	Low	▪ 'Poor' RBMP status and classified as a limited productivity aquifer.

[10] URL: https://www.eastlothian.gov.uk/info/210547/planning_and_building_standards/12242/local_development_plan/3 (accessed 03/02/2021)

Table 7.5: Summary of Receptor Sensitivity		
Receptor	Sensitivity	Justification
Bedrock Aquifer	Medium	▪ 'Poor' RBMP status but classified as a moderately productive aquifer.
Firth of Forth	Medium	▪ 'Poor' RBMP status. ▪ Contains flood alleviation features.
Unnamed Burn/ Ditch	Low	▪ Not classified within the RBMP. ▪ Not within the extent of the SEPA flood maps.

7.5 Assessment of Likely Effects

7.5.1 The following section provides the assessment of likely effects in the absence of mitigation.

Potential Construction Effects

Mobilisation of existing contaminants

7.5.2 There is potential for impacts on the quality of the underlying superficial aquifer as a result of increased leaching following excavation/ exposure of Made Ground during the construction phase. The superficial aquifer is considered to be of Low sensitivity and the potential magnitude of effects on this receptor is anticipated to be Medium, resulting in Minor Adverse effect (Not Significant).

7.5.3 Impacts on the quality of the underlying bedrock aquifer could occur as a result of vertical migration of contaminated groundwater following excavation/ exposure of Made Ground during the construction phase. The bedrock aquifer is considered to be of Medium sensitivity and the potential magnitude of effects on this receptor is anticipated to be Medium, resulting in Moderate Adverse effect (Significant).

7.5.4 Impacts on the quality of the bedrock aquifer could also occur should the deeper, coal-mined strata be intercepted during construction (e.g. foundation construction) resulting in vertical or lateral groundwater migration. However, this is considered unlikely unless deep piled foundations were proposed. Therefore, no significant effect is anticipated.

7.5.5 Impacts on the quality of the Firth of Forth of migration of existing contaminants in Made Ground and subsequent lateral migration in permeable strata towards the coast. The Firth of Forth is considered as a receptor of Medium sensitivity and the potential magnitude of effects on this receptor is anticipated to be Medium, resulting in Moderate Adverse effect (Significant).

Alteration to Surface Water Flows and Runoff

7.5.6 Changes to the volume and rate of surface water runoff from the Site could occur as a result of the increased impermeable space within the Site boundary associated with the Proposed Development. This could lead to increased downstream or downgradient flood risk. However, the dominant flood risk in the vicinity of the Site (although not predicted to impact on the Proposed Development), is associated with tidal flooding which would not be impacted by any changes to the surface water runoff regime within the Site. Furthermore, the Proposed Development would be served by a new surface water drainage network which would be designed at detailed design stage and would ensure no increase in downstream flood risk. As such no likely significant effects are identified.

Sedimentation and Morphology

7.5.7 The quality of surface waters, coastal waters or groundwater could be impacted through the release of sediment generated during excavation, earth moving and from temporary stockpiles. Potential effects include degradation of water quality and indirect effects in aquatic habitats and species. The bedrock aquifer is considered as a receptor of medium sensitivity and the potential magnitude of the effects on this receptor is anticipated to be Medium, resulting in a Moderate Adverse and significant effect. The Firth of Forth is considered as a receptor of Medium sensitivity and the potential magnitude of effects on this receptor is anticipated to be Medium, resulting in Moderate Adverse and significant effect. The superficial aquifer and unnamed burn are considered as a receptor of low sensitivity and the potential magnitude of effects on these receptors are anticipated to be Medium, resulting in Minor Adverse effect (not significant).

Chemical Pollution and Foul Water Discharge

7.5.8 Impacts to the quality of surface waters, coastal waters or groundwater could occur through the accidental spills or release of pollutants such as stored fuels, oils and materials used during construction. Potential effects include degradation of water quality and indirect effects in aquatic habitats and species. The bedrock aquifer is considered as a receptor of medium sensitivity and the magnitude of the effects on this receptor is anticipated to be Medium, resulting in a Moderate Adverse and significant effect. The Firth of Forth is considered as a receptor of Medium sensitivity and the magnitude of effects on this receptor is anticipated to be Medium, resulting in Moderate Adverse and significant effect. The superficial aquifer and unnamed burn are considered as a receptor of low sensitivity and the potential magnitude of effects on these receptors are anticipated to be Medium, resulting in Minor Adverse effect (not significant).

7.5.9 Impacts to the quality of surface waters, coastal waters or groundwater could occur through direct discharge of untreated foul sewage from temporary welfare facilities to watercourses, coastal waters or to ground. However, the direct discharge of foul waters is not considered likely. Measures to treat foul water or manage its discharge would be set out in the Construction Environmental Management Plan (CEMP) prior to commencement of works.

Soils

7.5.10 Changes to local soil habitats as a result of:

- Compaction of soils;
- Potential for increased erosion of soils through disturbance either through direct disturbance or localised drying caused by infrastructure; and
- Loss of soil habitats through excavations for infrastructure.

7.5.11 The soils present are assessed to be of low sensitivity on the basis that there is extensive Made Ground in the Site. The likely effects associated with the landfall, onshore cable and temporary construction compounds are considered to be low magnitude and temporary effects, with all soil materials stripped and stored in accordance with good practice for the purpose of backfilling of excavations, reinstatement and landscaping. Impacts on soils within the access development zone and substation development zone are anticipated to be permanent, but limited in extent and low magnitude. Any soils present would be stripped and stored for later use in site reinstatement and landscaping. The overall effect on soils is assessed to be Minor Adverse and not significant.

Potential Operational Effects

7.5.12 The potential risk of the release of pollutants or sediment from the activities relating to the operational phase of the Proposed Development is substantially lower than during construction because of the decreased levels of ground disturbance. Additionally, the operation or refuelling of plant machinery shall not take place on the Proposed Development area during the operational phase. Potential impacts are likely to be restricted to localised accidental leakages or spillages of fuels/ materials associated with maintenance activities (e.g. any oil-filled electrical equipment in the substation or site vehicle use on site) which would likely be directed towards the drainage network which will be designed to incorporate oil water separation. No likely significant effects are predicted during the operational phase.

7.5.13 There is the potential for hardstanding surfaces and compacted tracks and infrastructure to lead to increased rates of surface runoff, in turn leading to the potential for increased risk of surface erosion and downstream flood risk; however as described in Chapter 2: Development Description, the Proposed Development would incorporate a drainage design using Sustainable Drainage Systems (SuDS) principles in accordance with The SuDS Manual (C753) 2015[11].

Potential Cumulative Effects

7.5.14 The potential for likely significant effects from the Proposed Development alone is limited to effects associated with the potential to encounter contamination during ground breaking works, associated with historic land use. When these effects are considered in addition to the consented Inch Cape substation, no further additional or in combination effects are anticipated. This is because the likelihood of a pollution event occurring at more than one construction area at the same time, and of that pollution migrating to combine to create a cumulative effects is considered to be very low. Any contaminated material associated with the former use of the Inch Cape site is assumed to be removed as part of the power station remediation and restoration programme as required by the Pollution Prevention and Control (PPC) permit surrender (as set out in the Inch Cape Onshore Transmission Works Environmental Statement, 2018). Given that all elements of construction will be undertaken in accordance with the CEMP (Technical Appendix 2.2) the risk is further reduced. The cumulative effect on water quality (surface and groundwater) is therefore assessed as being no greater than for the Proposed Development alone. The required construction of both schemes will not require any substantial groundwater abstraction or alterations to surface watercourses, as such the cumulative impact on surface water flows or groundwater flows is therefore assessed as Negligible.

7.6 Mitigation

7.6.1 An intrusive Site investigation would be completed to provide further site-specific information on the geological, hydrogeological and mining conditions beneath the Site, as well as the presence of significant contamination in soils and groundwater. The investigation would allow assessment of environmental risks and identify mitigation measures that could be required to ensure that the Site is suitable for the proposed use. It is expected that the requirement for a site investigation to assess the potential for contamination to be present and the resulting potential pollutant linkages would be inserted as a planning condition such as: "*Prior to*

[11] The SuDS Manual (C753) 2015. https://www.susdrain.org/resources/SuDS_Manual.html [Accessed Dec 2020].

commencement of construction at the site a) an environmental risk assessment (including intrusive investigation) will be carried out to establish environmental risks to sensitive receptors including human health and the Water Environment as a result of contamination at the site; b) where environmental risks exist as a result of identified pollutant linkages, a remediation strategy will be developed and submitted to the planning authority for approval; and c) a verification report will be submitted to the planning report for approval confirming implementation of the remediation and mitigation measures."

7.6.2 Impacts to groundwater and surface water receptors could occur if contaminated soils are exposed, or contaminated groundwater is intercepted, resulting in the formation of a new pollutant linkage (e.g. increased infiltration). To minimise the potential for contaminant migration as a result of construction phase activities, protocols should be developed to manage contaminated soils and groundwater should these be encountered.

- In the event that suspected contaminated soils are encountered during the construction phase, including cable installation works and substation development (e.g. soils that are visibly stained or have a strong odour), it is recommended that guidance is sought from a suitably qualified environmental consultant to determine whether the material would be suitable for use as backfill. Suspected contaminated soils should be segregated from 'clean' soils to minimise the potential for cross contamination. Sampling and laboratory analysis may be required to allow assessment of the associated environmental risks. Should an environmental risk be identified (e.g. to human health, the water environment or cable material) then alternative material could be required for use as backfill and an appropriate treatment/ disposal route identified for the unsuitable soil.
- Should shallow groundwater be encountered during excavation of trenches which appears to be contaminated (e.g. water that is discoloured, has an odour or an iridescent sheen) or intercepts significantly contaminated soils, there could be a requirement for water to be pumped from the excavation to a temporary storage container such as an IBC. As per the protocol for soils, sampling of the groundwater would likely be required to ascertain the most appropriate management options for the water.

7.6.3 In order to mitigate potential impacts from contaminated soil or groundwater during the operational phase, there may be a requirement to implement measures to break identified pollutant linkages such as excavation of contaminated soils, placement of capping layers, geomembranes, or provision of hardstanding surfaces to limit infiltration. Such measures would be identified following completion of the environmental risk assessment and updated conceptual site model, and a remediation strategy developed. The remediation work would be subsequently require verification by an independent environmental consultant and a report prepared for submission to the Council.

7.6.4 A management system would be developed as part of the detailed Construction Environmental Management Plan, in order to describe in detail the individual demolition and construction works which would be undertaken on the site, such as the unloading and storing of materials, temporary works such as scaffolding, the construction, engineering or installation methods to be used and the sequence of works. The management system would also list the steps to be taken to prevent or minimise risks to the environment from the proposed works. The CEMP would include a Pollution Prevention Plan. Measures would seek to:

- ensure there would be no increase to flood risk or impact on drainage;
- minimise sediment being disturbed and moved downstream;
- minimise (and preferably avoid) the impact on biodiversity;

- ensure careful storage and disposal of waste;
- prevent pollution of watercourses, for example from construction debris or contaminated land;
- prevent pollution from static plant, mobile machinery, refuelling and material storage;
- prevent or minimise impacts on habitats and wildlife; and
- prevent the spread of invasive non-native species or plant or animal diseases.

7.6.5 Specific measures within the CEMP to avoid and minimise the potential for new sources of contamination to arise and to cause significant effects in respect of surface water resources could include the following:

- Regularly maintaining construction vehicles and plant to reduce the risk of hydrocarbon contamination;
- Storing, handling and managing construction materials with due regard to the potential for mobilisation into surface drainage;
- Locating above-ground storage tanks and temporary welfare facilities on designated areas of hardstanding away from potential surface drainage routes; and
- Storing liquids such as degreasers, solvents, lubricants and paints in segregated, bunded enclosures.

7.6.6 It is anticipated that detailed drainage design would be submitted to the planning authority in consultation with SEPA and Scottish Water (as required) for the agreement of details on SuDS surface water management and foul water treatment to discharge a condition of the planning consent.

7.7 Assessment of Residual Effects

Residual Construction Effects

7.7.1 Residual effects during construction include:

- The geology (superficial deposits and bedrock) is identified as being of 'Low' sensitivity. The magnitude of the impacts following mitigation are predicted to be 'Negligible', therefore the effect is predicted to be 'Negligible' and not significant.
- The superficial aquifer is identified as being of 'Low' sensitivity. The magnitude of the impacts following mitigation are predicted to be 'Negligible', therefore the effect is predicted to be 'Negligible' and not significant.
- The bedrock aquifer is identified as being of 'Medium' sensitivity. The magnitude of the impacts following mitigation are predicted to be 'Negligible', therefore the effect is predicted to be 'Negligible' and not significant.
- The unnamed burn which flows towards the southern margin of the Site is identified as being of 'Low' sensitivity. The magnitude of the impacts following mitigation are predicted to be 'Negligible', therefore the effect is predicted to be 'Negligible' and not significant.
- The Firth of Forth is identified as being of 'Medium' sensitivity. The magnitude of the impacts following mitigation are predicted to be 'Negligible', therefore the effect is predicted to be 'Negligible' and not significant.

Residual Operational Effects

7.7.2 No additional significant potential impacts on hydrology, hydrogeology or geology as a result of the operation of the Proposed Development have been identified. Impacts on water features

including the Firth of Forth and unnamed burn are addressed through design interventions or standard mitigation practice such that the magnitude of the impact is predicted to be 'Negligible' therefore the effect is predicted to be 'Negligible' and not significant.

Residual Cumulative Effects

7.7.3 No significant residual cumulative effects have been identified.

7.8 Summary

7.8.1 A desk based assessment of the Proposed Development has been undertaken. Following the standard mitigation practices (primary to be set out in the CEMP and Pollution Prevention Plan), no significant residual impacts resulting from the Proposed Development are considered to exist.

Table 7.6: Summary of Potential Significant Effects of the Proposed Development

Likely Significant Effect	Mitigation Proposed	Means of Implementation	Outcome/ Residual Effect
Construction			
Changes to the volume and rate of surface water runoff from the Site, and therefore increased downstream flood risk, due to increased impermeable space within the Site boundary.	The surface drainage network would be designed to minimise potential changes to the volume and rate of surface water runoff, such that discharge does not exceed that of the pre-development scenario.	Drainage design required by condition.	Not Significant
Impacts to the quality of surface waters or groundwater due to mobilisation of contamination during construction work	The assessment has identified the potential for contaminated soils and groundwater to exist associated with historical development. Site investigation to be undertaken to assess potential environmental risks to identified sensitive receptors. Standard procedure to be developed for the management of contaminated soils or groundwater during construction to limit infiltration or migration of contaminants to groundwater or surface water receptors. The main contractor would be required to develop specific Environmental Management Plans (EMPs) which would include the methodologies and management measures to be employed in the construction of the Proposed Development. It is anticipated that foul sewage from temporary welfare	Intrusive investigation prior to construction required by condition. CEMP, including protocol for the management of contaminated soils and/ or groundwater encountered during construction, required by condition.	Not Significant

Table 7.6: Summary of Potential Significant Effects of the Proposed Development			
Likely Significant Effect	Mitigation Proposed	Means of Implementation	Outcome/ Residual Effect
	facilities would be to tank for off-site removal.		
Impacts to groundwater or surface water receptors from residual contaminated soils or groundwater.	A remediation strategy would be prepared for the development detailing the mitigation measures necessary to break identified pollutant linkages between residual contaminated soils/ groundwater and identified receptors during the operational phase. This could include aspects such as localised excavation of contaminated soils, hardstanding cover, or provision of a capping layer.	Remediation Strategy and Verification Report required by condition.	Not Significant
Impacts on morphology and sediment supply in watercourses	Any works taking place near watercourses will be undertaken in accordance with SEPA guidance and in line with the requirements of the CAR to prevent or reduce adverse effects to the watercourse.	CEMP, incorporating a Pollution Prevention Plan required by condition.	Not Significant
Operation			
Impacts from accidental spills or leakage of chemicals introduced to the Site, causing a release of pollutants to watercourses during operations or any maintenance activities.	It is anticipated that detailed drainage design would be submitted to the planning authority in consultation with SEPA and Scottish Water (as required) for the agreement of details on SuDS surface water management and foul water treatment to discharge a condition of the planning consent	Drainage design required by condition.	Not Significant
Pollution as a result of unmanaged foul flows from welfare facilities.	A detailed drainage design would be developed in consultation with relevant consultees to address foul drainage.	Drainage design required by condition.	Not Significant

8 Cultural Heritage and Archaeology

8.1 Introduction

8.1.1 This chapter considers the likely significant effects on cultural heritage and archaeology associated with the construction, operation and decommissioning of the Proposed Development. The effects associated with the construction phase of the Proposed Development on cultural heritage and archaeology can be considered to be representative of reasonable worst-case decommissioning effects, therefore a separate assessment of the decommissioning phase has not been undertaken as part of this assessment.

8.1.2 The specific objectives of the chapter are to:

- describe the cultural heritage and archaeology baseline;
- describe the assessment methodology and significance criteria used in completing the impact assessment;
- describe the potential effects, including direct, settings and cumulative effects;
- describe the mitigation measures proposed to address likely significant effects; and
- assess the residual effects remaining following the implementation of mitigation.

8.1.3 The assessment has been carried out by Victoria Oleksy and Lisa Bird of AOC Archaeology Group. Victoria Oleksy is an Assistant Director and Consultancy Sector Head with 16 years' of experience working on cultural heritage assessments. Victoria specialises in EIAs, Archaeological Impact Assessment and Conservation Management Plans and has appeared as an expert witness for planning appeals and called-in planning applications. Lisa Bird is a Project Officer with five years' of experience working on a range of EIAs, desk-based assessments and large walkover survey projects.

8.1.4 This assessment has been carried out in accordance with the standards of professional conduct outlined in the Chartered Institute of Archaeologists (CIfA) Code of Conduct[1] and Professional Conduct[2], as well as the CIfA Standard and guidance for commissioning work on, or providing consultancy advice on, archaeology and the historic environment[3]; desk-based assessment[4]; field evaluations[5]; and other relevant guidance.

8.1.5 This chapter is supported by the following figures and technical appendices:

- Figure 8.1: Heritage Assets within the Site
- Figure 8.2: Heritage Assets within the cultural heritage study area and Seton Designated Assets

[1]Chartered Institute of Archaeologists (CIfA). (2019) *Code of Conduct*. Available at: https://www.archaeologists.net/sites/default/files/Code%20of%20conduct%20revOct2019_0.pdf (Accessed 26/11/2020)

[2]CIfA. (2019). *Regulations for Professional Conduct*. Available at: https://www.archaeologists.net/sites/default/files/Regulations%20for%20professional%20conduct%20May%202019.pdf (Accessed 26/11/2020)

[3] CIfA. (2020). *Standard and guidance for commissioning work on, or providing consultancy advice on, archaeology and the historic environment.* Available at: https://www.archaeologists.net/sites/default/files/CIfAS%26GCommissioning_2.pdf (Accessed 26/11/2020)

[4] CIfA. (2020). *Standard and guidance for historic environment desk-based assessment.* Available at: https://www.archaeologists.net/sites/default/files/CIfAS%26GDBA_4.pdf (Accessed 26/11/2020)

[5] CIfA. (2020). *Standard and guidance for archaeological field evaluation.* Available at: https://www.archaeologists.net/sites/default/files/CIfAS%26GFieldevaluation_3.pdf (Accessed 26/11/2020)

- Figure 8.3: Extract from map by Adair, 1682
- Figure 8.4: Extract from map by Roy, 1752-55
- Figure 8.5: Extract from map by Forrest, 1802
- Figure 8.6: Extract from Ordnance Survey map, 1854
- Figure 8.7: Extract from Ordnance Survey map, 1907
- Figure 8.8: Extract from Ordnance Survey map, 1934
- Technical Appendix 8.1- Heritage Assets Gazetteer;
- Technical Appendix 8.2- Cultural Heritage Plates; and
- Technical Appendix 8.3- Settings Assessment.

8.2 Scope of Assessment

8.2.1 This chapter considers the potential for likely significant effects on:

- *Known archaeological remains within the Site*
- *Hitherto unrecorded buried remains within the Site*
- *The setting of designated heritage assets within the Zone of Theoretical Visibility (ZTV)*
- *The setting of selected non-designated heritage assets within the ZTV*

8.2.2 The chapter assesses the potential for additional cumulative effects when considered in addition to other consented developments. The chapter considers the following cumulative development scenarios:

- *The Proposed Development in combination with the consented Inch Cape onshore substation (planning reference 18/00189/PPM) and the under construction residential and mixed-use development at Blindwells (14/00768/PPM) .*

8.2.3 The assessment is based on the Proposed Development as described in **Chapter 2: Development Description** and has been informed where appropriate by the Landscape and Visual Impact Assessment reported in Chapter 4.

Consultation

8.2.4 The scope of the assessment has been informed by consultation responses summarised in Table 8.1 and the following policies/ guidelines:

- *Scottish Planning Policy*[6]*;*
- *Historic Environment Policy for Scotland*[7]*, including Designation Policy and Selection Guidance*[8]
- *Planning Advice Notes (PAN) for Scotland in particular PAN 2/2011 'Archaeology and Planning'*[9]*;*

[6] Scottish Government (2020) *Scottish Planning Policy*. Available at: https://www.gov.scot/publications/scottish-planning-policy/

[7] Historic Environment Scotland (HES). (2019). *Historic Environment Policy for Scotland*. Available at: https://www.historicenvironment.scot/advice-and-support/planning-and-guidance/historic-environment-policy-for-scotland-heps/ (Accessed 24/11/2020)

[8] HES. (2019) *Designation Policy and Selection Guidance*. Available at: https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=8d8bbaeb-ce5a-46c1-a558-aa2500ff7d3b (Accessed 24/11/2020)

[9] Scottish Government. (2011) PAN2/2011 Planning and Archaeology. Available at: https://www.gov.scot/publications/pan-2-2011-planning-archaeology/ (Accessed 24/11/2020)

- *Managing Change in the Historic Environment: Setting*[10]*;*
- *Managing Change in the Historic Environment: Historic Battlefields*[11]*;*
- *East Lothian Local Development Plan 2018: Policies CH1: CH2: CH4: CH5; CH6*[12]*;*
- *East Lothian Local Development Plan 2018 Supplementary Planning Guidance- Cultural Heritage and the Built Environment*[13]*;*
- *NatureScot & HES's published guidance contained within 'Environmental Impact Assessment Handbook v5'*[14]*.*

8.2.5 Table 8.1 summarises the consultation responses received on cultural heritage and archaeology and provides information on where and/or how they have been addressed in this assessment. The following organisations made comments on the cultural heritage and archaeology assessment:

- *Historic Environment Scotland (HES); and*
- *Archaeological Officer, Archaeology Service ELC, archaeological advisor to ELC.*

8.2.6 Full details on the consultation responses can be reviewed in Technical Appendix 1.1: Consultation Register.

Table 8.1: Consultation Responses

Consultee and Date	Consultation	Issue Raised	Response/ Action Taken	Where issue is addressed in EIAR
Andrew Robertson, Archaeological Officer 26/11/2020 via email, response received 03/12/2020 via email	Consultation on the scope of the Cultural Heritage and Archaeology EIAR chapter.	The general scope of the chapter was agreed as appropriate. It was advised that the settings assessment should, dependant on the ZTV, include non-designated heritage assets whose setting may be impacted by the Proposed Development. The reasoning for scoping out assets from the setting	The assessment has been undertaken to the agreed appropriate scope. Non-designated heritage assets within the ZTV whose setting may be impacted by the Proposed Development will be included within the chapter. The reasoning for the inclusion of non-designated heritage assets will be clearly set out.	Methodology outlined in Section 8.3. Assets to be scoped out of assessment detailed in Table 8.2.

[10] Historic Environment Scotland. (2016 (Updated 2020)). *Managing Change in the Historic Environment- Setting.* Available at: https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationid=80b7c0a0-584b-4625-b1fd-a60b009c2549 (Accessed 24/11/2020) https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationid=b7a05b45-f2a9-4c71-8450-a60b0094c62e (Accessed 15/12/2020)

[11] HES (2016- Updated 2020). Managing Change in the Historic Environment: Historic Battlefields. Available at: https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationid=b7a05b45-f2a9-4c71-8450-a60b0094c62e (Accessed 15/12/2020)

[12] East Lothian Council (ELC) (2018). *East Lothian Local Development Plan 2018*. Available at: https://www.eastlothian.gov.uk/downloads/file/27791/local_development_plan_2018_adopted_270918. (Accessed 24/11/2020)

[13] ELC. (2018a*). East Lothian Local Development Plan 2018 Supplementary Planning Guidance- Cultural Heritage and the Built Environment* Available at: https://www.eastlothian.gov.uk/downloads/file/27907/cultural_heritage_and_the_built_environment_spg (Accessed 24/11/2020)

[14] Scottish Natural Heritage & Historic Environment Scotland. (2018). *Environmental Impact Assessment Handbook v5.* Available at: https://www.nature.scot/sites/default/files/2018-05/Publication%202018%20-%20Environmental%20Impact%20Assessment%20Handbook%20V5.pdf (Accessed 24/11/2020)

Table 8.1: Consultation Responses				
Consultee and Date	**Consultation**	**Issue Raised**	**Response/ Action Taken**	**Where issue is addressed in EIAR**
		assessment should be clearly stated.	The reasoning for scoping out of assets from the setting assessment will be clearly justified.	
Historic Environment Scotland (HES) 26/11/2020 via email. Reply received 07/12/2020 via email	Consultation on the scope of the Cultural Heritage and Archaeology EIA chapter.	HES stated that as no details of the Proposed Development had been submitted HES could not fully comment. HES generally agreed with the outlined scope.	The assessment has been undertaken to the generally agreed appropriate scope.	Methodology outlined in Section 8.3.

Potential Effects Scoped Out

8.2.7 The scope of this assessment takes account of the committed mitigation measures both incorporated into the design and those standard construction and decommissioning mitigation measures incorporated into the Proposed Development, as described in **Chapter 2: Proposed Development**, and EIAR Volume 4: Technical Appendix 2.1: Outline Construction Environmental Management Plan. Table 8.2 summarises the issues scoped out of the assessment:

Table 8.2: Issues Scoped Out of EIA	
Potential Effect	**Basis for Scoping Out**
Impact on the setting of the designated heritage assets and Property in Care at Seton House (Sites 1, 5 & 23-5)	These designated heritage assets are located outwith the 'with screening' ZTV for the Proposed Development. A site visit also found no appreciable intervisibility due to distance, vegetation and the intervening built environment.
Impact on the setting of non-designated heritage assets	Following site visits and due to the nature of the Proposed Development and historic industrial use and character of the Site there is judged to be no impact on the setting of non-designated heritage assets within the cultural heritage study area

8.3 Assessment Methodology and Significance Criteria

Method of Baseline Characterisation

Extent of the Study Area

8.3.1 In order to assess the potential for significant effects on cultural heritage assets resulting from the Proposed Development, the baseline survey has identified all heritage assets within a distance of up to 1 km from the Site (the cultural heritage study area).

8.3.2 All heritage assets identified have been given a unique site number. Assets are referred to by site number in the text and on the associated figures and details of each asset can be found by site number in the Heritage Assets Gazetteer (Technical Appendix 8.1). Site numbers are not sequential due to an error during on-site recording.

Desk Study

8.3.3 Data on known archaeological and cultural heritage assets on the Proposed Development site and in the surrounding study area has been collated from the following sources:

- *HES for:*
  - National Record of Historic Environment (NRHE) Data (downloaded in November 2020);
  - Designated asset data (downloaded in November 2020); and
  - Published and unpublished archaeological reports.
- *East Lothian Historic Environment Record (HER)*
  - Non-designated heritage assets as recorded on the HER; and
  - Unpublished archaeological reports (Events).
- *National Library for Scotland (NLS) for*
  - Ordnance Survey maps and pre-Ordnance Survey historical maps;
- *John Gray Centre East Lothian History for*
  - Historic information and documentary records. These records have been viewed online.
- *National Collection of Aerial Photography (NCAP), held by HES, for*
  - Historic aerial photographs. These records have been viewed online.
- *LiDAR Data held on the Scottish Remote Sensing Port by the Scottish Government*
  - LiDAR Phase 1 and Phase 3 Digital Terrain Model (DTM) and Digital Surface Model (DSM)

Field Survey

8.3.4 A walkover survey of the Site was undertaken on the 3 December 2020. The Site was walked in a systematic way. Photographs of the general Site terrain and land use were taken and archaeological remains were also recorded via photography and written records. These are detailed in the Heritage Assets Gazetteer (Technical Appendix 8.1).

8.3.5 Site visits to designated heritage assets within 1 km of the Site and the designated heritage assets and Property in Care at Seton House (Sites 1, 5, & 23-25) were undertaken on the 3 December 2020.

Criteria for the Assessment Effects

8.3.6 The assessment distinguishes between the terms 'impact' and 'effect'. An impact is defined as a physical change to a heritage asset or its setting, whereas an effect refers to the significance of this impact. The first stage of the assessment involves establishing the importance of the heritage asset and assessing the sensitivity of the asset to change (impact). Using the proposed design for the Proposed Development, an assessment of the impact magnitude is made and a judgement regarding the level and significance of effect is arrived at.

Criteria for Assessing the Sensitivity of Receptors

8.3.7 The definition of cultural significance is readily accepted by heritage professionals both in the UK and internationally and was first fully outlined in the Burra Charter, which states in article one that 'cultural significance' or 'cultural heritage value' means aesthetic, historic, scientific,

social or spiritual value for past, present or future generations[15]. This definition has since been adopted by heritage organisations around the world, including HES. HEPS notes that to have cultural significance an asset must have a particular "*aesthetic, historic, scientific or social value for past, present and future generations*"[16]. Heritage assets also have value in the sense that they "...*create a sense of place, identity and physical and social wellbeing, and benefits the economy, civic participation, tourism and lifelong learning*"[17].

8.3.8 All heritage assets have significance; however, some heritage assets are judged to be more important than others. The level of that importance is, from a cultural resource management perspective, determined by establishing the asset's capacity to contribute to our understanding or appreciation of the past[18]. In the case of many heritage assets their importance has already been established through the designation (i.e. Scheduling, Listing and Inventory) processes applied by HES.

8.3.9 The rating of importance of heritage assets is first and foremost made in reference to their designation. For non-designated assets importance will be assigned based on professional judgement and guided by the criteria presented in Table 8.3; which itself relates to the criteria for designations as set out in Designation Policy and Selection Guidance[19] and Scotland's Listed Buildings[20].

Table 8.3: Criteria for Establishing Importance of Heritage Assets

Importance	Receptors
Very High	World Heritage Sites; Other designated or non-designated assets with demonstrable Outstanding Universal Value.
High	Scheduled Monuments (as protected by the Ancient Monuments and Archaeological Areas Act 1979 (the "1979 Act"); Category A Listed Buildings (as protected by the Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997) (the "1997 Act"); Inventory Gardens and Designed Landscapes (as protected by the 1979 Act, as amended by the Historic Environment (Amendment) (Scotland) Act 2011); Inventory Battlefields (as protected by the 1979 Act, as amended by the 2011 Act); Outstanding examples of some period, style or type; Non-Designated assets considered to meet the criteria for the designations as set out above (as protected by SPP[21]).
Medium	Category B and C Listed Buildings (as protected by the 1997 Act); Conservation Areas (as protected by the 1997 Act); Major or representative examples of some period, style or type; or Non-designated assets considered to meet the criteria for the designations as set out above (as protected by SPP[22]);
Low	Locally Listed assets;

[15] ICOMOS (2013) The Burra Charter 2013: Article 1.2. Available at: https://australia.icomos.org/publications/charters/ (Accessed 24/11/2020)

[16] Historic Environment Scotland (HES). (2019). Historic Environment Policy for Scotland. Available at: https://www.historicenvironment.scot/advice-and-support/planning-and-guidance/historic-environment-policy-for-scotland-heps/ (Accessed 24/11/2020)

[17] Scottish Government (2014) *Scottish Planning Policy*. Available at: https://www.gov.scot/publications/scottish-planning-policy/

[18] HES. (2019) *Designation Policy and Selection Guidance*. Available at: https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=8d8bbaeb-ce5a-46c1-a558-aa2500ff7d3b (Accessed 24/11/2020)

[19] Ibid

[20] HES. (2019). *Scotland's Listed Buildings*. Available at: https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=34c90cb9-5ff3-45c3-8bc3-a58400fcbc44 (Accessed 24/11/2020)

[21] Scottish Government (2020) Scottish Planning Policy. Available at: https://www.gov.scot/publications/scottish-planning-policy/

[22] Ibid

Table 8.3: Criteria for Establishing Importance of Heritage Assets	
Importance	**Receptors**
	Examples of any period, style or type which contribute to our understanding of the historic environment at the local level.
Negligible	Relatively numerous types of assets; Findspots of artefacts that have no definite archaeological remains known in their context; The above non-designated assets are protected by Paragraph 137 of SPP.

8.3.10 Determining cultural heritage significance can be made with reference to the intrinsic, contextual and associative characteristics of an asset as set out in HEPS[23] and its accompanying Designation Policy and Selection Guidance[24]. HEPS Designation Policy and Selection Guidance[25] indicates that the relationship of an asset to its setting or the landscape makes up part of its contextual characteristics. The Xi'an Declaration[26] set out the first internationally accepted definition of setting with regard to heritage assets, indicating that setting is important where it forms part of or contributes to the significance of a heritage asset. While SPP does not differentiate between the importance of the asset itself and the importance of the asset's setting, HES's Managing Change Guidance, in defining what factors need to be considered in assessing the impact of a change on the setting of a heritage asset or place, states that the magnitude of the proposed change should be considered "*relative to the sensitivity of the setting of an asset*"[27]; thereby making clear that assets vary in their sensitivity to changes in setting and thus have a relative sensitivity. The EIA Handbook suggests that cultural significance aligns with sensitivity but also states that "*the relationship between value and sensitivity should be clearly articulated in the assessment*"[28]. It is therefore recognised[29] that the importance of an asset is not the same as its sensitivity to changes in its setting.

8.3.11 Elements of setting may make a positive, neutral or negative contribution to the significance of an asset. Thus, in determining the nature and level of effects upon assets and their settings by the development, the contribution that setting makes to an asset's significance and thus its sensitivity to change need to be considered.

8.3.12 This approach recognises the importance of preserving the integrity of the setting of an asset in the context of the contribution that setting makes to the understanding, appreciation and experience of a given asset. It recognises that setting is a key characteristic in understanding and appreciating some, but by no means all, assets. Indeed, assets of High or Very High importance do not necessarily have high sensitivity to changes to their settings (e.g. do not necessarily have a high relative sensitivity). An asset's relative sensitivity to alterations to its setting refers to its capacity to retain its ability to contribute to our understanding and

[23] HES. (2019). Historic Environment Policy for Scotland. Available at: https://www.historicenvironment.scot/advice-and-support/planning-and-guidance/historic-environment-policy-for-scotland-heps/ (Accessed 24/11/2020

[24] HES. (2019) Designation Policy and Selection Guidance. Available at: https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=8d8bbaeb-ce5a-46c1-a558-aa2500ff7d3b (Accessed 01/10/2020)

[25] ibid

[26] ICOMOS (2005). Xi'an Declaration. Available at: https://www.icomos.org/xian2005/xian-declaration.htm (Accessed 24/11/2020)

[27] HES. (2016 (Updated 2020)). Managing Change in the Historic Environment- Setting. Available at: https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationid=80b7c0a0-584b-4625-b1fd-a60b009c2549 (Accessed 24/11/2020)

[28] Scottish Natural Heritage & Historic Environment Scotland. (2018). Environmental Impact Assessment Handbook v5. Available at: https://www.nature.scot/sites/default/files/2018-05/Publication%202018%20-%20Environmental%20Impact%20Assessment%20Handbook%20V5.pdf. (Accessed 24/11/2020)

[29] Ibid

appreciation of the past in the face of changes to its setting. The ability of an asset's setting to contribute to an understanding, appreciation and experience of it and its cultural significance also has a bearing on the sensitivity of that asset to changes to its setting.

8.3.13 While heritage assets of High or Very High importance are likely to be sensitive to direct effects, not all will have a similar sensitivity to effects on their setting; this would be true where setting does not appreciably contribute to their significance. HES's guidance on setting makes clear that the level of effect may relate to "*the ability of the setting [of an asset] to absorb new development without eroding its key characteristics*"[30]. Assets with Very High or High relative sensitivity to settings effects may be vulnerable to any changes that affect their settings, and even slight changes may erode their key characteristics or the ability of their settings to contribute to the understanding, appreciation and experience of them. Assets whose relative sensitivity to changes to their setting is lower may able to accommodate greater changes to their settings without having key characteristics eroded.

8.3.14 The criteria used for establishing an asset's relative sensitivity to changes to its setting is detailed in Table 8.4. This table has been developed based on AOC's professional judgement and experience in assessing setting effects. It has been developed with reference to the policy and guidance noted above including SPP[31], HEPS[32] and its Designation Policy and Selection Guidance[33], the Xi'an Declaration[34], the EIA Handbook[35] and HES's guidance on the setting of heritage assets[36].

Table 8.4: Criteria for Establishing Relative Sensitivity of a Heritage Asset to Changes to its Setting

Relative Sensitivity	Criteria
Very High	An asset, the setting of which, is critical to an understanding, appreciation and experience of it should be thought of as having Very High Sensitivity to changes to its setting. This is particularly relevant for assets whose settings, or elements thereof, make an essential direct contribution to their cultural significance (e.g. form part of their Contextual Characteristics[37]).
High	An asset, the setting, of which, makes a major contribution to an understanding, appreciation and experience of it should be thought of as having High Sensitivity to changes to its setting. This is particularly relevant for assets whose settings, or elements thereof, contribute directly to their cultural significance (e.g. form part of their Contextual Characteristics[38]).

[30] HES. (2016 (Updated 2020)). *Managing Change in the Historic Environment- Setting*. Available at: https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationid=80b7c0a0-584b-4625-b1fd-a60b009c2549 (Accessed 24/11/2020)

[31] Scottish Government (2020) *Scottish Planning Policy*. Available at: https://www.gov.scot/publications/scottish-planning-policy/

[32] HES. (2019). Historic Environment Policy for Scotland. Available at: https://www.historicenvironment.scot/advice-and-support/planning-and-guidance/historic-environment-policy-for-scotland-heps/ (Accessed 24/11/2020)

[33] HES. (2019) *Designation Policy and Selection Guidance.* Available at: https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=8d8bbaeb-ce5a-46c1-a558-aa2500ff7d3b (Accessed 24/11/2020)

[34] ICOMOS (2005). Xi'an Declaration. Available at: https://www.icomos.org/xian2005/xian-declaration.htm (Accessed 24/11/2020)

[35] Scottish Natural Heritage & Historic Environment Scotland. (2018). *Environmental Impact Assessment Handbook v5*. Available at: https://www.nature.scot/sites/default/files/2018-05/Publication%202018%20-%20Environmental%20Impact%20Assessment%20Handbook%20V5.pdf. (Accessed 24/11/2020)

[36] HES. (2016 (Updated 2020)). *Managing Change in the Historic Environment- Setting.* Available at: https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationid=80b7c0a0-584b-4625-b1fd-a60b009c2549 (Accessed 24/11/2020)

[37] HES. (2019) *Designation Policy and Selection Guidance-Annex 1.* Available at: https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=8d8bbaeb-ce5a-46c1-a558-aa2500ff7d3b (Accessed 24/11/2020)

[38] ibid

Table 8.4: Criteria for Establishing Relative Sensitivity of a Heritage Asset to Changes to its Setting	
Relative Sensitivity	**Criteria**
Medium	An asset, the setting of which, makes a moderate contribution to an understanding, appreciation and experience of it should be thought of as having Medium Sensitivity to changes to its setting. This could be an asset for which setting makes a contribution to significance but whereby its value is derived mainly from its other characteristics[39] .
Low	An asset, the setting of which, makes some contribution to an understanding, appreciation and experience of it should generally be thought of as having Low Sensitivity to changes to its setting. This may be an asset whose value is predominantly derived from its other characteristics.
Marginal	An asset whose setting makes minimal contribution to an understanding, appreciation and experience of it should generally be thought of as having Marginal Sensitivity to changes to its setting.

8.3.15 The determination of a heritage asset's relative sensitivity to changes to its setting is reliant upon an understanding of the key characteristics of its setting which contribute to its cultural significance, and an understanding of that cultural significance. This aligns with Stage 2 of the HES guidance on setting[40]. The criteria set out in Table 8.4 are intended as a guide. Assessment of individual heritage assets is informed by knowledge of the asset itself; of the asset type if applicable and by site visits to establish the current setting of the assets. This will allow for the use of professional judgement and each asset is assessed on an individual basis.

Criteria for Assessing the Magnitude of Change

8.3.16 Potential impacts, that is the physical change to known heritage assets and unknown buried archaeological remains, or changes to their settings, in the case of the Proposed Development relate to the possibility of disturbing, removing or destroying in situ remains and artefacts during the construction phase or the placement of new features within their setting during the operational phase.

8.3.17 The magnitude of the impacts upon heritage assets caused by the Proposed Development is rated using the classifications and criteria outlined in Table 8.5.

Table 8.5: Criteria for Classifying Magnitude of Impact	
Magnitude of Impact	**Criteria**
High	Substantial loss of information content resulting from total removal of an asset or large-scale removal of deposits from an asset; Major alteration of an asset's baseline setting, which materially compromises the ability to understand, appreciate and experience the contribution that setting makes to the significance of the asset and erodes the key characteristics[41] of the setting.
Medium	Loss of information content resulting from material alteration of the baseline conditions by removal of part of an asset; Alteration of an asset's baseline setting that effects the ability to understand, appreciate and experience the contribution that setting makes to the

[39] HES. (2019) *Designation Policy and Selection Guidance.* Available at: https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=8d8bbaeb-ce5a-46c1-a558-aa2500ff7d3b (Accessed 24/11/2020)

[40] HES. (2016 (Updated 2020)). *Managing Change in the Historic Environment- Setting*. Available at: https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationid=80b7c0a0-584b-4625-b1fd-a60b009c2549 (Accessed 24/11/2020)

[41] ibid

Table 8.5: Criteria for Classifying Magnitude of Impact	
Magnitude of Impact	**Criteria**
	significance of the asset to a degree but whereby the cultural significance of the monument in its current setting remains legible. The key characteristics of the setting[42] are not eroded.
Low	Detectable impacts leading to minor loss of information content. Alterations to the asset's baseline setting, which do not affect the ability to understand, appreciate or experience the contribution that setting makes to the asset's overall significance.
Negligible	Loss of a small percentage of the area of an asset's peripheral deposits; A reversible alteration to the fabric of the asset; A marginal alteration to the asset's baseline setting.
None	No effect predicted

Criteria for Assessing Cumulative Effects

8.3.18 It is necessary to consider the effects arising from the addition of the Proposed Development to other cumulative developments. Consideration will be given to whether this would result in an additional cumulative change upon heritage assets, beyond the levels predicted for the Proposed Development alone.

8.3.19 The cumulative assessment will have regard to the guidance on cumulative effects upon heritage assets as set out in Environmental Impact Assessment Handbook V5.[43] and will utilise the criteria for assessing impacts as set out above. The assessment of cumulative effects will consider whether there would be an increased impact, either additive or synergistic, upon heritage assets as a result of adding the Proposed Development to a baseline, which may include operational, under construction, consented or proposed developments. As agreed through pre-application consultation this will be limited to consideration of the effects of adding the Proposed Development to the consented Inch Cape onshore substation and the In Construction Blindwells development.

8.3.20 In determining the degree to which a cumulative effect may occur as a result of the addition of the Proposed Development into the cumulative baseline a number of factors are taken into consideration including:

- *the distance between cumulative developments;*
- *the interrelationship between their ZTVs;*
- *the overall character of the asset and its sensitivity;*
- *the siting, scale and design of the cumulative developments themselves;*
- *the way in which the asset is experienced;*
- *the placing of the cumulative development(s) in relation to both the Proposed Development being assessed and the heritage asset under consideration; and*
- *the contribution of the cumulative baseline schemes to the significance of the effect, excluding the individual proposal being assessed, upon the setting of the heritage asset under consideration.*

[42] ibid

[43] Scottish Natural Heritage & Historic Environment Scotland. (2018). *Environmental Impact Assessment Handbook v5.* Available at: https://www.nature.scot/sites/default/files/2018-05/Publication%202018%20-%20Environmental%20Impact%20Assessment%20Handbook%20V5.pdf. (Accessed 24/11/2020)

8.3.21 Given the emphasis NatureScot place on significant effects, and the requirements of the EIA Regulations, cumulative effects have been considered in detail for those assets where the Proposed Development has been judged to have an impact on their setting. Where no impact has been predicted for the Proposed Development there will be no cumulative effect.

Criteria for Assessing Significance

8.3.22 The predicted level of effect on each heritage asset is then determined by considering the asset's importance and/ or relative sensitivity in conjunction with the predicted magnitude of the impact. The method of deriving the level of effect is provided in Table 8.6.

Table 8.6: Level of Effects based on Inter-Relationship between the Importance and/ or Relative Sensitivity and the Magnitude of Impact

Magnitude of Impact	**Importance/ Relative Sensitivity of Heritage Asset**				
	Negligible/ Marginal	Low	Medium	High	Very High
High	Minor	**Moderate**	**Moderate**	**Major**	**Major**
Medium	Negligible/ Neutral	Minor	**Moderate**	**Moderate**	**Major**
Low	Negligible/ Neutral	Negligible/ Neutral	Minor	Minor	**Moderate**
Negligible	Negligible/ Neutral	Negligible/ Neutral	Negligible/ Neutral	Minor	Minor

Levels of effects shaded in grey and in **bold** denote levels of effect which are considered to be Significant in EIA terms.

8.3.23 The level of effect is judged to be the interaction of the asset's importance and/ or relative sensitivity (Tables 8.3 and/ or 8.4) and the magnitude of the impact (Table 8.5). In order to provide a level of consistency, the assessment of importance and relative sensitivity, the prediction of magnitude of impact and the assessment of level of effect is guided by pre-defined criteria. However, a qualitative descriptive narrative is also provided for each asset to summarise and explain each of the professional value judgements that have been made in establishing sensitivity and magnitude of impact for each individual asset.

8.3.24 Using professional judgment and with reference to the Guidelines for Environmental Impact Assessment (as updated)[44], and the EIA Handbook[45] the assessment considers moderate and greater effects to be significant (shaded grey in Table 8.6), while minor and lesser effects are considered not significant.

Integrity of setting

8.3.25 SPP notes that where there is potential for a Proposed Development to have an adverse effect on a Scheduled Monument or on the integrity of its setting, permission should only be granted where there are 'exceptional circumstances'. Adverse effects on integrity of setting are judged here to relate to whether a change would seriously adversely affect those attributes or elements of setting which contribute to an asset's significance to the extent that the setting of the asset can no longer be understood or appreciated.

8.3.26 In terms of effects upon the setting of heritage assets, it is considered that only those effects identified as 'significant' in the assessment will have the potential to adversely affect integrity

[44] IEMA (2017) *Environmental Impact Assessment Guide*. Available at Available at: https://www.iema.net/assets/newbuild/documents (Accessed 24/11/2020)

[45] Scottish Natural Heritage & Historic Environment Scotland. (2018). *Environmental Impact Assessment Handbook v5.* Available at: https://www.nature.scot/sites/default/files/2018-05/Publication%202018%20-%20Environmental%20Impact%20Assessment%20Handbook%20V5.pdf. (Accessed 24/11/2020)

of setting. Where no significant effect is found it is considered that the integrity of an asset's setting will remain intact. This is because for many assets, setting may make a limited contribution to their significance and as such changes would not affect the integrity of their settings. Additionally, as set out in Table 8.5 lower ratings of magnitude of change relate to changes that would not obscure or erode key characteristics of setting.

8.3.27 Where significant effects are found, a detailed assessment of adverse effects upon integrity of setting is made. Whilst non-significant effects are unlikely to affect integrity of setting, the reverse is not always true. That is, the assessment of an effect as being 'significant' does not necessarily mean that the adverse effect to the asset's setting will harm its integrity. The assessment of an adverse effect upon the integrity of an asset's setting, where required, will be a qualitative one, and will largely depend upon whether the effect predicted would result in a major impediment to the ability to understand or appreciate the heritage asset and therefore reduce its cultural significance.

Limitations and Assumptions

8.3.28 This assessment is based upon data obtained from publicly accessible archives as described in the Data Sources (8.3.4) as well as a walkover survey and site visits to assets subject to setting assessment. HER data was received in December 2020 and NRHE data was downloaded from HES in November 2020.

8.3.29 The scope of the baseline data gathering, including study areas and sources was agreed with consultees through pre-application consultation and the assessment adheres to relevant policy and guidance for undertaking assessment of archaeological and cultural heritage effects. The identification of the historic environment baseline provides an appropriate level of interrogation of known heritage assets and allows for a robust assessment of potential impacts.

Current Baseline

8.3.30 The Site currently occupies landscaped brownfield land which is partially still in use.

8.3.31 This assessment has identified 28 heritage assets within the Site. These have mainly been identified through a historic map regression.

Geology

8.3.32 The British Geological Survey (BSG)[46] records four different bedrocks within the Site, all formed in the Carboniferous Period in a local environment dominated by swamps, estuaries and deltas. The western most bedrock is Limestone Coal formation, a sedimentary bedrock of the Clackmannan Group Type formed approximately 328 to 329 million years ago. A thin linear band, aligned north west to south east, of Index Limestone, also a sedimentary bedrock and also formed between 328 to 329 million years ago, is recorded within the centre of the Site. Upper Limestone Formation composed of sandstone and subordinate argillaceous rocks and limestone formed approximately between 324 million year ago and 329 million years ago and is recorded in the central area of the Site. The eastern most recorded bedrock is known as Passage Formation and is composed of sandstone and seateath and was formed approximately 318 million years ago to 328 million years ago.

[46] British Geological Survey (BGS). *Geology of Britain-Map Viewer*. Available at: http://mapapps.bgs.ac.uk/geologyofbritain/home.html (Accessed 26/11/2020)

8.3.33 The BGS records three superficial deposit within the Site, although no superficial deposits are recorded in a small portion of the Site north of the Prestonpans to North Berwick road. The northern most deposit is recorded as Marine Beach Deposits, composed of gravels, sands and silts formed up to three million years ago in the Quaternary period in a local environment previously dominated by shorelines. The central deposit, which is aligned parallel to the Prestonpans to North Berwick road is recorded as Raised Marine Deposits of Holocene Age, composed of sand and gravel formed up to two million years ago in the Quaternary period in an environment dominated by shallow seas. The southern deposit is recorded as Till, Devensian-Diamicton, a deposit also formed up to two million years ago in the Quaternary period in ice age conditions.

8.3.34 The BGS also records the location of historic boreholes[47], some of which are a matter of public record and as such are available free online. However, some records associated within boreholes within the Site are confidential and as such there is no access to these records.

8.3.35 A borehole in the western portion of the Site (NT37NE3) recorded topsoil overlying coal mining waste to a depth of 2.3 m overlying deposits associated with coal mining reported as "fireclay"[48], "blaes"[49], interspersed with layers of sandstone. Coal deposits were found from a depth of approximately 26 m and the borehole was terminated at a depth of 124 m.

8.3.36 Three boreholes located within the central area of the Site (NT37NE59, NT37NE31 and NT37NE56) recorded layers of colliery waste including broken coal fragments. NT37NE56 was sunk to a depth of 2.89 m and found approximately1.62 m of colliery refuse underlain by approximately1.12 m of course yellow sands, sandstone cobbles and boulders, underlain by red sandstone. NT37NE59 also recorded approximately1.62 m of colliery waste underlain by a deposit called Fill, composed of course grains and mixed sandstone, to a depth of approximately 2.77 m underlain by thin layers of a laminated black layer and hard red sandstone to a maximum depth of 3.04 m. NT37NE31 recorded 2.4 m of "Bing" material associated with waste from coal mining, underlain by successive layers of siltstone, shale, mudstone and limestone. A layer of broken core composed of coal fragments was identified at a depth of 13.6 m overlying core deposits of clay. The maximum depth of the borehole was 15.24 m. These boreholes reflect the reason for the siting, the working and subsequent abandonment the of Preston Links Colliery (Site 30).

8.3.37 Seventeen boreholes are recorded within the footprint of the Cockenzie substation (Site 139), however the records for three were not available. Twelve of the boreholes were sunk by James Raeburn and Sons Ltd in April 1963, probably in advance of the construction of the substation (Site 139), although the records on the BGS website have not scanned well and as such the details are difficult to make out. The records for the other two boreholes (NT37NE69 and 70) are legible. NT37NE69 recorded 1.7 m of sand overlying 0.7 m of mudstone underlain by siltstone, mudstone and sandstone to a maximum depth of 9.75 m. NT37NE70 found approximately 2.5 m of sand overlying sandstone cobbles to a depth of 2.8 m, overlying sandstone to a maximum depth of 8.99 m.

8.3.38 The BGS records eight boreholes in the north eastern area of the Site. Seven of the boreholes record an upper layer of fill approximately 0.6 m in thickness overlying topsoil. The fill most

[47] Where historic boreholes are recorded in imperial measurements, they have been converted to metric measurements

[48] A silicate deposit often associated with brick making- Scottish mining Website (2018). *A Glossary of Scotch Mining Terms*. Available at: http://www.scottishmining.co.uk/Indexes/Barrowman.html (Accessed 26/11/2020)

[49] A shale, laminated clay and mud deposit- Scottish mining Website (2018). *A Glossary of Scotch Mining Terms*. Available at: http://www.scottishmining.co.uk/Indexes/Barrowman.html (Accessed 26/11/2020)

likely reflects the earthworks around the coal store (Site 78). The underlying deposits are varied in thickness but generally record layers of mudstones, sandstone and limestone.

8.3.39 A further fifteen boreholes are recorded in the south eastern area of the Site, two of which are confidential. Coal deposits were identified in six of the southern most of the boreholes (NT 47SW268; NT47SW648; NT47SW256; NT47SW273; NT47SW652; NT47SW655) beneath a layer of topsoil and layers of mudstone, sandstone and limestone of varying thicknesses. These boreholes are located to the north of the 19th century Thorntree Colliery which suggest that this area may have been subject to extraction activities. The other nine boreholes in general record a layer of topsoil underlain by sand, clay, mudstone, sandstone and limestone.

8.3.40 A programme of Site Investigation (SI) works, which were subject to archaeological monitoring, was undertaken across the Site between the 9 February and 11 February 2021. Nine tests pits were excavated to depths between 2.5 m to 3.4 m below ground level (bgl). Made ground was observed in all nine test pits. No archaeological remains were identified. Further SI works are planned in February 2021, and these works will also be subject to archaeological monitoring.

Prehistoric (-43 AD)

8.3.41 There are no known prehistoric remains recorded on the Site.

8.3.42 The Scheduled enclosure at Seton Mains West (Site 4) is located approximately 510 m to the south of the Site. The Scheduled Monument encompasses the remains of at least two prehistoric enclosures which have been recorded from aerial photography. The form of the enclosures appears to be a mix of square and circular in plan enclosures, which suggest that they may date from 1200 BC to 400 AD spanning the Bronze and Iron Ages. The importance of the Scheduled Monument, in part, relates to it being one of several prehistoric enclosure sites along the coastal plain.

8.3.43 An excavation of a cropmark at Site 89, to the east of the Site, found a major defended enclosure complex dating, potentially, to the Iron Age. There was a lack of evidence for long term use of the complex, although there was evidence for short term intensive use. The enclosure was found to have a double ditch and rampart. At least two houses were identified, and a sunken area was interpreted as an industrial area, possibly for the processing of animal carcasses.

8.3.44 A further enclosure was found during excavations near another cropmark (Site 91) also to the east of the Site. The limits of the enclosure were defined by ditches and five phases of activity were identified, even though the site was recorded as being heavily truncated. No dating evidence was identified, however due to the similarities to Site 89 and other similar remains in East Lothian a date of the 1st Millennium BC to AD has been proposed.

8.3.45 To the north east, another possible enclosure (Site 81) recorded from aerial photography has been identified along with a settlement (Site 87) further to the north east. Both were identified on aerial photographs. Evidence for a settlement at Site 87 includes a sub-oval in plan enclosure, encircled by a broad ditch, which has been interpreted as the remains of a palisade enclosure; post holes located around the gaps in the ditch may be suggestive of an entrance and a potential round house is located in the interior. The date of the remains has not been confirmed by excavation. The description of the cropmarks at Site 81 is similar to those for the remains identified during excavation at Sites 89 and 91, and as such they may be contemporary. In addition, due to their location and proximity to Site 4, it is likely that Sites 81 and 87 are prehistoric in date.

8.3.46 A cist is documented as being found in association with a Bronze Age Irish armlet in the mid-19th century, to the south of Preston Tower (Site 3) and to the south west of the Site. Another cist (Site 94), constructed of sandstone, was identified in 1931 to the north of the Site. The cist (Site 94) was found in association with a food vessel in which cremated human bone and charcoal were identified. As the human remains were cremated, the cist is likely prehistoric in date and the food vessel, potentially a beaker vessel, may indicate a Bronze Age date[50].

8.3.47 A sherd of later prehistoric pottery was recovered from a ditch at Site 64, to the south west of the Site. The pottery is likely residual as it was found in a fill containing modern remains. A singular potential palaeolithic flint blade (Site 163) has been found to the west of the Site.

8.3.48 Prehistoric settlement remains have been identified within the cultural heritage study area and further prehistoric remains have been identified via cropmarks on historic aerial photography. On the basis of the evidence for prehistoric remains in the surrounding area, as outlined above, a High potential for prehistoric remains to survive would normally be predicted. However, post-medieval and modern mining activities and modern construction on the Site may have truncated or damaged any underlying remains and no archaeological remains have been identified during a watching brief on SI works on the Site. As such there is judged to be a Low potential for prehistoric archaeology to survive on the Site.

Roman (43 AD to 410 AD)

8.3.49 Roman period activity in the south of Scotland has been identified and is evidenced by the military fort at Inveresk approximately 5.3 km to the south west. The Lothians based tribe, the Votadini, also appear to have traded with the Romans however it seems as though the Roman practises were not adopted[51].

8.3.50 Six burials (Site 95) were found to the north of the Site, in Cockenzie, during excavations in 1988. The burials were found in small cists or round pits, and two relatively undisturbed cists were found to contain flexed inhumations whilst the remains of at least two individuals were identified in another cist. In general, the burials were found to have either been disturbed in antiquity, disturbed by root action, or disturbed by modern construction. None of the burials were intercutting and a variety of technology and techniques were identified suggesting that the burials respect one another and together may be evidence of a small cemetery. Radiocarbon dates indicate that the burials date to the Roman period between AD 10 toAD 340[52].

8.3.51 A metal detecting survey to the south of the Site found a coin of possible Roman date (Site 160). There is a paucity of remains from the Roman period within the study area and as such there is judged to be a Low potential for Roman remains to survive on the Site. Any such remains which may have been present may have been impacted upon by previous mining and construction activities in the post-medieval and modern periods and it is noted that archaeological monitoring during SI works have not identified any archaeological remains.

[50] Scottish Archaeological Research Framework (Carf). (2020*). 5.5 Funerary and Burial evidence*. Available at: https://scarf.scot/national/scarf-bronze-age-panel-report/5-identity-society-belief-systems/5-5-funerary-and-burial-evidence/ (Accessed 26/11/2020)

[51] East Lothian Council (2020). *Romans in East Lothian (AD43-410)*. Available at: https://www.johngraycentre.org/times/our-earliest-history-8500-bc%E2%80%93ad-43/romans-in-east-lothian-ad-43%E2%80%93410/#:~:text=The%20Roman%20period%20in%20Scotland,The%20Antonine%20period%20%E2%80%93%20c. (Accessed 26/11/2020)

[52] Dalland M. (1991). *Burial at Winton House, Cockenzie and Port Seaton, East Lothian*. Proceedings of the Society of Antiquaries of Scotland 121: pp. 175-180

Early Historic (410 AD to 1066 AD)

8.3.52 A record (Site 77) associated with a grid reference centred approximately 80 m south of the Site notes that a number of cists containing deer horn, human and animal bone and a dagger/ knife handle were found around Cockenzie in 1849. Cockenzie is located to the north east of the Site. The text and description for Site 77 includes a discussion on the potential for Early Historic burials in the general area around Cockenzie and Prestonpans and is not a distinctive or discrete location of an archaeological record. The cists, which were reported as being of the long type were interpreted as potentially being the remains of a cemetery. Following reinterpretation of the remains in the 1950s, it was concluded that they were not found within a cist, but within the vicinity of a number of cists. It is possible that the cists had been disturbed. Short cist burials are often associated with the Bronze Age, however long cists are associated with the Early Historic period. Other long cist burials in East Lothian have been radiocarbon dated to the 1st millennium AD[53].

8.3.53 A number of long cists (Site 33), presumably dating from the 5th century to 9th century AD, were identified to the south of the Site in the 1970s during building works. Several cists were destroyed by the collapse of an old mining shaft, however one cist survived and was recorded as being 1.8 m long and being composed of slabs. The bones of at least four individuals were identified. The recorders concluded that due to the lack of evidence for other burials in the area that the remains represented a cemetery. However other long cists have been identified within the cultural heritage study area which suggests that the area must have had some association with burial and funerary practices.

8.3.54 Long cists were identified at Site 33 and Site 67 to the south west of the Site in the early 1950s. No further information is recorded about either cist.

8.3.55 Funerary related Early Historic remains have been recorded within the cultural heritage study area. In addition, a singular, undated burial (Site 27) has been found within 35 m of the northern Site boundary. It is acknowledged that the Site has been heavily truncated in the past by mining activities, as has the area around the Site and as such there is judged to be a Medium potential for Early Historic funerary remains and a Low potential for other Early Historic archaeological remains to survive on the Site. However, it is noted that any such surviving remains may have been disturbed by previous mining and construction activities within the Site and further noted that no such remains have been encountered during an archaeological watching brief on SI works.

Medieval (1066 AD to 1600 AD)

8.3.56 There is one Scheduled Monument of medieval date within the cultural heritage study area, Preston Tower and Dovecot (Site 3). Whilst the majority of the remains within the Scheduled area are post-medieval in date, the foundations and lower portion of the tower date from the 15th century. The tower was constructed by the Hamilton family and was originally built as a tower house.

8.3.57 The settlements of Preston and Prestonpans, centred on the modern Conservation Areas, Sites 8 and 9 respectively, to the west of the Site, date to the medieval period. The etymology of Prestonpans (centred Site 50) refers to the historic ownership and activity in the area. The

[53] Dalland, M. (1192). *Long cist burials at Four Winds, Longniddry, East Lothian.* Proceedings of the Society of Antiquaries of Scotland 122 pp. 197-206. See also Rees, A.R. & Finlayson, W.; (1997). *A Long Cist at Innerwick, near Dunbar, East Lothian.*. Proceedings of the Society of Antiquaries of Scotland 127: 601-607. Maldonado, A. (2016). *Materialising the Afterlife: The Lond Cist in Early Medieval Scotland*. In: Russell, A., Pierce, E., Maldonado, A. and Campbell, L. (eds.) Creating Material Worlds The Uses of Identity in Archaeology. Oxbow Books Ltd.: Oxford, pp. 39-62.

Monks of Newbattle Abbey mined the area around Prestonpans for coal and used part of this coal to boil seawater to make salt and as such the area was formerly recorded as "Salt Priestown Pans". Over time as a settlement grew up to the south and then expanded to form one settlement, the "salt" was dropped, and the "priest" evolved, making Prestonpans[54].

8.3.58 Prestonpans or Preston (centred Site 50) was erected a burgh of barony in 1552 and the first town church (now a Category A Listed Building, LB40320), to the west of the Site, was erected in the late 16th century by John Davidson and lies within what is now the Conservation Area of Harlawhill Prestonpans (centred Site 9).

8.3.59 The settlements of Cockenzie and Port Seton (Conservation Area centred at Site 7; centre point of towns Sites 106 and 118) are located to the north east of the Site. Cockenzie began as small fishing settlement around a natural harbour. The origin of Cockenzie is believed to relate to the name of the natural harbour or inlet, "the Cove of Kenneth" or "Cul Cionnich" in Celtic. The settlement was created a burgh of barony in 1591 when the name of the village is recorded as "Cowkany"[55].

8.3.60 The etymology of Port Seton reflects the origin of the settlement around a harbour or port and the involvement of the Seton family in its development in the 17th century, although a hamlet or village is believed to have existed prior to the construction of the harbour[56].

8.3.61 A watching brief approximately 67 m south west of the Site identified six, east to west aligned supine burials in a sewer pipe trench (Site 29). The skeletons had been buried in simple coffins and analysis found that the skeletons included males and females which ranged in age from approximately7 to 9 years to over 50 years. Some signs of physical stress suggest that the individuals were involved in manual labour and a pathology was observed on one skeleton. Radiocarbon dates for the remains suggest that they were buried between AD 1410 and AD 1800.

8.3.62 Rig and furrow cultivation remains (Site 74), potentially of medieval or post-medieval date, and the remains of two drystone walls, which correspond to field boundaries recorded on the Ordnance Survey map published in 1845, were identified to the south of the Site and may relate to medieval cultivation.

8.3.63 The Site appears to have been located between the growing settlements of Prestonpans and Cockenzie and Port Seton, and to the east of the medieval Seton Castle (centred Site 24) in the medieval period. It is likely that the Site was undeveloped land and may have been in use as agricultural land. It is also possible that small scale coal extraction was being undertaken in the medieval period in the north western and eastern portions of the Site, where coal deposits have been documented. Post-medieval and modern mining and construction of the Site has likely truncated any surviving medieval remains and as such there judged to be

[54] Prestonpans Historic Society. (N.d.) *The Pans- old and New- John Kay Wilson*. Available at: http://www.prestoungrange.org/prestonpans/html/press/tales_of_the_pans/6.html#:~:text=Even%20before%20making%20its%20name,on%20over%20the%20border%20into (Accessed 26/11/2020). See also Dixon, N. (1947). *The Placenames of Midlothian*. Available at: https://spns.org.uk/wp-content/uploads/2017/11/The_Placenames_of_Midlothian_Norman_Dixon.pdf (Accessed 26/11/2020). See also W, W. (1799). *Appendix for Prestonpans, County of Haddington, Old Statistical Accounts of Scotland (OSA), Volume XXI*. Available at: https://statacscot.edina.ac.uk/static/statacc/dist/viewer/osa-vol21-Appendix_for_Prestonpans_in_the_county_of_Haddington_in_volume_21_of_account_1/ (Accessed 30/11/2020)

[55] Turner, R. (1980). *One Hundred Years New- Cockenzie and Port Seaton*. Available at: http://www2.thesetonfamily.com:8080/gallery/Port_Seton_History.htm (Accessed 27/11/2020). See also Undiscovered Scotland (N.d). *Cockenzie and Port Seaton.* Available at: https://www.undiscoveredscotland.co.uk/seton/portseton/index.html#:~:text=Cockenzie%20was%20the%20first%20to,coal%20being%20unearthed%20around%20Tranent. (Accessed 27/11/2020)

[56] iBid

a Low potential for medieval remains to survive. No remains have been encountered during an archaeological watching brief on SI works.

Post-medieval (1600 AD to 1900 AD)

8.3.64 The majority of the Site is located within the north western extent of the Inventory Battlefield of the Battle of Prestonpans (Sites 79 and 135). The Battle took place in 1745 and is significant as the opening battle of the 1745 Jacobite Rising, and ended in a victory for the Jacobites. The Inventory states that "*the fields surrounding Seton West Mains farm and Seton village [were] the main area of initial fighting where the Jacobite charge made contact with the Government line as determined through recent fieldwork*" and that "*the location of the 18th century wagonway and lands to the south-east including Bankton House and grounds, the former location of Preston House and policies, the location of Gardiner's Hawthorn tree and Johnnie Cope's Road"* are likely located in the vicinity of "*the path of the route and the location of the slaughter of the Government troops within the parklands of the properties"*[57].

8.3.65 Seton West Mains (Scheduled Monument Site 4; Listed Farmhouse-Site 11 & 82) is located approximately 415 m south east and the village of Seton as recorded on historic maps and was located on the western side of Seton Castle's grounds (centred Site 5), approximately 1.07 km east of the Site. Therefore, the initial fighting is recorded in close proximity to the Site. The wagonway described (Site 122) is recorded as the first use of a railway in a battlefield context[58] and is thought to be located along the eastern Site boundary based on historic mapping and the Inventory description. The land to the south of the Site is depicted as being wet and marshy land, reported on the later OS maps to have been drained, and the Jacobite army are documented as crossing marshy land to engage the Government troops. Johnnie Cope's Hole is annotated to the south of the Site on the Ordnance Survey map published in 1854, Bankton House is recorded to the south west and Preston House was located to the west of the Site and as such the location of the slaughter of government troops appears to have been located to the south of the Site. Bodies with well-preserved clothing are documented as being discovered to the north east of Thorntree in the 1880s (Site 79). This location is to the south of the Site. Due to the proximity of both events of the battle to the Site it is likely that some form of activity took place on or in the immediate vicinity of the Site in 1745. A metal detecting survey (centred Site 76) around Seton Mains West found a large number of battle related remains and a further three lead projectiles, most likely associated with the battle, were identified to the west of the Site in 2012 (Site 90).

8.3.66 There are two Scheduled Monuments of post-medieval date within the south eastern area of the cultural heritage study area; Preston, market cross (Site 2) and Preston Tower and Dovecot (Site 3). The Scheduled Market Cross (Site 2) is thought to have been erected in the early 17th century and survives as a broken rectangular shaft of sandstone surviving to a height of approximately 1.5 m.

8.3.67 The Scheduled extent of Site 3 includes the remains of a 17th century altered medieval tower house and an early 17th century dovecot. The tower was burnt in 1650 by the troops of Oliver Cromwell, and subsequently repaired only to be burnt again in 1663. The tower house is not believed to have functioned as residential accommodation since that time. The tower and

[57] HES. (2020). *Designations- Battle of Prestonpans*. Available at: https://portal.historicenvironment.scot/designation/BTL16 (Accessed 27/11/2020)

[58] Undiscovered Scotland (N.d). *Cockenzie and Port Seaton.* Available at: https://www.undiscoveredscotland.co.uk/seton/portseton/index.html#:~:text=Cockenzie%20was%20the%20first%20to,coal%20being%20unearthed%20around%20Tranent. (Accessed 27/11/2020)

gardens are enclosed in boundary walls (Site 68). An archaeological evaluation in the vicinity of the tower (Site 3) found no evidence of an earlier structure and identified post-medieval and modern pottery.

8.3.68 The Inventory Garden and Designed Landscape (GDL) of Cockenzie House (Site 6) is located to the north east of the Site within the western portion of the Conservation Area of Cockenzie and Port Seton (centred Site 7). The garden dates from the late 17th century, is the setting for the Category A Listed Cockenzie House (LB23026) and includes another four Listed Buildings relating to the demarcation of the garden extent and garden structures. General Cope is documented as having stayed in Cockenzie House prior to the Battle of Prestonpans and money and documents stored by the General are thought to have been stolen by Charles Stuart (aka Bonnie Prince Charlie) following the defeat of the Government.

8.3.69 There are three Conservation Areas within the cultural heritage study area; Cockenzie and Port Seton (centred Site 7) to the north east; Preston (centred Site 8) to the south west; and Harlawhill Prestonpans also to the south west of the Site. Cockenzie and Port Seton Conservation Area (Site 7) includes 72 Listed Buildings (six Category A; 15 Category B; and 51 Category C) which largely date to the post-medieval period and reflect the coastal location and development of the settlement. Cockenzie and Port Seton were formerly in the parish of Tranent, centred to the south. The settlement, which in part was developed by the Seton family, the York Buildings Company and the Cadel family was associated with salt manufacture, shipping, fishing, and coal mining throughout the post-medieval period[59].

8.3.70 The Conservation Area of Preston (centred Site 8) includes two Scheduled Monuments (Sites 2 and 3) and six Listed Buildings (one Category A, three Category B and two Category C) which date from the late medieval and post-medieval periods. Historic mapping and documentary records note that Preston was separate to the coastal settlement of Prestonpans[60], however the two merged in the 19th century.

8.3.71 Harlawhill Prestonpans Conservation Area (centred Site 9) includes seven Listed Buildings (four Category A; one Category B and two Category C). The settlement is centred on the Parish Church built in the 16th century. Harlawhill Prestonpans (Site 9) and Preston (Site 8) are located in the parish of Prestonpans.

8.3.72 There are 11, post-medieval Listed Buildings not located within Conservation Areas within the cultural heritage study area: four are Listed at Category B (Sites 12, 13, 14 and 21) and seven at Category C (Sites 10, 11, 16-18, 20 and 22). The Listed Buildings consist of residential dwellings (Sites 10, 11, 14, 18, 20 and 22), ecclesiastical structures (Sites 13 and 21), a school (Site 12), townhall (Site 17) and lighthouse (Site 16) common to coastal settlements of the period.

8.3.73 Historic maps tend to be schematic and not wholly accurate however they provide information about the location of historic settlements and broad land divisions. A map by Adair dated 1682[61] (Figure 8.3) depicts a castle within a walled garden or landscape (Site 5) at Seton to

[59] Cuntinghame, H Rev. (1794). *Tranent, County of Haddington, Old Statistical Account of Scotland (OSA), Volume X.* Available at: https://stataccscot.edina.ac.uk/static/statacc/dist/viewer/osa-vol10-Parish_record_for_Tranent_in_the_county_of_Haddington_in_volume_10_of_account_1/ (Accessed 30/11/2020). See also Henderson, A.M. Rev/ 1845. *Tranent, County of Haddington, New Statistical Account of Scotland (NSA), Volume II.* Available at: Parish_record_for_Tranent_in_the_county_of_Haddington_in_volume_2_of_account_2 (Accessed 30/11/2020).

[60] Trotter, J. Rev (1796). *Prestonpans, County of Haddington, OSA, Volume XVII.* Available at: https://stataccscot.edina.ac.uk/static/statacc/dist/viewer/osa-vol17-Parish_record_for_Prestonpans_in_the_county_of_Haddington_in_volume_17_of_account_1/ (Accessed 30/11/2020)

[61] Adair, J. (1682*). East Lothian / authore Johanne Adair*. Available at: https://maps.nls.uk/ (Accessed 30/11/2020)

the east of the Site. Seton Castle, as depicted, is the predecessor to the extant Category A Listed Adams designed castle. A ribbon development of buildings, most likely residential dwellings, are depicted along a north east to south west aligned road which appears to enter the castle walls in the centre of the western side. Preston is annotated to the west of the Site and is depicted as a ribbon development along an east to west aligned road with a central church. A pictogram of a windmill is illustrated to the west of the Site, located on the coast, and two rows of parallel structures are depicted further west, parallel to the coastline. The settlement of Cockenzie, annotated "Cokeny" is illustrated around a harbour to the north east of the Site. A north to south aligned trackway is depicted running south from Cockenzie to Tranent and is bisected by an east to west aligned trackway between Preston and Seton. This trackway is likely an antecedent to the road which runs along the eastern Site boundary, the B6371. As such the Site appears to have been located in undeveloped land, potentially agricultural land, between settlements in the late 17th century.

8.3.74 Another map by Adair dated 1736[62] (not illustrated) shows no changes to the Site; however the map is clearer than the earlier cartographic representation and depicts the backlands or back gardens associated with the residential structures at Preston and Seton.

8.3.75 Roy's Military map of Scotland (1752 to 1755[63] - Figure 8.4) records the Site between Prestonpans and Cockenzie. Prestonpans is annotated to the west of the Site as a settlement parallel to the coast and appears to have expanded from the settlement extent record by Adair 30 years previously. To the south a settlement is annotated at Preston and between the settlement and the Site, Preston House (Site 73) is labelled; however the location of the house is not well documented by Roy. Preston House (Site 73) is likely located within a square area of tree bordered land, divided regularly into rectangular plots by further tree plantations on the eastern side of Preston. Preston House (Site 17) was constructed in the late 16th century or early 17th century, is documented as being burned after 1650 following the Battle of Dunbar and must have been re-built or renovated prior to being demolished in 1930. Cockenzie or "Cockensie" is recorded to the east of the Site as a coastal settlement with a harbour and is shown similar to Adair's depiction in 1682. A road, the precursor to the B6371, is depicted immediately east of the Site and the area within the eastern portion of the Site is depicted within ploughed land. The road to the east of the Site may be the route of the wagonway (Site 122), built in 1722 to facilitate the transport of coal from Tranent to Cockenzie harbour. Indeed a portion of the road to the south is annotated as a wagonway on later maps. The central area of the Site occupied the northern most plot of four plots of land, aligned north to south which may denoted pasture and an open field bound to the north by a road aligned parallel to the coastline. An evaluation of the area centred at Site 76 identified linear features and shallow pits associated with post-medieval artefacts which may be associated with the possible areas of pasture drawn by Roy. The western portion of the Site is depicted as being crossed by routeways which create a triangular plan and as extending into the foreshore. Two small structures (Sites 131 and 132) depicted at the eastern end of Prestonpans appear to be located within the Site.

8.3.76 Taylor and Skinner's 1776 map[64] (not illustrated), of the road from Prestonpans to North Berwick, records the Site in undeveloped, most likely agricultural, land between Prestonpans and the Tranent Road, now the B6371. The road between Prestonpans and North Berwick,

[62] Adair, J. (1736*). A map of East Lothian / survey'd by J. Adair..* Available at: https://maps.nls.uk/ (Accessed 30/11/2020)

[63] Roy, W. (1752-55). *Military Map of Scotland- Lowlands*. Available at: https://maps.nls.uk/ (Accessed 30/11/2020)

[64] Taylor, G. & Skinner, A. 1776. The Road from Prestonpans to N. Berwick; Road from Musselburgh to Dalkeith & Newbattle; The Road from Haddington to North Berwick. Available at: https://maps.nls.uk/ (Accessed 30/11/2020)

now the B1348, crosses the northern portion of the Site, aligned east to west. Preston House (Site 17) is documented as being in the hands of Preston Esquire in 1776 and the house appears to be surrounded by a planned garden landscape which extends southwards to a house annotated as Bankton, owned by Mackdown Esquire. Another map by Taylor and Skinner (1776[65] - not illustrated), depicting the Road between Edinburgh and Berwick upon Tweed, annotates Seton Castle, to the east of the Site and is noted as being in ruins on this map. The map also labels the now Scheduled Preston Tower (Site 3) to the south west of the Site.

8.3.77 The Old Statistical Account of Scotland (OSA) for Tranent and Prestonpans suggests that agricultural land in the parishes was well used and profitable at the end of the 18th century with few areas being left fallow, however the majority of land was being used to support individual families rather than for profit. The OSA also reports the extraction of coal and salt[66] in the late 18th century.

8.3.78 A map of Haddingtonshire dated 1802[67] (Figure 8.5) also depicts the Site in undeveloped land between Prestonpans and Cockenzie. A parish boundary, roughly aligned north to south runs through the eastern portion of the Site between the coastline and the road between Edinburgh and Berwick upon Tweed to the south. The eastern Site boundary is depicted as being tree lined and is bound by a "Wagon Road" (Site 122), the precursor to the B6371. A plot of land (Site 133), rectangular in shape, being longer north to south, and also depicted as being tree lined is shown west of the parish boundary within the eastern portion of the Site. The western portion of the Site is depicted as being undeveloped land and the Prestonpans to North Berwick road runs along the northern boundary of the Site and crosses the north western portion of the Site, which is depicted as being the foreshore of the Firth of Forth. A Summer House is annotated to the south of the Site and is probably associated with Preston House (Site 17), which may be recorded as "in ruins" in 1802. Schaw's Hospital (Site 65) is also labelled to the south west of the Site. A house annotated as "Thorntree" and buildings formed in a U-shaped plan recorded as "Thorntree Main" are depicted to the south of the Site. To the east, Seton is recorded as belonging to Lord Wemys. An annotation to the south documents the Battle of Prestonpans (centred Site 135). In general, the Site is depicted between settlements, in most likely mixed-use agrarian land in the early 19th century.

8.3.79 Ainslie's[68], Thomson's[69] and Knox's[70] early 19th century maps were drawn at a larger scale than the map of 1802 and as such these maps do not record any further details about the Site. A map of Haddingtonshire by Greenwood, Fowler and Sharp, dated 1825[71] (not

[65] Taylor, G. & Skinner, A. (1776b). The road from Edinburgh to Berwick upon Tweed. Available at: https://maps.nls.uk/ (Accessed 30/11/2020)

[66] Trotter, J. Rev (1796). Prestonpans, County of Haddington, OSA, Volume XVII. Available at: https://stataccscot.edina.ac.uk/static/statacc/dist/viewer/osa-vol17-Parish_record_for_Prestonpans_in_the_county_of_Haddington_in_volume_17_of_account_1/ (Accessed 30/11/2020). See also Cuntinghame, H Rev. 1794. Tranent, County of Haddington, Old Statistical Account of Scotland (OSA), Volume X. Available at: https://stataccscot.edina.ac.uk/static/statacc/dist/viewer/osa-vol10-Parish_record_for_Tranent_in_the_county_of_Haddington_in_volume_10_of_account_1/ (Accessed 30/11/2020)

[67] Forrest, W. (1802). Map of Haddingtonshire. Available at: https://maps.nls.uk/ (Accessed 30/11/2020)

[68] Ainslie, J. (1812). The environs of Edinburgh, Haddington, Dunse, Kelso, Jedburgh, Hawick, Selkirk, Peebles, Langholm and Annan, making a complete map of the South East district of Scotland / by John Ainslie. Available at: https://maps.nls.uk/ (Accessed 30/11/2020)

[69] Thomson, J. (1822). Haddington . Available at: https://maps.nls.uk/ (Accessed 30/11/2020)

[70] Knox, J. (1828). Map of the Basin of the Forth. Available at: https://maps.nls.uk/ (Accessed 30/11/2020)

[71] Greenwood, C. Fowler, W. Sharp, R. (1825). Map of the county of Haddington. Available at: https://maps.nls.uk/ (Accessed 30/11/2020)

illustrated) records the plot of land centred at Site 133, which extends into the eastern portion of the Site with a deep tree border. A north to south railway line route is depicted as being proposed through the centre of the Site. No further details are recorded on this map.

8.3.80 A plan of lands belonging to George Watson's Hospital[72] records the plots of land to the south of the Site with the word "park" suggesting their former location within the parkland of Preston Hall (Site 73). Two coal pits are recorded in the plot known as "South East Park". The land to the north east of the plot and to the south of the Site is documented as belonging to Mr W Wright and Mr Robert Hislop and indeed the land within the Site may be under the ownership of one of these individuals in the mid-19th century.

8.3.81 The OS map published in 1854[73] (Figure 8.6) depicts the eastern half of the Site within "Warren Park" (Site 129), potentially a successor to the tree lined field (Site 133) depicted in 1802. The park (Site 129) is depicted as four tree lined fields and the name suggests that rabbits were prevalent in the area. A road is illustrated along the eastern Site boundary, the precursor to the B6371, and to the south "Thorntree mains" is depicted north of "Thorntree colliery", recorded as simply "Thorntree" in 1802, and Watson's colliery. As such there is evidence of mining activities in the vicinity of the Site at this time. An annotation to the south of the Site reads "Johnnie Cope's Hole" which must reference Major General John Cope, the Government forces' commander at the Battle of Prestonpans. The North British Railway line is depicted further south and a north to south aligned railway (para 8.3.79) appears to have never been built across the Site. The central area of the Site is depicted as occupying parts of at least eight fields. An oval feature (Site 127) is illustrated in the north central area of the Site and a "Coal Pit" is labelled in the eastern central area. Both suggest evidence of historic and ongoing coal extraction works on the Site. An old quarry (Site 126) is annotated in the western portion of the Site south of the road between Prestonpans and North Berwick and is associated with an L-shaped building (Site 125). The north-western portion of the Site is drawn within the foreshore of the Firth of Forth. Immediately north of the Site "Preston Links Colliery" (Site 30) is documented in association with a mine shaft, well and iron pier.

8.3.82 The OS map of 1895[74] (not illustrated) records historic quarrying and mining activity in the vicinity of the Site. The eastern portion of the Site is depicted within the remains of Warren Park, which is no longer annotated, and a break is depicted in the tree border. An old quarry is depicted to the east of the Site, east of the B6371. A stone depot (Site 130), an old airshaft (Site 126) and the unroofed remains of the building at Site 125 represent the 19th century extraction activity on the Site, and whilst the buildings at Preston Links Colliery (Site 30) are drawn they are annotated as a smithy to the north of the Site. A golf course (Site 28) is also annotated to the north of the Site. A footpath aligned north, north east to south, south west is drawn as crossing the central portion of the Site. An area of regular tree planting is depicted to the south of the Site on the OS map of 1895.

8.3.83 The Seton family, whose main residence, Seton Palace (replaced in 1789-91 by Seton Castle, Site 24) is located approximately.1.42 km to the west of the Site, built a harbour at Port Seton

[72] Carfrae & Geddes (1891) Plan of the Lands of Preston, Prestonpans, belonging to George Watson's Hospital / Carfrae & Geddes, Edinburgh, 1856. Available at: https://maps.nls.uk/ (Accessed 30/11/2020)

[73] Ordnance Survey. (1854). Haddingtonshire, Sheet 8 (includes: Edinburgh; Inveresk; Prestonpans) Survey date: 1853 Publication date: 1854 & Ordnance Survey.(1854). Haddingtonshire, Sheet 9 (includes: Aberlady; Gladsmuir; Haddington; Pencaitland; Prestonpans; Tranent) Survey date: 1853 Publication date: 1854. Available at: https://maps.nls.uk/ (Accessed 30/11/2020)

[74] Ordnance Survey. (1894). *Haddingtonshire IX.2 (Gladsmuir; Prestonpans; Tranent)* Publication date: 1894 Revised: 1892 & Ordnance Survey. (1894). *Haddingtonshire IX.1 (Prestonpans; Tranent)* Publication date: 1894 Revised: 1892. Available at: https://maps.nls.uk/ (Accessed 30/11/2020)

(Port Seton Conservation Area is Site 7) in 1656 and as such the settlement was thereafter known by the family name. Cockenzie and Port Seton were both known for salt production, seabourne trade and mining in the post-medieval period, with the salt trade becoming less lucrative in the mid-18th century and mining dominating the late 19th century landscape. Evidence of salt productions is located at Sites 120, 123, 124 and 166. The York Company, who took over the Seton family's mining interests in the early 18th century, built a horse drawn railway or wagonway (Site 122) to transport coal from the pits in Tranent to Cockenzie harbour. A bridge (Site 80) to the south of the Site was constructed to facilitate the wagonway.

8.3.84 The NRHE records industrial buildings and remains (Sites 34, 35, 105, 110, 120, 121, 123 and 124), municipal buildings (Sites 52, 65 and 113), non-designated residential dwellings (Sites 39, 44, 45, 53, 55, 59, 69, 73, 82, 107 and 117), two milestones (Sites 37 NS 109), a church (Site 114), a school (Ste 115), a bridge (Site 80) and a ditch for a wall (Site 112), which is thought to respect medieval plot boundaries, within the cultural heritage study area. A dovecot (Site 36) which was converted into a residential dwelling is recorded to the south west of the Site. Sea defences and coastal buildings (Sites 38, 40, 99, 101 and 104) are also documented to the north east and south west of the Site along the coastline.

8.3.85 Archaeological works in the cultural heritage study area have identified a pre-17th century wall and architectural fragments (Site 48) in a churchyard to the south west of the Site; unidentified disturbed pottery (Site 57), most likely associated with Bellfield's Pottery in Prestonpans and 19th century glass and slag at Site 93. Two archaeological investigations (Sites 71 and 72) to the south of the Site were undertaken in advance of the construction of a swimming pool and found a mineshaft, organic rich soil containing medieval or post-medieval pottery and small cut features. Post-medieval pottery (Site 76) was identified during works at Site 76 to the south of the Site; the pottery was recovered from linear features and shallow pits of unknown origin.

8.3.86 The Site was in agrarian use and was exploited for small scale coal and stone extraction in the post-medieval period. It is likely that modern coal workings, and the development of Cockenzie Power Station (Site 26) to the north and substation (Site 139) on the Site have truncated or damaged earlier remains which may survive on Site. There is judged to be a Medium potential for post-medieval remains so survive, though it is noted that no archaeological remains have been encountered during a watching brief during SI works on Site.

Modern (1900 AD to Present)

8.3.87 There are two modern Category B Listed Buildings within the south western portion of the cultural heritage study area; West Loan Public Library (Site 15) and Prestonpans High Street war memorial (Site 19).

8.3.88 There are no changes recorded within the eastern portion of the Site on the OS map published in 1907[75] (Figure 8.7). The extent of the Crown Terrace residential development (Site 137) is depicted as extending to the north eastern Site boundary and an old air shaft (Site 128), at the location of a coal pit annotated on the OS map published in 1854 (Figure 8.6), is recorded in the north eastern area of the Site on this map. Preston Links Colliery (Site 30) recorded

[75] Ordnance Survey. (1907). *Haddingtonshire IX.2 (Gladsmuir; Prestonpans; Tranent*) Publication date: 1907 Revised: 1906 & Ordnance Survey. (1907). *Haddingtonshire IX.1 (Prestonpans; Tranent)* Publication date: 1907 Revised: 1906. Available at: https://maps.nls.uk/ (Accessed 30/11/2020)

on earlier OS maps to the north of the Prestonpans to North Berwick road had expanded to the south of that road and into the Site by 1907. The OS map of that date records the building at Site 125 being roofed, suggesting that it was either reused or rebuilt, probably as part of the colliery. A number of individual buildings, a "Crown Pit", and a tramway across the road are depicted in the north western area of the Site and a mineral railway is shown to extend from the north-western area of the Site, along the south western Site boundary and further southwards to the North British Railway. Preston Links Colliery within the Site is centred at Site 30 and the extent, recorded on Figure 8.1, reflects the extent of the above ground colliery expanse as shown on the OS map published in 1949, two years before peak production is documented. Preston Links Colliery (Site 30) was owned by Nimmo and Company of Slamannan prior to 1912, after which it was owned by Edinburgh Collieries Company until it was abandoned in 1964.

8.3.89 Between 1907 and OS maps published in the early 1930s, a programme of land reclamation took place and as such the coastline to the north is recorded differently on those maps. The coastline in the 1930s is depicted further north of the earlier, natural coastline and it appears the works were undertaken in part to provide further space for Preston Links Colliery activities. During the second half of the 20th century a further land reclamation programme to the north of the Site was undertaken to provide enough land for the northern building of Cockenzie Power Station (Site 26). This is documented on the OS maps of the 20th century.

8.3.90 The northern tree border associated with Warren Park (Site 129) is depicted as being further truncated on the OS map published c. 1934[76] (Figure 8.8), however there are no major changes to the eastern portion of the Site on this OS map. In the north-eastern area of the Site a football ground and associated building (Site 134) and a "Miners Welfare Institute" (Site 136) are annotated on the OS map of 1934. Both facilities may be associated with Preston Links Colliery (Site 30), although the football ground and associated building (Site 134) may also be related to the nearby expanding residential developments. At least four buildings of the south-western terrace of Crown Square (Site 197) are drawn within the north-western area of the Site.

8.3.91 By 1957[77], the northern tree plantation of Warren Park (Site 129) is depicted as being wholly removed. Two unroofed buildings, or buildings being constructed, are depicted within the northern extent of Preston Links Colliery (Site 30) on the OS map of 1957 and another feature (Site 138), depicted in the centre northern area of the Site, appears to have been under construction at the time OS map published in 1957 (not illustrated) was being surveyed. By 1966[78], Site 138 is annotated as a works and the OS map published in 1969[79] records the circular feature as a gasholder, and the small building in the south eastern corner of the plot (Site 138) as a gas works. The gasworks (Site 138) were likely associated with the Cockenzie substation building (Site 139) which was constructed in the north eastern portion of the Site between the OS maps published in 1966 and 1969.

[76] Ordnance Survey. (1934). *Haddingtonshire Sheet IX.NW (includes: Prestonpans; Tranent)* Probable Publication date: ca. 1934. Available at: https://maps.nls.uk/ (Accessed 30/11/2020)

[77] Ordnance Survey . (1957*). NT37SE & part of NT37NE - A (includes: Inveresk; Prestonpans; Tranent)* Surveyed / Revised: Pre-1930 to 1956 Published: 1957. Available at: https://maps.nls.uk/ (Accessed 30/11/2020)

[78] Ordnance Survey. (1966). *NT37SE & part of NT37NE - A (includes: Inveresk; Prestonpans; Tranent)* Surveyed / Revised: 1948 to 1965 Published: 1966. Available at: https://maps.nls.uk/ (Accessed 30/11/2020)

[79] Ordnance Survey. (1969). *NT3975 - B (includes: Prestonpans; Tranent)* Revised: 1968 Published: 1969. Available at: https://maps.nls.uk/ (Accessed 30/11/2020)

8.3.92 Whilst Preston Links Colliery (Site 30) was abandoned and closed in 1964, the OS map published in 1966[80] records the structural remains of the colliery as drawn on previous OS maps, suggesting the above ground elements were abandoned. The north eastern area of the Site, south of Crown Square (Site 137), is annotated as "Whin Park" on the OS map published in 1966.

8.3.93 The OS map of 1969[81] (not illustrated) depicts the northern earthworks and tracks associated with a coal store (Site 78) extending within the eastern portion of the Site. The coal store (Site 78) is depicted as being bound by earthworks to the north, east, west and south and an internal road system is visible. The above ground, built remains of Preston Links Colliery (Site 30) are not depicted within the Site on the OS map published in 1969 and as such it can be assumed that these remains have been removed or had been flatted after 1966. The extent of the mineral railway to the south of the Site appears to have been re-used as a road after the railway was removed. Crown Square (Site 137), the Miners Welfare Institute (Site 136) and the football ground (Site 134) in the north eastern portion of the Site appear to have been demolished or removed between the OS maps published in 1966 and 1969. The southern building of Cockenzie Power Station, the substation (Site 139), is depicted within the northern portion of the Site from 1969 and at least three overhead power lines (OHLs) are depicted to the south the building.

8.3.94 A gantry (Site 140) is recorded between Cockenzie Power Station (Site 26) to the north of the Site and the coal store (Site 78) on the OS map published in 1973[82] and it seems as though the gantry was built to facilitate the movement of coal. The gantry (Site 140) appears to have gone out of use by 1991[83], as the OS map published in that year depicts the northern portion of Site 140 with dotted lines, however this may also suggest that the feature was suspended above ground level. An electricity substation (Site 141) is depicted south east of the southern Cockenzie substation building (Site 139) on the OS map of 1991. This map also depicts a playing field extending into the north-eastern Site boundary, an industrial estate to the north east of the Site and suggests that the north-western area of the Site was open land. The map indicates that the former mineral railway was in use as a foot path.

8.3.95 The NRHE records modern buildings (Sites 42, 47, 49, 63, 92, 98, 108 and 167), industrial works (Sites 61, 75) a sculpture (Site 43), anti-tank blocks (Site 97), an air raid shelter (Site 161), a commemorative monument (Site 100), a church (Site 164), and two coastal features (Sites 111 and 119), all of modern date, within the cultural heritage study area.

8.3.96 Archaeological work identified reclaimed ground and the remains of Fowlers Brewery at Sites 31 and 32 to the south of the Site.

8.3.97 The Site was part of Preston Links Colliery (Site 30) in the 20th century and later repurposed for Cockenzie substation (Site 139), an electricity substation (Site 141) and a coal store (Site 78). As such there is the potential for modern remains to survive, however successive use of the Site is likely to have had a detrimental impact on any surviving remains and thus there is judged to be a Medium potential for modern archaeology to survive on the Site. A watching

[80] Ordnance Survey. (1966). *NT37SE & part of NT37NE - A (includes: Inveresk; Prestonpans; Tranent)* Surveyed / Revised: 1948 to 1965 Published: 1966. Available at: https://maps.nls.uk/ (Accessed 30/11/2020)

[81] Ordnance Survey. (1969). *NT3975 - B (includes: Prestonpans; Tranent)* Revised: 1968 Published: 1969. Available at: https://maps.nls.uk/ (Accessed 30/11/2020)

[82] Ordnance Survey. (1973*). OS Plan (partial) 1:10000. & Ordnance Survey.(1973). OS Pan 1:1250* Available at: https://www.old-maps.co.uk/#/ (Accessed 30/11/2020)

[83] Ordnance Survey.1991. *OS Plan (partial) 1:10000.* Available at: https://www.old-maps.co.uk/#/ (Accessed 30/11/2020)

brief on SI works on Site has only identified made ground and no remains of archaeological interest.

Undated

8.3.98 Human remains (Site 27) of a single individual were excavated approximately 35 m north west of the Site during works associated with a new service pipe and have not been attributed a date. The area being excavated was heavily truncated by previous services and no stratified deposits were encountered. The human remains were judged not to be modern.

8.3.99 An enclosure (Site 86) has been transcribed from a cropmark visible on aerial photography to the east of the Site. The enclosure has been recorded as measuring 35 m east, north east by 24 m west, south west and a ditch has been identified. No excavations have been undertaken and so any date can only be presumed. It is possible, due to the proximity of other known or suspected prehistoric remains (Sites 81, 87 and 91) and the Scheduled Seton Mains West (Site 4), that the cropmark's origins may be prehistoric in date.

8.3.100 A discrete scatter of pits (Site 85), recorded as being 3 m in diameter, have been transcribed from cropmarks on aerial photography taken in 2015. The cropmarks (Site 85) are recorded to the east of the Site. As the asset appears similar to Site 85 and due to the presence of nearby remains of prehistoric date, a prehistoric date may be attributed to the cropmarks. However regular circular features in an area of historic mining may also be evidence of attempted mining activity and as such the cropmarks cannot be definitively dated.

Maritime Records

8.3.101 The NRHE and HER record 24 maritime records (Sites 168-191) within the cultural heritage study area. The majority of these records relate to vessels sunk in proximity to either Cockenzie and Port Seton or Prestonpans harbour in the post-medieval and modern eras. Further details about the individual records are contained within Appendix 8.1.

8.3.102 The centre point provided for the loss of four vessels (Sites 169, 175, 178 and 179) has been recorded to the south of the Site. The land to the north of the Site is the product of historic land reclamation in the modern era. The north western most section of the Site is historically documented as being in the foreshore and then in reclaimed land during the modern era (see Section 8.4.89). As such the centre point for the loss of these vessels is inaccurate and the vessels were most likely lost in the Firth of Forth to the north of the Site.

Previous Archaeological Works

8.3.103 Previous archaeological works not reported above by period will be detailed in this section.

8.3.104 Modern land reclamation and a build-up of deposits were identified at Site 62 to the south west of the Site. Due to the build-up of deposits on the Site there was judged to be a potential for buried remains to survive at greater depths.

8.3.105 The excavation of four trenches to the south west of the Site (Site 162) identified buttons associated with Schaw Hospital (Site 165).

8.3.106 Two intercutting mill lades (Sites 151 and 159) were identified to the south east of the Site during a walkover survey for a potential housing development. This area is recorded as being wet and drained on the first edition OS map.

8.3.107 No significant archaeological remains were identified during archaeological investigations at Site 46 to the south, at Sites 58 and 60 to the south west and at Sites 84 and 88 to the east of the Site.

8.3.108 A photographic survey is noted at Site 56; however no further information is available about the work.

Aerial Photography

8.3.109 NCAP's physical aerial photography collection is currently not available due to COVID-19 restrictions. Historic aerial photographs consulted for this assessment were viewed on NCAP's web viewer using AOC Archaeology Group's organisational subscription. The photographs viewed were a mix of vertical and oblique photography. Further aerial photographs were identified within close proximity to the Site; however, these are not digitised and as such were not available online.

8.3.110 Aerial photography taken in September 1974[84] records the Site. The eastern area is shown to be occupied by the northern part of the coal store (Site 78), including northern and eastern earthen bunds, a roadway and the south eastern portion of the gantry (Site 140). Cockenzie substation is visible (Site 139), as is the gasholder and associated gas works (Site 138). The land north and west of the coal store (Site 78) appears to be in active use as agricultural land, whereas the land in the western portion of the Site appears green and unused, potentially part of the landscaping associated the substation (Site 139) and Cockenzie Power Station (Site 26), which is visible to the north. An earthwork (Site 144), visible as a grassy mound, which corresponds to an earthwork within the northern boundary of Preston Links Colliery (Site 30), recorded on the OS map published from 1934[85], is visible aligned north east to south west and located south of the road. The land north of the road appears to have been landscaped, however an earthwork, which appears to be mounds of grassed earth (Site 143), possibly associated with land reclamation or the later period of Preston Links Colliery (Site 30), is visible south of the coastline.

8.3.111 The north eastern corner of the coal store can be observed on an image taken in 1980[86]. This image records the gantry (Site 140) as a white structure, at least two storeys high at its south eastern end. One tower is visible within the coal store, and the other tower is visible on the northern side of the earth bund. A road is recorded within the Site boundary and runs parallel to the B6371. The land north of the coal store (Site 78) and on the eastern side of the B6371 is visible as agricultural, ploughed land.

8.3.112 The gantry (Site 140) between Cockenzie Power Station (Site 26) and the coal store (Site 78) is visible as a suspended metal feature crossing the Site on an aerial photograph taken in 1993[87]. The land to the west, in the centre northern portion of the Site appears to have been occupied by grassland and the south western portion of the substation (Site 138), surrounded by earthworks and landscaping, is visible. The land to the south is visible as being agricultural land. The northern edge of the coal store (Site 78), within the Site, is recorded on a photograph taken in 1993[88] and two towers are visible within the coal store. Vehicle tracks are also visible as are the high earth bunds around the edge of the feature (Site 78). To the north an OHL, aligned north west to south east, is visible extending beyond the substation (Site 141). An industrial estate, fronting the Prestonpans to North Berwick road can also be

[84] Aerial photograph- Sortie FSL/7343/22, Frame 0710 & 0711, 14/09/1974 and Sortie FSL/7343/24, Frame 0195 & 0196, 26/09/1974

[85] Ordnance Survey. (1934). Haddingtonshire Sheet IX.NW (includes: Prestonpans; Tranent) Probable Publication date: ca. 1934. Available at: https://maps.nls.uk/ (Accessed 30/11/2020)

[86] Aerial photograph- Sortie ELUAS/0001, Frame 0016, 18/08/1980

[87] Aerial photograph- *Sortie AF/93/0043, Frame 8073, 24/03/1993*

[88] Aerial photograph- *Sortie AF/93/0043, Frame 8072, 24/03/1993*

seen in 1993[89], and the land to south suggests that it has been disturbed in the past, probably by the residential development at Crown Square (Site 137).

8.3.113 An aerial photograph taken in 2003[90] of the north-western corner of the Site shows a modern road along the north west and western Site boundary, with residential developments visible to the west. Two fields, divided by a road and bound by a high wall are visible in the north west corner of the Site, the northern most one appears to have been in recent agricultural use with cultivation marks, aligned north to south, being visible. The field to the south is visible as being mottled green in colour which suggests evidence of historic disturbance, most likely associated with the above and below ground disturbance of Preston Links Colliery (Site 30).

LiDAR

8.3.114 LiDAR data captured in 2011 and 2012 for the Scottish Environment Protection Agency (SEPA) and Scottish Water as part of the Phase 2 Scottish LiDAR survey and in 2015 and 2016 as part of the Phase 3 Scottish LiDAR survey was consulted as part of this assessment. A DTM and DSM produced from point data from both periods of data collection and downloaded from the Scottish LiDAR Remote Sensing website were viewed in ArcMap 10.7.

8.3.115 The Phase 1 DSM model records the buildings within the Site including the gas holder and associated buildings (Site 138), gantry (Site 140), Cockenzie substation (Site 139) and electricity substation (Site 141). The earthworks around the coal store (Site 78) are also visible on the LiDAR model.

8.3.116 The Phase 3 DSM and DTM records earthworks associated with the coal store (Site 78) and an earthen mound (Site 143), both of which were also seen on historic map and aerial photography. The OHLs which cross the Site to Cockenzie Substation (Site 139) are also visible on the LiDAR model.

Walkover Survey

8.3.117 A walkover survey of the Site was undertaken on the 3 December 2020 in cold and clear conditions.

8.3.118 The north western portion of the Site, north of the Prestonpans to North Berwick Road is located in a park (Appendix 8.2, Plate 8.1) and a car park is located in the north westernmost area (Appendix 8.2, Plate 8.2). A large mound, recorded from historic aerial photography, was observed centred at Site 143 (Appendix 8.2, Plate 8.3). Three semi-circular vegetation marks and a single circular vegetation mark (Site 150 - Appendix 8.2, Plate 8.4) were observed north east of Site 143 and to the south west of structural remains (Site 152) located beyond the Site. The vegetation marks measured approximately 2 m – 3 m in diameter. These marks may be evidence of modern activities in the park, or they may relate to the nearby structural remains (Site 152) and/ or Preston Links Colliery (Site 30).

8.3.119 Concrete and brick structural remains (Site 152) were observed to the north of the Site (Appendix 8.2, Plate 8.5). The bricks within the structures are stamped "DEWAR" and appear modern in form and composition. The brick stamp was also observed in brick at a gantry tower base (Site 158) within the Site. These structural remains, north of the Prestonpans to North Berwick Road, may relate to post-medieval or modern period activity of Preston Links

[89] Aerial photograph- *Sortie AF/93/0043, Frame 8016, 24/03/1993*

[90] Aerial photograph- *Sortie EAC/0002, Frame 2677, 20/07/2003*

Colliery (Site 30). A concrete manhole (Appendix 8.2, Plate 8.6) was observed to the south of Site 152. The feature is likely related to drainage and historic land reclamation.

8.3.120 No evidence of Sites 131 or 132 was observed during the walkover survey. The location of Site 132 has been landscaped by the modern path and access and a manhole are located in the vicinity of Site 132.

8.3.121 The area south of the Prestonpans to North Berwick Road was the former location of the modern extension of Preston Links Colliery (Site 30-Appendix 8.2, Plate 8.7). This area is occupied by grassland used as parkland. A small area of scrubland, bound by a bank, is located west of the modern entrance into the Site.

8.3.122 The area is bound to the north, west and south by a wall, mainly composed of concreted and mortared stone, which may have originally formed a dry stone wall. The height of the northern wall changes as does the top of the wall, which in some sections retains the base of iron railing fittings, suggesting that it has been altered and changed over time, most likely to fit the current use of the land it bounds and due to repairs and restoration (Appendix 8.2, Plate 8.8). Two historic entrances (Sites 156 and 157) were identified during the walkover survey. The break in the wall at Site 156 is denoted by concrete pillars with pyramid tops and two concrete steps were identified (Appendix 8.2, Plate 8.9). The entrance at Site 157 is similar in form to Site 156, although a later use of the entrance is evidenced by an agricultural metal fence and modern concrete block (Appendix 8.2, Plate 8.10). Historic aerial photography suggests that the area may have been in agricultural use in the modern era and this is further supported by the presence of an agricultural type gate.

8.3.123 The north western area of the wall appears to have been diverted or was constructed around a building (Site 125-Appendix 8.2, Plate 8.11). A building at Site 125 was present between at least the OS map published in 1854 (Figure 8.6) and the mid-1960s and it does appear that the wall respected the buildings footprint. A brick culvert with metal pipes (Appendix 8.2, Plate 8.12) were found within the building footprint and a concrete and brick support to the south facing side of the wall, to the south of the building, were recorded during the walkover survey. Both appear to be relatively modern features. The support may indicate that the wall needs extra support or that the building (Site 125) formed part of the wall.

8.3.124 The wall along the west of the Site supports the ground within the Site which appears to have been made up or landscaped following the abandonment of the colliery (Site 30). A mound (Site 144) recorded from aerial photography was not observed as a singular feature during the walkover, however the western area of the Site occupies higher ground and slopes steeply in the centre of the Site to lower lying, relatively flat land, west of Cockenzie substation (Site 139). The wall is composed of concreted stone, similar to that used in the wall to the north and south.

8.3.125 A double walled alley (Appendix 8.2, Plate 8.13), now a public footpath, is located along the southern boundary of the Site. The feature may relate to the colliery (Site 30) use of the Site. The southernmost wall is located outside of the Site and appears to support the earthen bund to the south. The northern most wall forms the southern boundary of the Site. This wall changes in height, following the topography of the land within the Site, is formed of concreted and mortared stone, which is likely to have been of dry stone wall construction when first constructed, and is overgrown with vegetation (Appendix 8.2, Plate 8.14). The western most portion of the wall has been underpinned by concrete and portions of the wall were found to have been repaired and restored and the eastern end has largely collapsed.

8.3.126 The southernmost wall continues south-eastwards and encloses the southern area of the Site which is occupied by a relatively flat area of grassland (Appendix 8.2, Plate 8.15) bound to the north by security fencing.

8.3.127 The area to the south and south east of Cockenzie substation (Site 139), which includes the northern and eastern portions of the coal store (Site 78), is enclosed by security fencing. Access was arranged with ELC and a member of the security team was present during the walkover survey within this area. Concrete foundations of a rectangular structure (Site 158-Appendix 8.2, Plate 8.16) were observed at the western end of a long concrete slab with kerbs (Appendix 8.2, Plate 8.16) which measured 6 m in width and stretched from Site 158 to the north-eastern area of the coal store (Site 78). The concrete slab is believed to be the ground remains of the gantry (Site 140-Appendix 8.2, Plate 8.17) which supplied coal from the store (Site 78) to the Power Station (Site 26). This gantry tower (Site 158) would have been located where the gantry changed alignment. The location of another tower, recorded from aerial photography (Site 142) to the north of the gantry (Site 140), is located in scrubland on the northern side of the security fence (Appendix 8.2, Plate 8.18). No structural remains were visible however the area was overgrown and may have been disturbed by the construction of the transformers to immediately to the east.

8.3.128 The earthworks around the coal store (Appendix 8.2, Plate 8.19) were observed within the south-eastern portion of the Site. The earthworks, which appear to be approximately 5 m in height, are largely covered by scrubland and self-seeded trees. The earthworks are used by the police in training and are home to deer and other wildlife.

8.3.129 There is no extant evidence of the parks (Sites 129 and 133) historically recorded as extending into the eastern portion of the Site. However, a mound of trees (Appendix 8.2, Plate 8.20) was observed running parallel to the coal store earthwork remains (Site 78) in the north-eastern area of the Site. It is likely that this area has been landscaped and is not a remnant of either of the historic parks.

8.3.130 A tunnel was observed through the coal store (Site 78). The western end is visible on Plate 8.17 (Appendix 8.2) and the eastern side (Site 153) was found on the east facing side of the coal store (Site 78-Appendix 8.2, Plate 8.21).

8.3.131 The concrete and metal foundations of the former weighbridge (Site 154-Appendix 8.2, Plate 8.22) and coal collection area were observed in the south eastern area of the Site. Metal capped manholes were also observed in this area, suggesting modern below ground disturbance. These remains relate to the former use of the store and are located by a gated former entrance.

8.3.132 The area north of the security fencing in the north-eastern area of the Site is bound by a tree belt along the side of the road is currently used for storage for pipes (Appendix 8.2, Plate 8.23). The pipes are to be used for the undergrounding of a wooden pole OHL which runs within the north-eastern area of the Site, aligned east to west (Appendix 8.2, Plate 8.24). The ground works for the undergrounding has already commenced.

8.3.133 Waste land and a cultivated field are located between the security fencing and Cockenzie substation (Site 139-Appendix 8.2, Plate 8.25). Cockenzie substation (Site 139) and the electricity substation (Site 141) are upstanding structures and appear to be in active use.

8.3.134 West of Cockenzie substation (Site 139) lies the hardstanding remains of the gas works (Site 138-Appendix 8.2, Plates 8.25 and 8.26). The area is currently used by a private car washing

company and was in active use during the walkover survey. No upstanding remains of the former gas works, other than the hardstanding, were observed.

8.3.135 The land to the north east of Cockenzie substation (Site 139) is occupied by further scrubland and grassland, to the south of Whin Industrial Estate. The location of a coal pit (Site 128) was observed by an OHL tower, but no evidence of the pit was observed on the ground (Appendix 8.2, Plate 8.28). Similarly, no evidence of the extent of the football pitch and pavilion (Site 134-Appendix 8.2, Plate 8.28) within the Site or the extent of the residential Crown Terrace (Site 137-Appendix 8.2, Plate 8.29) which extended to the north eastern boundary of the Site were observed. The area to the south of Whin Industrial Estate to the east of the Site, in the general vicinity of the historically documented football pitch (Site 134), has been used as a football pitch in the past and two rusted goal posts were found in that area (Appendix 8.2, Plate 8.27).

8.3.136 To the north of Cockenzie substation (Site 139) a linear bank (Site 155-Appendix 8.2, Plate 8.30) was observed. The bank (Site 155), which measures approximately 55 m in length, approximately 1.5 m in width and survives to a height of approximately 0.5 m, corresponds to the north eastern extent of the Miners Welfare Institute (Site 136) recorded on historic maps. It is likely that the boundary survived the demolition of the main building and redevelopment of the area. The location of the historically mapped stone depot (Site 130) is also located to the north of Cockenzie substation (Site 139). No above ground remains of the feature was identified (Appendix 8.2, Plate 8.32).

8.3.137 Post-medieval and modern archaeological remains were identified during the walkover survey. These remains largely relate to the post-medieval and modern extent of Preston Links Colliery (Site 30) and the subsequent redevelopment of the colliery land for Cockenzie Power Station (Site 26- including Sites 138, 139, 141, 142 and 158).

8.3.138 A setting assessment of nearby designated heritage assets was also undertaken on the 3 December 2020. The weather conditions were ideal for a settings assessment which will be detailed in Section 8.4.18 to 8.4.25 below.

Future Baseline

8.3.139 In the event that the Site is not developed there would be no change to the baseline of the Site.

8.4 Assessment of Likely Effects

Potential Construction Effects

8.4.1 Construction effects associated with the Proposed Development include construction works for the landfall location, infrastructure, substation and platform, construction compound and laydown areas and access and site tracks. Other construction activities, such as vehicle movements, soil and overburden storage and landscaping also have the potential to cause direct permanent and irreversible impacts to cultural heritage assets. As such the construction of the Proposed Development has the potential to disturb, damage or destroy features or buried remains of cultural heritage interest. Heritage assets within the Site, which may be subject to such effects, are shown on Figure 8.1.

8.4.2 The Site, south of Edinburgh Road, is located within the Inventory Battlefield of Prestonpans (see Figure 8.1) which is judged to be of High importance. There are 28 non-designated heritage assets within the Site. The cultural heritage importance of these non-designated

assets has been rated in line with the methodology detailed in Table 8.3, and is detailed in Table 8.7 below.

Table 8.7: Cultural Heritage Importance of Non-designated Assets within the Site

Receptor	Importance	Justification
Site 30- Preston Links Colliery	Low	A post-medieval colliery which expanded in the modern era. Its historical significance is related to the group value of collieries in East Lothian in the 19th and 20th centuries.
Site 78- Coal Store	Low	The earthwork remains of the coal store of Cockenzie Power Station are important to an understanding of the historic development of power production in the local area and to the historic development of coal mining in the local area.
Site 125- Post-medieval building	Negligible	Historical building probably associated with post-medieval quarrying and the 19th and 20th century Preston Links Colliery (Site 30). The asset is a historic building, which is no longer standing and is a common feature of historic land use.
Site 126- Old Quarry	Negligible	The location of a quarry recorded on historic maps. These are commonly recorded features within East Lothian and Scotland.
Site 127- Oval feature- potential mine shaft	Low	A potential mine shaft which could add further information on the extent of pre-20th century mine working on the Site.
Site 128- Coal pit	Low	A coal pit recorded on historic mapping which may add further information on the pre-20th century extraction works on the Site.
Site 129- Warren Park	Low	The extent of a small, landscaped park denoted by a tree border, possibly associated with Thorntree, a house to the south of the Site or Preston House (Site 73). Small parks are common features of the pre-industrial landscape and add to the understanding of local land use and ownership in the past.
Site 130- Stone Depot	Low	A stone depot which indicates that stone and coal were being extracted from the local area.
Site 131- Possible structure	Negligible	A small building on the eastern edge of the settlement of Prestonpans which no longer survives. A common feature of historic settlements.
Site 132- Possible structure	Negligible	A small building on the eastern edge of the settlement of Prestonpans which no longer survives. A common feature of historic settlements.
Site 133- Field/ Pleasure Park/ Pasture	Low	A pre-1850 potential pleasure park which may be the precursor to Site 129; it adds to our understanding of the local land use and land ownership.
Site 134- Football ground and building	Negligible	The historic location of a football pitch recorded on historic maps. These recreational features are common of modern settlement plans.
Site 135- Battle of Prestonpans (also Site 79)	High	The Battle of Prestonpans is designated as an Inventory Battlefield. As such it is of High importance.

Table 8.7: Cultural Heritage Importance of Non-designated Assets within the Site		
Receptor	**Importance**	**Justification**
Site 136- Miners Welfare Institute	Low	An historic building, which has been demolished and built over. The building is a common feature of mining landscapes and is associated with the increasing importance of miners' welfare in the modern era and relates to the mining activity in the local area.
Site 138- Gas Works	Negligible	A gas holder and works associated with the construction and use of Cockenzie Power Station.
Site 139- Cockenzie Substation	Low	The substation of Cockenzie Power Station. Its importance relates to the Power Station and local redevelopment for the Power Station.
Site 140- Gantry	Negligible	A coal gantry built to supply coal from the coal store to the Power Station. These are common features of power stations and are above ground features.
Site 141- Electricity substation	Low	The electricity substation of Cockenzie Power Station. The importance of the asset relates to the development of Cockenzie Power Station.
Site 142- Building	Negligible	A small building recorded on aerial photography within Cockenzie Power Station. Such buildings are common features within industrial landscapes.
Site 143- Earth mound	Negligible	An earthen mound probably associated with Preston Links Colliery (Site 30). Earth mounds are common features of former colliery landscapes.
Site 144- Earth mound	Negligible	An earthen mound probably associated with Preston Links Colliery (Site 30). Earth mounds are common features of former colliery landscapes.
Site 150- Vegetation marks	Negligible	Vegetation marks of unknown origin which may relate to historic mining or modern activities.
Site 153- Tunnel	Negligible	A tunnel within the coal store which formerly allowed vehicular entrance into the coal store. The asset is an element of the coal store (Site 78).
Site 154- Weigh Bridge	Negligible	Remains associated with the collection of coal to be stored in the coal store (Site 78). The modern remains are common features of these activities.
Site 155- Linear Bank	Negligible	Likely the north eastern boundary of the Miners Welfare Institute (Site 136). A common historic boundary feature

8.4.3 No construction is proposed in the north eastern area of the Site. The Proposed Development will have no impact on the potential archaeological remains (Sites 127, 128, 130, 134, 136, 139, 141, and 155) recorded from historic maps and no impacts upon the modern upstanding assets (Sites 139 and 141) in the central area of the Site. The Proposed Development is unlikely to have any impact on the upstanding remains of the Coal Store (Site 78) and therefore there is judged to be no impact on the tunnel (Site 153) which goes through the store.

8.4.4 There is judged to be a Low potential for hitherto unknown archaeological remains to survive on the Site. Any remains which are not identified in this chapter are likely to be related to historic mining activities on the Site and therefore are judged likely to be of Negligible importance.

8.4.5 Table 8.8 below details the predicted level of direct effect from the Proposed Development on known heritage assets recorded within the Site, divided by construction area and based on the worst-case scenario.

Table 8. 8: Level of Direct Effect

Site Number and Name	Importance	Magnitude of Impact	Level of Effect
Site 135 (and 79)- Battle of Prestonpans	High	Negligible	Minor
Access Corridor			
Site 78- Coal Store	Low	Low	Negligible
Site 129- Warren Park	Low	Negligible	Negligible
Site 133- Field/ Pleasure Park/ Pasture	Low	Negligible	Negligible
Site 140- Gantry	Negligible	Negligible	Negligible
Site 142- Building	Negligible	Negligible	Negligible
Substation Search Area			
Site 30- Preston Links Colliery	Low	Low	Negligible
Site 138-Gas Works	Negligible	High	Minor
Site 140- Gantry	Negligible	Low	Negligible
Cable Corridor			
Site 30- Preston Links Colliery	Low	Medium	Minor
Site 125- Building	Negligible	High	Minor
Site 126-Old Quarry	Low	Low	Negligible
Site 131-Possible structure	Negligible	High	Minor
Site 132-Possible structure	Negligible	High	Minor
Site 143-Earth mound	Negligible	High	Minor
Site 144-Earth mound	Negligible	High	Minor
Site 150- Vegetation marks	Negligible	High	Minor
Site 154- Weigh Bridge	Negligible	High	Minor

Minor

8.4.6 The Inventory Battlefield of the Battle of Prestonpans (centred Site 79 and 135- extent shown on Figure 8.2) extends into the southern portion of the Site (See Figure 8.1). "*A battlefield is defined as an area over which a battle was fought or an area of land which is significant"* and battlefields are assessed for inclusion on the Inventory of national importance in line with criteria detailing the importance and integrity of their "*Historical associations*"; "*Physical remains*" and the "*Landscape of the battle*".[91]. The Battle of Prestonpans historical association is with the Jacobite Rebellion of 1745 and to a victory of the Jacobites over the Government forces. The physical remains of the Battlefield include the surviving wagonway (Site 122),

[91] HES (2016- Updated 2020). Managing Change in the Historic Environment: Historic Battlefields. Available at: https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationid=b7a05b45-f2a9-4c71-8450-a60b0094c62e (Accessed 15/12/2020)

which survives as a footpath and modern road, as well as numerous historic and modern archaeological finds of human remains and battle debris (largely metal weaponry and personal items). Any surviving physical remains of the battlefield which might survive within the Site could be impacted directly by the construction of the Proposed Development. Adverse direct impacts include alteration to the special qualities of the battlefield or to physical remains or features[92] and are discussed here. The landscape characteristics of the battlefield and how it can be understood in its modern setting will be discussed below under operational effects (para 8.4.22-24).

8.4.7 The extent of the battlefield and the interpretation of certain areas within the battlefield extent are based on physical archaeological remains which have been identified in recent years, mainly composed of large numbers of metal remains found during metal detecting activities. Historic records document the finding of human remains, most likely those killed during the battle (Site 79) to the south of the Site and recent metal detecting has identified large collections of battlefield remains (Site 79 and 90). The area of initial engagement has been interpreted as being to the south of the Site, in the vicinity of Site 4, and records suggest key events also took place here. As a designated Inventory Battlefield the importance of the Battlefield is judged to be High. The Site is located on land which has been historically disturbed by small scale, and later large-scale resource extraction and storage activities, and is occupied by standing structures (Sites 139 and 141) which are not being altered. As such historic activities on the Site have likely truncated, disturbed or damaged any underlying archaeological remains, although as evidenced by discrete finds (Site 29) archaeological remains have survived. The magnitude of impact is judged to be Negligible, as the Proposed Development only occupies a small percentage of the overall Battlefield, documentary records and archaeological investigations suggest that main events are located to the south of the Site and any remains which may have been located within the Site are likely to have been adversely impacted by later activity. The resulting direct level of effect is judged to be **Minor** and **not significant** in EIA terms.

8.4.8 A portion of Preston Links Colliery (Site 30) extended into the Site when it was at its maximum extent. The colliery is judged to be of Low importance. The north western portion of the colliery extends into the area of the cable corridor and the north-eastern area extends within the substation search area. The Proposed Development has the potential to remove part or portions of the buried remains associated with the asset and as such at worst the Proposed Development is judged to have a Medium magnitude of impact. The resulting level of effect is considered to be **Minor**. This level of effect is **not significant** in EIA terms.

8.4.9 The Proposed Development, within the cable corridor, has the potential to result in the large scale removal of deposits associated with three buildings (Sites 125, 131 and 132) which have been identified from historic mapping and whose buried remains are likely to have been truncated by later development. These remains are judged to be of Negligible importance being common features of the wider post-medieval landscape. The magnitude of change is judged to be High and the resulting level of effect to be **Minor**. This level of effect is **not significant** in EIA terms.

8.4.10 Two earth mounds, most likely associated with Preston Links Colliery (Sites 143 and 144), are judged to be of Negligible importance. The mounds are located within the extent of the cable corridor. The Proposed Development has the potential to remove these assets, leading to the total removal of deposits. The magnitude of impact is judged, based on the worst-case

[92] ibid

scenario, to be High and the resulting level of effect is considered to be **Minor**. This level of effect is **not significant** in EIA terms.

8.4.11 The extent of the Gas Works (Site 138), including the hardstanding for a gas holder and small gas works is recorded in the area where the substation is proposed. The gas works are judged to be of Negligible importance as a modern industrial feature. The Proposed Development has the potential to cause substantial loss of information content resulting from the total removal of the remains of the gas works (Site 138) leading to a High magnitude of impact. The resulting level of effect is judged to be **Minor**. This level of effect is **not significant** in EIA terms.

8.4.12 The Proposed Development may use the existing south-eastern access into the Site and as such would have an impact on the remains of the weigh bridge (Site 154). The weigh bridge remains have been judged to be of Negligible importance. It is possible that the remains of the weigh bridge would need to be removed for a new and improved access track, although it is also likely that the remains could be covered and survive as buried remains. Taking into account the worst-case scenario the Proposed Development would be judged to result in a High magnitude of impact and the resulting level of effect would be **Minor**. This level of effect is **not significant** in EIA terms.

Negligible

8.4.13 The access corridor composed of a haul road with a maximum width of 5 m is located in the former extent of two successive parks (Sites 129 and 133) recorded on historic mapping and judged to be of Low importance. Any archaeological remains associated with the historic parks (Site 129 and 133) have likely been truncated by the modern coal store (Site 78) and as a result of the proposal for the access corridor it is unlikely that any underlying remains will be impacted by the Proposed Development and as such the magnitude of impact is considered to be Negligible. The resulting level of effect would be **Negligible**, and **not significant** in EIA terms.

8.4.14 The northern extent of the coal store (Site 78) is located within the access corridor of the Proposed Development. The remains are largely composed of earthworks and are judged to be of Low importance. The Proposed Development, including a maximum 5m width haul road, is likely to result a minor loss of information content in the northern and eastern portion of the asset. The magnitude of impact is judged to be **Low** and the resulting level if effect to be **Negligible,** this is **not significant** in EIA terms.

8.4.15 The gantry (centred Site 140), which transported coal from the store (Site 78), is recorded as crossing areas proposed for the access corridor and substation and two buildings (Sites 142 and 158) associated with the gantry have also been documented in the proposed access corridor for the Proposed Development. The above ground remains of the gantry (Site 140) and associated buildings (Sites 142 and 158) have been largely removed. These assets (Sites 140, 142 and 158) are judged to be of Negligible importance. The Proposed Development has the potential to remove a part of these assets leading to a minor loss of information content and as such would result in a Low magnitude of impact. The resulting level of effect on the coal store (Site 78) would be **Negligible**, and **not significant** in EIA terms.

8.4.16 A historically recorded quarry at Site 126 is judged to be of Low importance as it relates to post-medieval industry and resource extraction which was common in the local area. The Proposed Development has the potential to materially alter a portion of the buried baseline conditions of the asset, where it extends into the Site. The magnitude of impact is judged to

be Low and the resulting level of effect to be **Negligible.** This level of effect is **not significant** in EIA terms.

8.4.17 In addition to the individual assets in Table 8.8 there is the potential for the Proposed Development to impact upon the stone building walls around the portion of the Site south of the Prestonpans to North Berwick Road. These walls have been altered, reinstated and consolidated in the modern era, however they relate to the enclosing of the land in the late 19th and early 20th century, most likely as a result of the expansion of Preston Links Colliery (Site 30). As such the walls are judged to be of Low importance. If the existing access into the Site is used for the Proposed Development, it is unlikely that the Proposed Development would necessitate the removal of all these walls and only small alterations or new breaks to the existing walls would be required. The magnitude of impact would therefore be Negligible, being a small loss of a percentage of the assets overall fabric. The resulting level of effect would be **Negligible** and **not significant** in EIA terms.

Potential Operational Effects

8.4.18 Operational effects include potential effects upon the settings or character of designated assets such as Listed Buildings, Scheduled Monuments, Inventory Gardens and Designed Landscapes (GDL), Inventory Battlefields and Conservation Areas (note no World Heritage Sites are located within the cultural heritage study areas). No direct effects upon designated or non-designated assets are anticipated during the operational phase.

8.4.19 A ZTV has been produced for the Proposed Development. The ZTV has been modelled using a digital terrain model (DTM) and a digital surface model (DSM) and predicted visibility has been based on the viewers eye being 2 m above ground level. The screening effects of built structures and vegetation have been modelled in the ZTV (Chapter 4- para 4.3.20). In addition to the ZTV, site visits to designated heritage assets within the cultural heritage study area have been undertaken.

8.4.20 Consultation with the ELC Archaeological Advisor highlighted the potential need to assess the setting of non-designated heritage assets. Non-designated assets in the vicinity of the Site, in general, include buildings within the Conservation Areas, buried remains of potential prehistoric date, agricultural buildings and the wagonway (Site 122). The setting of the upstanding non-designated heritage assets relates mainly to their immediate surroundings. Historically and in the present the location and immediate vicinity of the Proposed Development has included industrial buildings, firstly Preston Links Colliery (Site 30) and later Cockenzie Power Station.

8.4.21 The non-designated wagonway (Site 122) to the south and east of the Site, is thought to have been constructed to transport extracted resources and is documented as being in use during the Battle of Prestonpans to transport soldiers, potentially the earliest use of mechanised travel to do so. The route of the wagonway can still be understood as it survives as a footpath and road. The ability to appreciate how it relates to the Battlefield has been enhanced by interpretation boards within the Scheduled area of Seton Mains West (Site 4), to the south of the Site, in recent years. From the Prestonpans Battlefield Viewpoint (Appendix 8.2, Plate 8.32) the route of the wagonway can be seen to cross an agricultural field, the location of the Scheduled Seton Mains West asset (Site 4), and the location of the initial engagement of the Battle of Prestonpans. This is explained from the Battlefield Viewpoint. The wagonway can be understood as extending north to Cockenzie and Port Seton. These localities, when the wagonway was constructed, were characterised by a mixed residential and industrial environment and today the character is similar, although the built environment has spread

since the 18th century. The Proposed Development is located in the urban and industrial environment to the north and located in an area which has arguably been associated with industrial usage since the wagonway was constructed. The redevelopment of the Site would not change how the wagonway can be appreciated and understood today nor will it change how the wagonway can be understood to relate to the Inventory Battlefield, the Battle of Prestonpans. As such the Proposed Development would have no impact on the setting of the wagonway.

8.4.22 The setting of the other non-designated heritage assets were not found to be impacted by the Proposed Development and as such they have not been included here.

8.4.23 Table 8.9 below details provides a summary of the potential for impacts on the setting of heritage assets. Technical Appendix 8.3 includes the settings assessment for designated heritage assets where the Proposed Development is judged to have no impact on their setting.

Table 8.9: Level of Effect on the Settings of Selected Heritage Assets							
Site Name	**Site Number**	**Designation**	**Distance from Proposed Development**	**Other Factors Effecting Visibility**	**Relative Sensitivity to Change**	**Magnitude of Impact**	**Level of Effect**
Cockenzie and Port Seton	6	Conservation Area	90 m (closest)	Built environment and existing Cockenzie substation	Low	Negligible	Neutral
Battle of Prestonpans	135 (and 79)	Inventory Battlefield	Site partial within the Inventory Battlefield	Existing industrial character	Medium	Low	Minor

Minor

8.4.24 There is anticipated to be no appreciable change to the setting or character of the Inventory Battlefield, Battle of Prestonpans (centred Site 135- the extent is shown on Figure 8.2). The Inventory states that although the landscape around the battlefield has changed since 1745, "key characteristics" of the landscape enable the appreciation of the battlefield terrain and understanding of how the battle unfolded. Major events of the battle, including the first engagement and the slaughter of government troops, are documented as taking place to the south of the Site and the terrain and buildings in this area, which are refenced in the records of the battle, are still in existence and enable an observer to appreciate the historical context and landscape setting of those events, from the ground and from aerial and/ or satellite imagery. Events associated with the battle are also likely to have taken place further to the north, within the vicinity of the Site, however this area is not specifically discussed in the Inventory entry in terms of contributing to the key landscape characteristics of the battlefield. This area has been successively altered in the modern era and currently contributes little to the understanding and appreciation of the events of the battle. Plate 8.32, in Technical Appendix 8.2, shows the arc of view from west to east across the Inventory Battlefield from Prestonpans Battlefield Viewpoint. The area to the north is occupied by trees, and an open field, the location of the Scheduled Seton Mains West (Site 4), and the location for the initial battle events. Seton Mains West (Site 4) is crossed by a roughly north to south aligned trackway which corresponds to a portion of the non-designated wagonway (Site 122), which is also visible from the Prestonpans Battlefield Viewpoint. The Prestonpans Battlefield Viewpoint provides a viewer with an appreciation of the battle location and key landscape characteristics. Modern developments, including Cockenzie substation (Site 139), OHLs, roads, residential developments and a sport centre, are also visible in this arc of view. The view to the south from the Prestonpans Battlefield Viewpoint includes the A1, vegetation, modern structures and the built environment of Tranent. As such from the Prestonpans Battlefield Viewpoint a key location of the battle, namely the initial engagement location can be understood. However, the wider setting of the Battlefield and how the location of initial engagement relates to other portions of the battle has been much altered ; and without prior knowledge it is difficult to appreciate the Battlefield or its extent from the viewpoint. The setting of the battlefield is even more difficult to understand and appreciate from other positions within the Battlefield, notwithstanding from the centre of Site 4 (Appendix 8.2, Plate 8.33) or adjacent land.

8.4.25 Within the Battlefield, the Site was occupied by Preston Links Colliery (Site 30), an industrial complex from at least the early 20th century, although Preston Links Colliery is documented from the mid-19th century to the north of the Site. It is possible that coal extraction on the Site pre-dates documentation on historic cartography. The practise of resource extraction, in the vicinity of the Site is known to have been contemporary with the battle and indeed the coal transport wagonway (Site 122) is reported to have been in use during the battle and then was subsequently redeveloped as part of Cockenzie Power Station (Sites 26, 78, 139 and 141), another industrial activity. The Proposed Development is another industrial use of the Site and does not encroach further south than previous modern industrial activity. As such whilst the Proposed Development is located within the Inventory Battlefield and would backdrop views from within the Battlefield when looking northwards, this area has been in modern industrial use for at least 100 years and does not affect how the key characteristic and key events of the battle can be appreciated in the modern landscape. Therefore, in line with criteria set out in Table 8.4, the relative sensitivity of the Battlefield (Site 135),

particularly where the area of the Site is concerned, is considered to be Medium, as whilst its setting contributes to the significance and key contextual characteristics of the asset, it only does so moderately given the later alterations to the landscape.

8.4.26 The Proposed Development is judged to be a slight alteration to the baseline setting and character of the Battlefield, which will not affect the ability to understand the setting, key landscape characteristics and keys views of the Battlefield (Site 135) as identified in the Inventory Entry. As such the magnitude of impact is judged to be Low. The resulting level of effect would be **Minor** and **not significant** in EIA terms.

Neutral

8.4.27 The ZTV produced for this assessment (Figure 4.1) suggest that there will be some intervisibility between the Proposed Development and the Cockenzie and Port Seton Conservation Area (Site 6), indeed a site visit confirmed that there may be some intervisibility between the western extent of the Conservation Area and the Site. A viewpoint (Figure 4.2a) taken from Preston Links Mound, looking south-east towards the Proposed Development, also indicates that the western extent of the Conservation Area will be visible in views of the Proposed Development from the north west. The Conservation Area has a relatively higher sensitivity to changes to its setting and character within its boundaries, than it does to changes outwith. The Conservation Area includes the historic extent of the post-medieval village, including the harbour (LB23025), and the setting of the Conservation Area insofar as it contributes to the understanding and appreciation of the asset relates to the inter-relationship of the features therein and to the harbour and coast. The western edge of the Conservation Area is readily understandable and the character of the built environment changes here from an industrial and coastal area (Appendix 8.2, Plate 8.34 and Figure 4.2a) to a historic residential village character; the latter consisting of multiple Listed and non-listed historic buildings. The southern and eastern edges of the Conservation Area are less well defined due to modern residential developments at the urban extent. The Proposed Development may be seen from parts of the Conservation Area, however the area is already dominated by Cockenzie substation (Site 138) and as such any adjacent building would be seen in conjunction with that building. The Proposed Development is located in an area already historically dominated by an industrial character and is readily identified as being separate from the Conservation Area. As such the Proposed Development is unlikely to alter the understanding and appreciation of the Conservation Area. The relatively sensitivity of the Conservation Area to changes beyond its extent is judged to be Low and the magnitude of change is judged to be Negligible. The resulting level of effect is **Neutral** and **not significant** in EIA terms.

Potential Cumulative Effects

8.4.28 Cumulative effects relating to archaeology and cultural heritage are for the most part limited to effects upon the settings of heritage assets. This assessment considers the potential for the cumulative effects arising from the addition of the Proposed Development to other cumulative developments upon the setting of heritage assets which have the potential to occur during the operational phase. The cumulative effect assessment takes regard of the guidance on cumulative effects upon heritage assets as set out in Environmental Impact Assessment Handbook V5[93] and utilises the criteria for assessing setting effects as set out above.

[93] Scottish Natural Heritage & Historic Environment Scotland. (2018). Environmental Impact Assessment Handbook v5. Available at: https://www.nature.scot/sites/default/files/2018-05/Publication%202018%20-%20Environmental%20Impact%20Assessment%20Handbook%20V5.pdf. (Accessed 24/11/2020)

8.4.29 Whilst cumulative impacts on the settings of heritage assets may in some instances exceed impacts resulting from the Proposed Development alone, in other cases they may reduce it. For example, if an intervening development could potentially mask the Proposed Development under consideration, the impact of adding the Proposed Development to the cumulative baseline would be less than if the Proposed Development were to stand alone.

8.4.30 The assessment considers the consented Inch Cape onshore substation (planning reference 18/00189/PPM), located on the former footprint of Cockenzie Power Station (Site 26) and the residential development of Blindwells, Tranent, East Lothian (14/00768/PPM) which is currently being constructed to the south-east of the Site on the eastern side of the A198.

8.4.31 Given the emphasis NatureScot place on significant effects, cumulative effects have been considered for the designated assets where there has been judged to be an effect upon their setting from the Proposed Development. Where there is no impact from the Proposed Development alone there will be no cumulative impact resulting from the addition of it to a theoretical cumulative baseline.

8.4.32 The Proposed Development is largely located within the nationally important Inventory Battlefield of Prestonpans (centred Site 135 and 79) and the cumulative development of Inch Cape is located immediately north of the north western extent of the battlefield, outside its boundaries and on largely 20th century reclaimed land. A such there is no potential for cumulative direct effects resulting from the combination of these two developments.

8.4.33 The cumulative development at Blindwells is located within the eastern portion of the Inventory Battlefield extent. The Proposed Development is located on previously disturbed land and as such the redevelopment of the Site is unlikely to have a significant direct impacts upon the special qualities of the Inventory Battlefield. Similarly, the Blindwells development is located on the former site of an opencast mine, suggesting that any archaeological remains related to the Battle of Prestonpans that may have survived within its boundaries are likely to have be lost to previous disturbance associated with extraction. Whilst the Inventory Battlefield is judged to be of High importance there is unlikely to be any cumulative direct impacts upon the special qualities of the battlefield, as represented by archaeological remains, given the previous disturbance and on this basis no cumulative direct effect upon the special qualities of the battlefield is expected.

8.4.34 In considering the potential for cumulative effects related to impacts upon the setting and landscape characteristics of the battlefield, it is noted that land to the north west of the Site in the vicinity of Inch Cape, was not dry land at the time of the battle and as such it is not directly related to the battle. No significant events of the battle are recorded within the Site or the north western area in close proximity of the cumulative development of Inch Cape. During the 19th and 20th centuries the northern portion of the battlefield including the Site and cumulative development at Inch Cape were developed, making it difficult to appreciate, without prior knowledge, the battlefield context from these areas. The battle is more readily appreciated from the south in the open area around Site 4 where modern memorials to the battle have been recently erected. Views from the Prestonpans Battlefield Viewpoint (Appendix 8.2, Plate 8.32) towards the Proposed Development and cumulative development of Inch Cape include an area which is already industrial in character. The addition of the Proposed Development to a baseline which includes Inch Cape will not impact upon the ability to appreciate the surviving landscape context nor will it affect the ability to appreciate the extent of the battlefield in a modern context. At most a Negligible magnitude cumulative impact is expected. This would result in a **Neutral** level of effect which is **not significant** in EIA terms.

8.4.35 The cumulative development of Blindwells is located to the south east of the Proposed Development in a location previously subject to opencast mining and later reinstatement, which has affected the natural topography in the area making it difficult to understand the landscape context of this area of the Battlefield. The Proposed Development is located in land historically associated with an industrial use both at the time of the battle and in the later post-medieval period, as a colliery site, and in the modern era, as part of Cockenzie Power Station. In the modern landscape, the Site and Blindwells are separated from each other visually by B6371 and its banked junction with A198 along with mature trees in these areas. The two developments will not be seen in the same view from important locations within the battlefield, including from Site 4 and Prestonpans Battlefield Viewpoint. As such the in combination effects of Proposed Development and the development at Blindwells are likely to relate to the overall loss of open space within the wider Battlefield but without effect the key landscape characteristics and relationships. On this basis, at most a Low magnitude cumulative impact is expected. This would result in a **Minor** level of effect which is **not significant** in EIA terms.

8.4.36 As noted above the Cockenzie and Port Seton Conservation Area (Site 6) is judged to be more sensitive to changes within the Conservation Area than to chance outside of its boundaries. As such it is judged to be of Low relative sensitivity to changes to its setting beyond the Conservation Area extent. The Proposed Development is located to the west of the existing Cockenzie substation (Site 138) and electricity substation (Site 141) and the cumulative development at Inch Cape would also be located to the north west between the Conservation Area and the Proposed Development along the coast. The Blindwells development is located to the south of the Conservation Area. The area to the west of the Conservation Area has had an industrial character from at least the mid-19th century, having been associated with mineral extraction and later Cockenzie Power Station (Site 26). As such the Inch Cape development in conjunction with the Proposed Development would result in a slight alteration to the baseline setting of one area of the Conservation Area, however the western edge of the Conservation Area could still be readily understood and the way in which the Conservation is appreciated would not be materially altered. The cumulative development to the south is separated from the Conservation Area by modern residential development, agricultural land and the A198 and it is unlikely it can be seen from the Conservation Area given these features and the rising ground to the south. On this basis the in combination effects of the Proposed Development with Inch Cape and Blindwells would result in an, at worst, a Low magnitude cumulative impact upon the setting and character of the Conservation Area. As such the cumulative effect would be **Neutral** and **not significant** in EIA terms.

8.5 Mitigation

8.5.1 This assessment has found that the Proposed Development would have no significant direct effects on the known heritage assets within the Site. Coal and stone extraction are documented on the Site in the late 19th and 20th centuries and Cockenzie Power Station occupied the Site from the 1960s, limiting, though not negating, the potential for hitherto unknown remains to survive.

8.5.2 A programme of Site Investigation (SI) works, which were subject to archaeological monitoring, was undertaken across the Site between the 9 February and 11 February 2021. Nine tests pits were excavated to depths between 2.5 m bgl to 3.4 m bgl. Made ground was observed in all nine test pits. No archaeological remains were identified. Further test pits are

due to be undertaken in February 2021 to March 2021', and these works will also be subject to archaeological monitoring.

Mitigation during Construction

8.5.3 No likely significant effects have been identified in the absence of mitigation, therefore no mitigation is required. However best practice recommends that a programme of archaeological works be undertaken prior to or during the construction of the Proposed Development. The archaeological works may take the form of an evaluation or watching brief depending on the final results of the SI works and the final areas required for ground breaking. Due to the amount of historic disturbance, it is not advised that a metal detecting survey be undertaken prior to intrusive works. However, it is advised that any soils removed during archaeological works are scanned with a metal detector in order to identify any battlefield remains which may survive.

Mitigation during Operation

8.5.4 No mitigation is proposed.

8.5.5 This assessment has not found any significant effects on the settings of heritage assets within the cultural heritage study area. No specific mitigation is required. It is noted that the detailed design of the Proposed Development will be subject to further planning applications for the approval of matters specified in conditions.

8.6 Assessment of Residual Effects

Residual Construction Effects

8.6.1 The implementation of the above outlined mitigation measures for construction effects, should they be required, would allow for recording of deposits associated with known remains and allow for the investigation of the potential for previously unknown assets. Following the completion of construction, no further groundworks would be undertaken. Mitigation would allow for the detailed recording of any remains encountered during the construction phase and the results would therefore enhance our understanding of the area's archaeological heritage. The only direct effects on known heritage assets would be on non-designated assets with a negligible to low sensitivity, with the exception of the Battle of Prestonpans, though no known remains associated with the battle will be impacted upon and the potential for hitherto unknown remains is thought to be low. On the basis that mitigation measures would be employed and would allow for recording of elements of assets which would be removed there would be minimal loss of information content and the effects would be **Negligible** and not significant. Potential effects on unknown and previously unrecorded buried remains cannot be predicted at this stage, although any such impacts are also addressed by the proposed mitigation measures and it is judged unlikely that they will exceed the EIA significance threshold.

Residual Operational Effects

8.6.2 The predicted residual effects on the settings and character of heritage assets would be the same as assessed for the operational effects. However, no significant operational effects are anticipated.

Residual Cumulative Effects

8.6.3 The predicted residual cumulative effects on the settings of designated heritage assets would be the same as those assessed for the cumulative effects. No significant residual cumulative effects are anticipated.

8.7 Summary

8.7.1 The Site is located on land formerly associated with Preston Links Colliery (Site 30) and latterly Cockenzie Power Station. Due to the post-medieval and modern disturbance of the Site for extraction and redevelopment works it is likely that any below ground remains have been truncated, damaged or disturbed by this later activity. This assessment has identified 28 heritage assets within the Site, one of which is the Inventory Battlefield of Prestonpans (Site 135 and 79). The other remains largely relate to the extraction works on the Site documented on historic mapping from the mid-19th century and the development of the Site in the later 20th century associated with Cockenzie Power Station. With the exception of the Battle of Prestonpans the heritage assets are judged to be of Negligible and Low importance. The Proposed Development will avoid twelve identified heritage assets and the resultant level of effect on the remaining heritage assets, including a portion of the Inventory Battlefield, is considered to be **not significant** in EIA terms.

8.7.2 An assessment of the impact of the Proposed Development on the setting of heritage assets, carried out via site visits and review of a ZTV, found that there be a Minor effect on the setting of the Inventory Battlefield and a Neutral effect on Cockenzie and Port Seton Conservation Area (Site 6). These levels of effect are **not significant** in EIA terms. The assessment in general found that the Proposed Development would have no impact on the designated heritage assets within the cultural heritage study area and the reasons for this are detailed in Technical Appendix 8.3.

8.7.3 No significant cumulative effects have been identified.

8.7.4 Table 8.10 provides a summary of the potential effects, mitigation proposed and residual effects.

Table 8.10 Summary of Potential Significant Effects of the Proposed Development

Likely Significant Effect	Mitigation Proposed	Means of Implementation	Outcome/ Residual Effect
Construction			
Potential to disturb, damage or destroy archaeological remains associated with the Battle of Prestonpans, non-designated features or buried remains of cultural heritage interest during construction	▪ No likely significant effects have been identified, therefore no mitigation is required. ▪ However a programme of archaeological works to be undertaken prior to or during the construction of the Proposed Development is proposed as a good practice measure, dependent upon the final results of the SI works. The archaeological works may take the form of an evaluation or watching brief depending on the results of the SI works and the final areas required for ground breaking. Any soils	▪ It is anticipated that a suitably worded planning condition will require the provision of a Written Scheme of Investigation (WSI) for the agreement of the Archaeological Advisor to ELC.	Not significant

Table 8.10 Summary of Potential Significant Effects of the Proposed Development			
Likely Significant Effect	**Mitigation Proposed**	**Means of Implementation**	**Outcome/ Residual Effect**
	removed during archaeological works would be scanned with a metal detector in order to identify any battlefield remains which may survive.		
Operation			
Potential effects upon the settings or character of designated assets such as Listed Buildings, Scheduled Monuments, Inventory Gardens and Designed Landscapes (GDL), Inventory Battlefields and Conservation Areas	▪ No likely significant effects have been identified; therefore no mitigation is required. ▪ It is noted that the detailed design of the Proposed Development will be subject to further planning applications for the approval of matters specified in conditions.	▪ It is anticipated that a suitably worded planning condition will require the provision of final substation design for the approval of ELC.	Not significant
Cumulative			
Potential cumulative effects upon the settings or character of designated assets such as Listed Buildings, Scheduled Monuments, Inventory Gardens and Designed Landscapes (GDL), Inventory Battlefields and Conservation Areas	▪ No likely significant cumulative effects have been identified; therefore no mitigation is required. ▪ It is noted that the detailed design of the Proposed Development will be subject to further planning applications for the approval of matters specified in conditions.	▪ It is anticipated that a suitably worded planning condition will require the provision of final substation design for the approval of ELC.	Not significant

9 Access, Traffic and Transport

9.1 Introduction

9.1.1 This chapter considers the likely significant effects on Access, Traffic and Transport associated with the construction, operation and decommissioning of the Proposed Development. The effects associated with the construction phase of the Proposed Development on Access, Traffic and Transport can be considered to be representative of reasonable worst-case decommissioning effects, therefore a separate assessment of the decommissioning phase has not been undertaken as part of this assessment.

9.1.2 The specific objectives of the chapter are to:

- Describe the current traffic and transport baseline;
- Describe the assessment methodology and significance criteria used in completing the impact assessment;
- Describe the potential effects, including direct, indirect and cumulative effects;
- Identify and describe the mitigation measures proposed to address likely significant effects; and
- Assess the residual effects remaining following the implementation of mitigation.

9.1.3 The Access, Traffic and Transport assessment has been undertaken by SYSTRA Ltd with SYSTRA's EIA input led by Alan DeVenny. Alan is a Projects Director and Chartered Engineer with SYSTRA. He has a BEng in Civil and Transportation Engineering as well as a PhD in Civil Engineering. Alan has over 21 years' experience in the traffic and transportation industry (specialising in development planning) and over 12 years' experience in the production of EIA transport chapters (and associated studies) for onshore wind farms and electricity transmission projects in Scotland, as well as being responsible for assisting both Transport Scotland and Highways England in the preparation of guidelines for assessing the effects of wind farm developments. Alan is a Chartered Member of the Institution of Civil Engineers (CEng, MICE). SYSTRA's EIA team has produced Traffic and Transport EIA Report Chapters and Abnormal Loads Assessment reports for numerous wind farm developments and transmission projects across Scotland and for several developments within East Lothian.

9.1.4 This chapter is supported by the following figures and technical appendices:

- Figure 9.1: Study Area; and
- Figure 9.2: Traffic Counter Locations.

9.2 Scope of Assessment

9.2.1 The assessment is based on the Proposed Development as described in **Chapter 2: Development Description**.

9.2.2 This chapter considers the potential for likely significant effects relating to traffic and transport, as identified by the Institute of Environmental Management (IEMA) Guidelines and including:

- Noise;
- Severance;
- Driver delay;

- Pedestrian delay;
- Pedestrian amenity;
- Accidents and safety;
- Hazardous loads (e.g. nuclear products); and
- Dust and dirt.

9.2.3 The environmental effects associated with visual impact and noise are addressed in **Chapter 4: Seascape, Landscape and Visual** and **Chapter 10: Noise and Vibration** respectively. There are no hazardous loads associated with the Proposed Development.

9.2.4 The chapter assesses the potential for additional cumulative effects when considered in addition to other consented developments. The chapter considers the following cumulative development scenarios:

- Concurrent construction phase with the consented Inch Cape Onshore Transmission Works (planning reference 18/00189/PPM).

Construction Traffic

9.2.5 The most identifiable traffic and transport characteristic associated with the Proposed Development are the transportation of general construction materials (concrete, aggregates, pipes, cabling, etc.) to the Site in standard heavy goods vehicles (HGVs). The characteristic of this form of traffic is a temporary intensification of HGV traffic on the road network. This intensification varies depending on the scale of the development, the construction stage and operational requirements. A small amount of traffic would also be generated by construction workers commuting to/ from the Site during the construction and operational stages.

Consultation

9.2.6 A consultation note related to access, traffic and transport for the Proposed Development was issued to East Lothian Council (ELC) and Transport Scotland (TS) in November 2020.

9.2.7 The scope of the assessment has been informed by consultation responses summarised in Table 9.1 and the following guidelines/ policies:

- Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (EIA Regulations);
- Scottish Planning Policy (SPP) Paragraphs 165-181;
- Planning Advice Notice (PAN) 75 – 'Planning for Transport';
- Institute of Highways and Transportation (IHT) publications – "Guidelines for Traffic Impact Assessment", 1998;
- Institute of Environmental Management and Assessment (IEMA) publication – "Guidelines for the Environmental Assessment of Road Traffic", 1993 ("the IEMA Guidelines"); and
- Department for Transport (DfT) publication "Design Manual for Roads and Bridges" (DMRB).

9.2.8 Table 9.1 summarises the consultation responses received regarding access, traffic and transport and provides information on where and/ or how they have been addressed in this assessment. The following organisations made comment on access, traffic and transport:

- ELC Transport Planning Department.

9.2.9 Full details on the consultation responses can be reviewed in **Technical Appendix 1.1: Consultation Register**.

Table 9.1: Consultation Responses

Consultee and Date	Consultation	Issue Raised	Response Action Taken	Where Issue is Addressed in EIAR
ELC Transport Planning Dec 2020	Access, Traffic and Transport	Further to your emails below and our correspondence regarding traffic count data, I can confirm that I am happy with your proposed scope for the access, traffic and transport EIA chapter. Additionally, a Traffic Management Plan must be submitted to the Planning Authority for approval. It must include the following: 1. Details of and controls for access routes to and from the site for large components and day-to-day deliveries/removals associated with the construction and decommissioning phases of the development. 2. Detailed swept path assessment of large component delivery routes and drawings detailing any required off-site mitigation works. 3. Drawings showing details of any proposed alterations to the existing vehicular access onto the B6371 and alterations to existing junctions or creation of new junctions with the B1348. 4. Frequencies and times of deliveries and arrangements for the removal of materials/ plant from the site. 5. Details of access and management for the onshore cabling works including the potential for traffic management on B1348 Edinburgh Road. 6. Details of temporary signage in the vicinity of the site warning of construction traffic. 7. Arrangements for road maintenance and cleaning. 8. Details of wheel washing facilities which must be provided and maintained in working order during the period of construction and/ or decommissioning of the site. All vehicles must use the wheel washing facilities to prevent deleterious materials being carried onto the public road on vehicle wheels. 9. A Travel Plan to include measures to minimise dependency on the private car to and from the construction compounds. 10. Prior to the commencement of the development, a dilapidation/ condition survey is needed of the roads in the vicinity of the site. These being the A198 between Bankton Interchange (A198/ A1) and Meadowmill Roundabout (A198/ B6371/ B1361), B6371 between Meadowmill Roundabout and B1348 Edinburgh to Road and B1348, Edinburgh Road between East Lorimer Place and Appin Drive.	A Construction Traffic Management Plan (CTMP) will be produced post-planning consent in agreement with the Roads Authority and Police Scotland). 1. Noted. 2. Noted. Layouts detailing required accommodation works will be submitted to the planning authority. 3. Noted. Site access arrangements will be included in the application pack. 4. Details such as projected traffic movements by programme month and vehicle type are included within this chapter and will be included in the emerging CTMP. 5. Noted. 6. Noted. 7. Noted. 8. Noted. 9. Noted. 10. Noted.	An indication of measures to be included in the CTMP is contained in the Mitigation Measures section of this chapter.
Transport Scotland	Access, traffic and transport	No response received to consultation.	Assumed that TS are satisfied with proposed scope.	

Potential Effects Scoped Out

9.2.10 The scope of this assessment takes account of the committed mitigation measures both incorporated into the design and those standard construction and decommissioning mitigation measures incorporated into the Proposed Development, as described in **Chapter 2: Proposed Development**, and **Technical Appendix 2.1: Outline Construction Environmental Management Plan**. Table 9.2 summarises the issues scoped out of the assessment:

Table 9.2: Issues Scoped Out of EIA

Potential Effect	Basis for Scoping Out
Environmental assessment of traffic associated with the operational stage.	Once the Proposed Development is operational, the amount of associated traffic is minimal, relating to general site maintenance and maintenance of components. Vehicles used for maintenance are likely to be road going 4x4s or works vans. There may, on rare occasions be the need for HGV access to the Proposed Development. It is considered that the effects of vehicle movements during the operational phase would be negligible. In respect of traffic and transport the operational phase of the Proposed Development is therefore not assessed in this chapter.
Environmental assessment of traffic associated with the decommissioning stage.	Traffic associated with the decommissioning stage is anticipated to be significantly less than that generated during construction. Given the timescales involved and the likelihood for changes to the baseline situation during this period, the traffic and transport effects of decommissioning are not assessed in this chapter.
The effect of construction related vehicles on the road network, in respect of traffic flows, both in isolation and cumulatively.	It is considered unlikely that construction vehicle movements would be significant in terms of peak hour congestion. Therefore, full detailed junction capacity assessments have not been undertaken.

9.2.11 It is anticipated that the volume of traffic associated with the construction of the Proposed Development would not have a discernible effect on roads and sensitive receptors out-with the study area (see paragraphs 9.3.1 to 9.3.5 for definition of the study area) as the effects of traffic are diluted with increasing distance from the point of origin.

9.3 Assessment Methodology and Significance Criteria

Method of Baseline Characterisation

Extent of the Study Area

9.3.1 The study area for the assessment of traffic and transport is indicated by **Figure 9.1** and has been identified using the assessment thresholds within the IEMA Guidelines as an aide. The study area has been predicated on the access point to the Site and the proposed road routes to this access point from the external road network. To determine appropriate access routes, detailed consideration and assessment of the surrounding road network has been undertaken and the location of nearby sensitive receptors has been considered. Notwithstanding this, the route taken by construction vehicles will largely depend on where the construction materials are sourced. A comprehensive desk-based study was undertaken to fully understand the surrounding road network.

9.3.2 The results of the study have established that the most appropriate routes for general construction HGV traffic to reach the Site access point are from either the east along the A1 or from the west along the A1 depending on the point of origin of materials. Vehicles would then follow the direct route north from the A1 to the site via the A198 and B6371. It is noted that the onshore export cable would have a temporary parallel access track along its length.

It is anticipated that detailed proposals for temporary access points/ crossings over the B1348 would be brought forward as part of the applications for matters specified in conditions. The study area is therefore identified as follows:

- The B1348 from the junction with the B6371 to west of the point where the onshore export cable area of search crosses the B1348;
- The B6371 between the B1348 and the A198;
- The A198 between the roundabout with the B1361 and the A1 slip road roundabout; and
- The A1 in the immediate vicinity of the Bankton Junction.

9.3.3 It is considered highly unlikely that there would be any significant effects on the road network outside of the study area identified above as traffic will be heavily diluted across the road network beyond these points.

9.3.4 Taking into account the IEMA Guidelines for sensitive receptors, it is considered that the following areas would be classed as sensitive receptors since there would be pedestrians present in these areas and there are local residential properties with direct frontage to the road:

- The section of the B6371 between the junction with the B1348 and the junction with Alder Road; and
- The section of the B1348 between the junction with the B6371 and the junction with Whin Park Industrial Estate.

9.3.5 It is considered that all road links within the study area are subject to Rule 1 (30% threshold), with the areas listed in paragraph 9.3.4 identified as sensitive receptors subject to Rule 2 (10% threshold) of the IEMA Guidelines.

Desk Study

9.3.6 The traffic and transport study area characteristics have been determined by a desk-based assessment and Automatic Traffic Count (ATC) survey results obtained for the Proposed Development. The source of the traffic count information at each of the road links identified in the study area is set out below and is illustrated by **Figure 9.2**:

- Publicly available DfT Annual Average Daily Flow (AADF) data (counter no. 80103) for the A1 in the vicinity of Bankton Junction (manually counted in 2019);
- Publicly available DfT AADF data (counter no. 80125) for the A198 to the north of Bankton Junction (manually counted in 2019);
- Publicly available ATC data collected for the B6371 to the south of Alder Road Roundabout over a 7-day period (21 August – 27 August 2017); and
- Publicly available ATC data collected for the B1348 over a 7-day period (21 August – 27 August 2017).

Criteria for the Assessment of Effects

9.3.7 Guidance for the assessment of the environmental effects of traffic is provided in the IEMA document, "Guidelines for the Environmental Assessment of Road Traffic". The document is the only guidance document currently available that sets out a methodology for assessing potentially significant environmental impacts where a Proposed Development is likely to give rise to changes in traffic flows.

9.3.8 The guidance suggests that in order to determine the scale and extent of the assessment and the level of impact the development would have on the surrounding road network, the following two 'rules' should be followed:

- Rule 1 – Include highway links where flows are predicted to increase by more than 30% where the number of heavy goods vehicles (HGVs) is predicted to increase by more than 30%; and
- Rule 2 – Include any other specifically sensitive area where traffic flows are predicted to increase by 10% or more.

9.3.9 These rules are used to identify the road links within the study area where a full assessment of environmental effects associated with an intensification in road traffic may be required. Areas/ receptors which have been identified as sensitive are outlined in paragraph 9.3.4.

9.3.10 Paragraph 2.5 of the IEMA Guidelines identifies groups, locations and special interests which may be sensitive to changes in traffic conditions. These are:

- People at home;
- People in workplaces;
- Sensitive groups including children, elderly and disabled;
- Sensitive locations, e.g. hospitals, churches, schools, historic buildings;
- People walking or cycling;
- Open spaces, recreational sites, shopping areas; and
- Sites of ecological/ nature conservation value tourist attractions.

9.3.11 The significance of each impact is considered against the criteria within the guidelines. However, the guidelines state that:

"For many effects, there are no simple rules or formulae which define the thresholds of significance and there is, therefore, a need for interpretation and judgement on the part of the assessor, backed-up by data or quantified information wherever possible. Such judgements will include the assessment of the numbers of people experiencing a change in environmental impact as well as the assessment of the damage to various natural resources."

9.3.12 The significance falls into two categories; significant and not significant. The latter corresponds to significant effects in accordance with the EIA Regulations.

Criteria for Assessing the Sensitivity of Receptors

9.3.13 The sensitivity to change in traffic levels of any given road segment and the receptors located along that road segment are generally assessed by considering the residual capacity of the network under existing conditions. Where there is a high degree of residual capacity, the network may readily accept and absorb an increase in traffic and therefore the sensitivity may be said to be low. Conversely, where the existing traffic levels are high compared to the road capacity, there is little spare capacity, and the sensitivity to any change in traffic levels will be considered to be high.

9.3.14 Consideration has been given to the composition of the traffic on the road network, under both existing and proposed conditions. For example, light goods vehicles (LGVs) have less effect on traffic and the road system than HGVs.

9.3.15 The criteria that have been used to make judgements on the sensitivity of the receptor(s) and the magnitude of change are presented in Table 9.3.

Table 9.3: Receptor Sensitivity	
Sensitivity	**Description**
High	The receptor/ resource has little ability to absorb change without fundamentally altering its present character, or is of international or national importance. Local residents whose daily activities depend upon unrestricted movement within their environment. Receptors such as schools, colleges, hospitals and accident hotspots.
Moderate	The receptor/ resource has moderate capacity to absorb change without significantly altering its present character, or is of high importance.
Low	The receptor/ resource is tolerant of change without detriment to its character, is of low of local importance. Areas such as trunk road or A class roads constructed to accommodate significant HGV volumes.

Criteria for Assessing the Magnitude of Change

9.3.16 The magnitude of traffic effects is a function of the existing traffic volumes, the percentage increase and change due to a development, changes in the type of traffic and the temporal distribution of traffic (day of week, time of day). The determination of magnitude has been undertaken by reviewing the Proposed Development, establishing the parameters of the receptors that may be affected and quantifying these effects utilising IEMA Guidelines and professional judgement.

9.3.17 The criteria that has been used to make judgements on the magnitude of the effect on the receptor(s) is presented in Table 9.4.

Table 9.4: Magnitude of Change	
Magnitude	**Description**
Major	Total loss of or major/ substantial alteration to key elements/ features of the baseline (pre-development) conditions such that the post development character/ composition/ attributes would be fundamentally changed. Generally, a rule of >90% (or >70% at sensitive receptors) change in traffic is considered to be a major magnitude
Moderate	Loss or alteration to one or more key elements/ features of the baseline conditions such that post development character/ composition/ attributes of the baseline would be materially changed. Generally, a rule of 60% - 90% (or 40% - 70% at sensitive receptors) change in traffic is considered to be a moderate magnitude.
Minor	A minor shift away from baseline conditions. Change arising from the loss/ alteration would be discernible/ detectable but not material. The underlying character/ composition/ attributes of the baseline condition would be similar to the pre-development circumstances/ situation. Generally, a rule of 30% – 60% (or 10% - 40% at sensitive receptors) change in traffic is considered to be a small magnitude.
Negligible	Very little change from baseline conditions. Change barely distinguishable, approximating to a 'no change' situation. Generally, a rule of <30% (or <10% at sensitive receptors) change in traffic is considered to be a negligible magnitude.

Criteria for Assessing Significance

9.3.18 As a guide to inform the assessment, but not as a substitute for professional judgement, a criteria matrix for determining the significance of traffic related effects is set out in Table 9.5. This is based on combining the magnitude of the effect with the receptor sensitivity.

Table 9.5: Significance Criteria Matrix					
	Magnitude of Change				
Sensitivity		**Major**	**Moderate**	**Minor**	**Negligible**
	High	Major	Major	Moderate	Moderate
	Moderate	Major	Moderate	Moderate	Minor
	Low	Moderate	Moderate	Minor	Negligible

9.3.19 Significance is categorised as major, moderate, minor or negligible. Effects judged to be of major or moderate significance are considered to be Significant in accordance with the EIA Regulations. Effects judged to be of minor or negligible significance are considered Not Significant.

Limitations and Assumptions

9.3.20 The construction traffic associated with the Proposed Development would comprise of construction workers, HGVs/ LGVs carrying construction materials and plant.

9.3.21 The following assumptions have been made to ensure a robust assessment of each road link and sensitive receptors:

- 100% of construction traffic will access the Site from the B6371;
- 100% of construction traffic will access the Site from the A198, and then join the B6371 to route to the site access;
- 70% of construction traffic will access the Site from the west on the A1, via the A198 and B6371;
- 70% of construction traffic will access the Site from the east on the A1, via the A198 and B6371;
- 20% of construction traffic will access the site from the east on the B1348, via the B6371; and
- 100% of stone requirement will be imported to site.

9.3.22 The construction working hours for the proposed Development would be 07:00 to 19:00 Monday to Saturday. As noted in **Chapter 2: Development Description** and **Chapter 10: Noise and Vibration**, noisy activities on Saturday afternoons would be restricted to reduce noise disturbance.

9.3.23 The installation of the offshore export cable at landfall (using trenchless installation techniques, e.g. HDD) is likely to require greater flexibility in working hours, as described in **Chapter 2: Development Description**, however this is considered unlikely to have any material effect on access, traffic or transport effects.

9.3.24 There is expected to be between 30 and 60 personnel working on-site at any one time. It is important to note that the number of personnel on-site would vary during the construction process. It is expected that the majority of staff would travel to the Site by private car or works minibus/ pick-up although a small proportion may access the site by walking, cycling or by public transport.

9.3.25 In order to calculate a robust scenario, information was gathered regarding the materials required and the size of average loads associated with the construction vehicles (excluding staff vehicles). Table 9.6 includes an estimate of construction vehicle numbers required for each task during the construction period.

Table 9.6: Estimated No. of Vehicle Trips during Construction		
Construction Task	**Vehicle Type**	**Approximate No. of Loads**
Substation Civil Works	Stone and Concrete Wagons	2,330
Enabling Works	Various	75
Services and Plant Installation	Flat	1,750
Onshore Cabling	Flat Beds & Low Loaders Fuel and Misc. Wagons	628
Works at Landfall	Various	24
Electrical Plant Installation	Flat beds and Low Loaders	1,748
Access Roads	Stone Wagons	280
Landscaping	Various	3,519
Total (one-way trips)		10,354
Total (two-way trips)		20,708

9.3.26 For the purposes of this assessment, it is assumed that 100% stone would be sourced from off-site, thus representing a robust case on which to base the worst-case assessment.

9.3.27 In addition to the construction vehicles identified in Table 9.6, it is anticipated that there would be 60 – 120 two-way daily private car/ LGV (or works minibus trips) to the Proposed Development associated with construction staff.

9.3.28 Using the indicative construction programme, the number of HGV deliveries anticipated at the Site per month of the construction period has been calculated as illustrated in Table 9.7.

Table 9.7: Estimated No. of HGV Trips per Month

Construction Task	Month																					Totals
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
Sub-station Civil Works				233	233	233	233	233	233	233	233	233	233										**2,330**
Enabling Works	25	25	25																				**75**
Services and Plant Installation									175	175	175	175	175	175	175	175	175	175					**1,750**
Onshore Cabling										157	157	157	157										**628**
Works at Landfall							6	6	6											6			**24**
Electrical Plant Installation																			437	437	437	437	**1,748**
Access Roads								140	140														**280**
Landscaping															1173	1173	1173						**3,519**

Table 9.7: Estimated No. of HGV Trips per Month

Construction Task	Month																					Totals
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
Total (one-way trips)	**25**	**25**	**25**	**233**	**233**	**233**	**239**	**379**	**554**	**565**	**565**	**565**	**565**	**408**	**1348**	**1348**	**1348**	**175**	**437**	**443**	**437**	**437**	**10,354**
Total (two-way trips)	**50**	**50**	**50**	**466**	**466**	**466**	**478**	**758**	**1108**	**1130**	**1130**	**1130**	**1130**	**816**	**2696**	**2696**	**2696**	**350**	**874**	**886**	**874**	**874**	**20,708**

9.3.29 The construction Site may be operational 12 hours every weekday (07:00 to 19:00) and 6 hours on a Saturday (07:00 to 13:00), therefore, vehicles could be arriving or leaving at any time during the working week of 6 days. Construction vehicles would be arriving and departing the Site at regular intervals during expected Site working hours.

9.3.30 Table 9.7 indicates that the HGV trips are relatively well spread out over the duration of the construction period. Months 15 to 17 have the highest number of trips, associated with the landscaping and services/ plant installation. The remaining months of the construction period are very light in terms of HGV trips when compared with the months with civils works and electrical plant installation.

Worst-Case Assessment

9.3.31 The worst-case month for construction HGV traffic are Months 15 to 17 with an estimated 2,696 two-way HGV trips per month. Assuming four weeks per month, this equates to approximately 674 two-way HGVs per week (approximately 337 inbound and 337 outbound). Months 15 to 17 are therefore used to assess the impact and effect of the Proposed Development on the transport network.

9.3.32 The daily vehicle trip generation for Months 15 to 17 is estimated to be approximately 112 two-way trips (assuming 6 days per week). This equates to approximately 9 two-way HGV trips per hour (4.5 inbound and 4.5 outbound), assuming a 12-hour working day. It is important to note that this represents a minor number of trips over a temporary period.

Staff Movements

9.3.33 In addition to the construction vehicles illustrated in Table 9.7, it is anticipated that there would be 60 to 120 two-way daily private car trips to the Proposed Development associated with construction staff (depending on the stage of construction). This equates to a maximum of 60 arrivals and 60 departures at the start and end of the working day, assuming that no car-sharing will occur among staff. This represents a small volume of traffic on an existing road network which does not suffer from congestion. Notwithstanding this, the likely significant environmental effect of this level of trip generation has been considered in the assessment.

9.4 Baseline Conditions

Current Baseline

9.4.1 The B6371 is a single-carriageway road which extends in a generally south to north direction between the A198 at Meadowmill Roundabout and the B1348. The B6371 is subject to varying speed limits with sections of 30 mph (and 40 mph transition zones) through the settlement limits of Cockenzie and the national speed limit (60 mph) elsewhere in more rural locations. The B6371 is a route well used by HGV traffic and provides connections to the A198 and B1348 in the vicinity of the Site. All construction traffic would be required to use a section of the B6371 to route from the wider road network.

9.4.2 The A198 is a good standard single-carriageway road which extends in a south west to north east direction, and then a south to north direction between Bankton Junction and Meadowmill Roundabout. The A198 is subject to the national speed limit (60 mph) for the majority of its length. All construction traffic would be required to use this section of the A198 to route to the Site from the wider road network.

9.4.3 The B1348 is a single-carriageway road that routes in and east to west direction between the B6371 and the Site. The road is subject to a 30 mph speed limit in the vicinity of the Site. It is possible that a small proportion of construction traffic may be required to utilise the B1348 to access the cable corridor/ landfall if the existing private haul road through the Site is deemed unsuitable for any reason. There will also be a need for vehicles to cross between the northern and southern parts of the Site which would involve crossing the B1348. It is anticipated that such movements would be undertaken under the supervision of a banksman.

9.4.4 Table 9.8 indicates the baseline and projected two-way Average Annual Daily Traffic Flows (AADF) for the routes within the study area and the percentage of traffic which is classified as HGV's. The source of the data is described in paragraph 9.3.6. The table below also indicates the category and capacity of each road link as per the guidance contained within the DMRB[1].

9.4.5 The National Road Traffic Forecast (NRTF) 'low growth' rate has been applied to the 2017 baseline data for the B6371 and B1348, and for the 2019 baseline data for the A1 to factor it up to represent 2021 baseline flows and 2023 (expected year of construction) flows respectively. This equates to factors of 1.033 and 1.016 (2017 and 2019 to 2021) and 1.011 (2021 to 2023).

Table 9.8: Study Area Baseline Traffic Flows

Counter Location	DMRB Road Category	DMRB Capacity (two-way/ 12hrs)	2021 Baseline AADF	2021 Baseline HGV	2023 Projected AADF	2023 Projected HGV	HGV %
B6371	Rural – typical single 6 m	21,600	5,370	155	5,429	157	2.9%
B1348	Rural – typical single 6 m	21,600	8,034	305	8,122	308	3.8%
A198	Rural – typical single 7.3 m	28,800	22,068	372	22,311	376	1.7%
A1	Rural Duel 2 lanes	81,600	44,479	2,348	44,968	2,374	5.3%

9.4.6 The CrashMap[2] website has been utilised to determine the number of accidents that have occurred in the previous five years (2015 to 2019) within the identified study area. The results of this investigation are indicated by Table 9.9 with additional commentary provided on serious and fatal accidents if applicable.

Table 9.9: Accident Statistics

Counter Location	Slight	Serious	Fatal	Comment
B6371	3	-	-	
B1348	4	-	-	
A198	4	1	-	A serious accident occurred in 2016 near the northern roundabout at Bankton Junction.
A1	4	-	-	

[1] DMRB 'The NESA Manual', 2013, Vol 15, Section 1, Part 5: Chapter 3

[2]

9.4.7 Table 9.9 indicates that a total of 15 slight and one serious accident occurred within the study area of the 5-year period from 2015 to 2019. It is noted that an accident cluster of three slight accidents took place in 2015 and 2016 on the B1348 in the vicinity of the junction with the B6371 within the settlement limits of Cockenzie. Measures to reduce accidents will be addressed within the CTMP and monitored to ensure that construction traffic doesn't add to the existing level of accident occurrence.

Future Baseline

9.4.8 If the Proposed Development was not implemented then it is likely that there would be no significant changes to the traffic and transport situation in the vicinity of the Site, other than changes to background traffic as a result of general traffic growth and any nearby committed developments.

9.5 Assessment of Likely Effects

Potential Construction Effects

Construction Traffic Distribution

9.5.1 To assess the impact of construction traffic it is necessary to determine the distribution of trips generated. At this stage, the source of the construction materials is unknown and given that the A1 to the east and west of Bankton junction are both good standard links in the vicinity of the Proposed Development, it is possible that a proportion of general construction traffic (HGVs and staff) could originate from either route. There are numerous possibilities for material sources and residential areas to draw staff from via both road links.

9.5.2 Based on these assumptions, and in order to assess a robust scenario, a distribution of 70% of HGVs and staff vehicles along the A1 to the east and west of Bankton Junction has been adopted in this assessment. Whilst 100% of construction traffic would utilise the A198 and B6371, and 20% of construction traffic could potentially route via the B1348.

9.5.3 It is anticipated that the private road within the Site boundary will become the recognised construction haul route for the Proposed Development and will result in there being no requirement of HGVs to route along the B1348.

9.5.4 It is important to note that this represents a worst-case scenario for each road link in isolation and this impact would not occur in reality as the total traffic distribution between all links could not exceed 100%. Table 9.10 below indicates the theoretical worst-case distribution of traffic across each counter location.

Table 9.10: Construction Impacts on Routes within the Study Area

	B6371	**B1348**	**A198**	**A1 East**	**A1 West**
% Distribution of HGVs	100%	20%	100%	70%	70%
% Distribution of staff	100%	20%	100%	100%	100%
No. of HGV Movements	112	22	112	78	78
No. of staff movements (private car)	120	24	120	120	120

Table 9.10: Construction Impacts on Routes within the Study Area					
	B6371	**B1348**	**A198**	**A1 East**	**A1 West**
Total no. of daily movements	232	46	232	198	198

Construction Traffic Impact

9.5.5 Table 9.11 details the daily percentage increases in traffic flows associated with the construction of the Proposed Development at the traffic counters within the study area during the worst-case months. The location of the traffic counters is illustrated in **Figure 11.2**.

Table 9.11: Construction Impacts on Routes within the Study Area					
	B6371	**B1348**	**A198**	**A1 East**	**A1 West**
Existing AADF	5,370	8,034	22,068	44,479	44,479
Existing HGV count	155	305	372	2,348	2,348
Month 7 (worst-case) daily HGV traffic flow (two-way)	112	22	112	78	78
Month 7 (worst-case) staff vehicle traffic flow (two-way)	120	24	120	120	120
Existing AADF + Month 7 total traffic (HGVs + staff vehicles)	5,602	8,080	22,300	44,677	44,677
Percentage increase in total traffic due to the Proposed Development	4.3%	0.6%	1%	0.4%	0.4%
Percentage increase in HGV traffic due to the Proposed Development	72.3%	7.2%	30.1%	3.3%	3.3%

9.5.6 Table 9.11 indicates that, as a worst-case, the temporary increase in daily total traffic levels along the B6371, B1348, A198 and the A1 associated with the Proposed Development would be 4.3%, 0.6%, 1% and 0.4% respectively. This is considered to be a negligible increase in accordance with the IEMA Guidelines and 'Rule 1' for the all road links within the study area (<30%) and 'Rule 2' for the sensitive receptors on the B6371 to the north of the Alder Road Roundabout and on the B1348(<10%).

9.5.7 Table 9.11 indicates that the temporary increase in daily HGV levels during the worst-case month of the construction stage for the Proposed Development would be 72.3%, 7.2%, 30.1% and 3.3% along the B6371, B1348, A198 and the A1 respectively. The level of increase along the B1348 and the A1 is considered to be negligible as it does not exceed 30% (Rule 1).

9.5.8 The level of increase along the B6371 and A198 exceeds the 30% threshold for HGV levels, as stipulated under IEMA Rule 1, and requires a full assessment of effects to be undertaken in accordance with the IEMA Guidance. In addition, an assessment of effects has been undertaken for the B1348 and John Muir Way due to the potential significant impacts on these receptors during construction. This is detailed below for each road link.

Severance

9.5.9 The IEMA Guidelines advise that "Severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery".

9.5.10 The potential for traffic associated with the Proposed Development to cause severance is assessed on a case by case basis using professional judgement where non-negligible traffic increases are predicted on roads through residential settlements.

9.5.11 Increased severance can result in the isolation of areas of a settlement or individual properties. Severance may result from the difficulty of crossing a heavily trafficked road or a physical barrier created by the road itself. Severance effects could equally be applied to residents, motorists or pedestrians.

B6371

9.5.12 With reference to Table 9.4, the magnitude of the change in HGV levels along the B6371 is considered to be moderate given that the increase is between 60% to 90% of baseline levels. The sensitivity of the B6371 (at the site access point and to the south) to an increased severance effect is considered to be low in accordance with Table 9.3 as the road is a good standard rural single-carriageway with very few residential properties and Development traffic would not route through any settlements in this area. Combining the magnitude of the change with the sensitivity of the receptor in accordance with Table 9.5 equates to a likely effect which is classed as Moderate and **Significant** as per the EIA Regulations. Therefore, mitigation will be required to address this effect.

A198

9.5.13 With reference to Table 9.4, the magnitude of the change in HGV levels along the A198 is considered to be minor given that the increase is between 30% to 60% of baseline levels. The sensitivity of the A198 to an increased severance effect is considered to be low in accordance with Table 9.3 as the road is a good standard rural single-carriageway with very few residential properties and development traffic would not route through any settlements. Combining the magnitude of the change with the sensitivity of the receptor in accordance with Table 9.5 equates to a likely effect which is classed as minor and **Not Significant** as per the EIA Regulations.

B1348

9.5.14 Whilst the level of increase in HGVs along the B1348 is considered to be negligible in accordance with IEMA guidelines, it is considered that there is likely to be a potential increased level of severance created which is related to onshore cable construction and the "stringing-out" works associated with shore end export cable and landfall works. It is anticipated that, in the event that the onshore export cable is installed through the road by open cut trenching, these works will require traffic management in the form of traffic lights for a period of between four to twelve weeks during months 10 to 13 of the construction programme. Combining the negligible magnitude of change with a high sensitivity equates to a likely effect which is classed as moderate and **Significant** as per the EIA regulations. Therefore, mitigation will be required to address this effect. Impacts associated with the stringing out work will be avoided through the use of a temporary bridge structure over the B1348, allowing the road to remain open.

Driver Delay

9.5.15 Some driver delay may be experienced when construction traffic is accessing the Site from the B6371. The IEMA Guidelines advise "*delays are only likely to be significant when the traffic on the network surrounding the Site is already at, or close to, the capacity of the system*".

9.5.16 Traffic delay to non-development traffic may occur at several points on the network surrounding the Site including:

- At the Site entrance where there will be additional turning movements;
- At intersections along the local road network which might be affected by increased traffic; and
- At side roads where the ability to find gaps in traffic may be reduced, thereby lengthening delays.

B6371

9.5.17 With reference to Table 9.4, the magnitude of the change in HGV levels along the B6371 is considered to be moderate given that the increase is between 60% to 90% of baseline levels. The sensitivity of the road link to an increased driver delay effect is considered to be low in accordance with Table 9.3 as there are very few junctions and therefore potential areas for delaying of other road users by turning HGVs. Combining the magnitude of the change with the sensitivity of the receptor in accordance with Table 9.5 equates to an effect which is classed as moderate and **Significant** as per the EIA Regulations. Therefore, mitigation will be required to address this effect.

A198

9.5.18 With reference to Table 9.4, the magnitude of the change in HGV levels along the A198 is considered to be minor given that the increase is between 30% to 60% of baseline levels. The sensitivity of the road link to an increased driver delay effect is considered to be low in accordance with Table 9.3 as there are very few junctions and therefore potential areas for delaying of other road users by turning HGVs. Combining the magnitude of the change with the sensitivity of the receptor in accordance with Table 9.5 equates to an effect which is classed as minor and **Not Significant** as per the EIA Regulations.

B1348

9.5.19 Whilst the level of increase in HGVs along the B1348 is considered to be negligible in accordance with IEMA guidelines, it is considered that there is likely to be an increased level of driver delay related to the onshore cable works. It is anticipated that these works will require traffic management in the form of temporary lane closures and traffic lights for a period of between four to twelve weeks during months 10 to 13 of the construction programme. Combining the negligible magnitude of change with a high sensitivity equates to a likely effect which is classed as moderate and **Significant** as per the EIA regulations. Therefore, mitigation will be required to address this effect.

Pedestrian Delay and Amenity

9.5.20 Traffic volumes, traffic composition, traffic speed, the existence of pedestrian footways and the existence of pedestrian crossings all contribute to the level of general pleasantness, fear, intimidation and delay experienced by pedestrians and other vulnerable road users.

B6371

9.5.21 With reference to Table 9.4, the magnitude of the change in HGV levels along the B6371 is considered to be moderate. The sensitivity of the road link to an increased pedestrian delay and reduced pedestrian amenity effect is considered to be low in accordance with Table 9.3 as there will be very low pedestrian activity along this road link due to the lack of residential properties (south of the Site access) and no amenities within reasonable walking distance.

Combining the magnitude of the change with the sensitivity of the receptor in accordance with Table 9.5 equates to an effect which is classed as Moderate and **Significant** as per the EIA Regulations. Therefore, mitigation will be required to address this effect

A198

9.5.22 With reference to Table 9.4, the magnitude of the change in HGV levels along the A198 is considered to be moderate. The sensitivity of the road link to an increased pedestrian delay and reduced pedestrian amenity effect is considered to be low in accordance with Table 9.3 as there will be very low pedestrian activity along this road link due to the lack of residential properties and no amenities within reasonable walking distance. Combining the magnitude of the change with the sensitivity of the receptor in accordance with Table 9.5 equates to an effect which is classed as Moderate and **Significant** as per the EIA Regulations. Therefore, mitigation will be required to address this effect

B1348

9.5.23 Whilst the level of increase in HGVs along the B1348 is considered to be negligible in accordance with IEMA guidelines, it is considered that there is likely to be an increased level of pedestrian delay related to the "stringing-out" works associated with onshore cabling. It is anticipated that these works will require traffic management in the form of traffic lights for a period of between four and twelve weeks during months 10 to 13 of the construction programme. Combining the minor magnitude of change with a high sensitivity equates to a likely effect which is classed as Moderate and **Significant** as per the EIA regulations. Therefore, mitigation will be required to address this effect.

JOHN MUIR WAY

9.5.24 It is anticipated that access to the Site and wider area will only be affected (and indeed restricted) during the construction phase of the Proposed Development. Once operational, it is considered that access to the Proposed Development will not impact on the John Muir Way in any way.

9.5.25 During construction there will likely be a requirement to manage and control access along the John Muir Way (where it passes through the Site) to allow for the movement of construction vehicles, and to allow construction works to proceed. The Applicant is committed to minimising periods where access is restricted, and a Traffic Management Plan will be in place to ensure that disruption is kept to a minimum. It is proposed that measures are put in place to keep the John Muir Way open to the public throughout the construction period. This will include the use of temporary signage, and the management of construction traffic as detailed in the Construction Traffic Management Plan. Further details of mitigation measures are included in Section 9.6 of this chapter.

Accidents and Safety

9.5.26 The most recently available accident data for the road links within the Study Area has been provided in Table 9.9 for the period between 2015 and 2019. The data indicates that a total of 16 accidents have occurred, most of which were of a slight severity.

9.5.27 An approximate calculation has been undertaken to quantify the level of accident risk that could be expected due to an increase in traffic associated with the Proposed Development. The likelihood of an accident occurring is commonly expressed in accidents per million vehicle-kilometres. Accidents that are appraised in relation to transport are predominantly those in which personal injury is sustained by those involved (personal injury accidents (PIAs)).

9.5.28 Whilst it is acknowledged that there are varying road characteristics along the routes within the Study Area, for the purpose of this calculation it has been assumed that the length of road is approximately 3.5 km and can be classified as 'rural good single carriageway' (applicable to the B6371, B1348 and A198, which make up the majority of the Study Area) in accordance with the criteria set out within DMRB.

9.5.29 Accident rates from the DMRB for this standard of road are:

- Rural typical single carriageway: 0.381 Personal Injury Accidents (PIA) per million veh-km.

9.5.30 Assuming a two-way trip on the 3.5 km route for each of the 18,378 vehicles during the construction period, a total distance of 128,646 km is obtained. Based on the rate above; this suggests 0.049 PIA during the construction period.

9.5.31 It is considered that the magnitude of this effect is negligible but receptor sensitivity to this effect is always considered as high. When combined, the effect can be classified as moderate and **Significant** for all Traffic Counter locations within the Study Area. Therefore, mitigation will be required to address this effect.

Dust and Dirt

9.5.32 IEMA Guidelines acknowledge that it is not practical to quantify the level of dust and dirt that can be anticipated from development traffic. Therefore, a quantitative description of the effect on dust and dirt from construction traffic is not provided here. A Dust Risk Assessment is provided as a **Technical Appendix 2.3: Dust Risk Assessment**.

9.5.33 It is acknowledged that HGVs would have the potential to collect debris on their tyres when accessing the Proposed Development. This could be transferred to the road surface when vehicles travel away from the Site and can be deposited on the road in the form of either dust or mud depending on weather conditions.

9.5.34 For all locations within the Study Area, the magnitude of the effect is considered to be negligible and the sensitivity of the receptors low. The overall significance of the environmental effect of dust and dirt at all receptors within the Study Area is regarded as negligible and therefore **Not Significant**.

Potential Cumulative Effects

9.5.35 Cumulative effects have been considered for another onshore transmission works development in the vicinity of the Proposed Development. The potential for cumulative effects has been assessed by reviewing data available from the Traffic and Transport Chapter within the respective EIA Report (EIAR) for the relevant development.

Blindwells

9.5.36 Blindwells received planning permission in principle in May 2018 for the creation of a new residential led development to the north of Tranent. The development is permitted to deliver up to 1,600 residential units between 2020 and 2037, with a maximum buildout rate of 97 units per annum during the years 2022 to 2031 (years which overlap with the anticipated construction of the Proposed Development).

9.5.37 It is noted that the level of traffic associated with the Blindwells development will be relatively low (as a result of the modest build-out rate) at any given time during construction of the Proposed Development and the only access routes that would be shared are the A198 and A1.

As such, a full cumulative assessment involving detailed calculations of traffic flows on the affected routes have not been undertaken.

9.5.38 The A198 and A1 are well used by HGVs and have sufficient capacity to accommodate temporary increases in traffic levels. Notwithstanding this, both developments would implement a CTMP which would ensure that deliveries are scheduled appropriately to minimise the impact to the public road network and ensure that any discernible cumulative impacts are avoided.

Inch Cape Onshore Transmission Works

9.5.39 Inch Cape Offshore Limited (ICOL) received planning permission in principle in March 2019 for Onshore Transmission Works to connect ICOL's Offshore Wind Farm to the National Electricity Transmission System. The Traffic and Transport EIAR chapter for the development states that the worst case traffic generating month would occur during Months 5 and 6 of a 28-month construction programme. During these months it is predicted that Inch Cape Onshore Transmission works will generate an average of 67 HGV movements and 120 staff movements.

9.5.40 Table 9.12 indicates the cumulative increase in HGV levels along road links within the Study Area if the worst case months for the Proposed Development and the Inch Cape development were to overlap.

Table 9.12: Cumulative Construction Traffic Impacts

Road Link	Daily HGV Flows (worst-case month)		Total Cumulative	AADF Total	% Increase in Total Traffic	% Increase in HGVs
	Seagreen	Inch Cape				
B6371	112	67	179	5,370	7.2%	115%
B1348	22	67	89	8,034	2.8%	29.2%
A198	112	67	179	22,068	1.9%	48.1%
A1 East	78	7	85	44,479	0.5%	3.6%
A1 West	78	60	138	44,479	0.8%	5.9%

9.5.41 Table 9.12 demonstrates that there could be an additional 179 two-way HGV trips along the A198 and an additional 85 and 138 two-way HGV trips along the A1 to the east and west respectively during the worst-case concurrent month. This represents a cumulative increase in HGVs from baseline levels of 48.1% along the A198 and 3.6% and 5.9% along the A1 to the east and west respectively. The cumulative increase from the worst-case construction months represents increases which are only slightly greater than the worst-case for the Proposed Development in isolation (30.1% for the A198, 3.3% for the A1 east and 3.3% for the A1 west) and has no impact on the magnitude of effect. Therefore, it can be concluded that this does not represent a material change when compared with the stand-alone assessment of the Proposed Development and as such no further assessment is deemed to be required for these road links.

9.5.42 Table 9.12 demonstrates that there will be an additional 179 two-way HGV trips along the B6371 and an additional 89 two-way HGV trips along the B1348 during the worst-case month. This represents a cumulative increase in HGVs of 115% along the B6371 and 29.2% along the B1348 from baseline levels, which is greater than the worst-case for the Proposed Development in isolation (72.3% for the B6371 and 7.2% for the B1348). The level of increase along the B6371 will result in a change in magnitude from moderate to major which when

combined with low receptor sensitivity will equate to effects which are classified as moderate and **Significant** for all effects in accordance with EIA regulations. Therefore, mitigation will be required to address these effects.

9.5.43 The level of increase along the B1348 is very close to the 30% threshold as stipulated under IEMA Rule 1 and therefore a full assessment of effects has been undertaken.

Assessment of Cumulative Effects

Severance

9.5.44 With reference to Table 9.4, the magnitude of the change in HGV levels along the B1348 is considered to be minor given that the increase is between 30% to 60%. The sensitivity of the road link to an increased severance effect within the boundaries of the Study Area is considered to be high as the majority of the link is considered as a sensitive receptor with numerous residential properties and narrow footways fronting the road link. Combining a minor magnitude with a high sensitivity equates to an effect which is considered as moderate in accordance with the significance matrix in Table 9.5 and **Significant** as per the EIA Regulations. Therefore, mitigation will be required to address this effect.

Driver Delay

9.5.45 With reference to Table 9.4, the magnitude of the change in HGV levels along the B1348 is considered to be minor. The sensitivity of the road link to an increased driver delay effect within the Study Area is considered to be high as majority of the link is considered as a sensitive receptor with numerous residential properties and narrow footways fronting the road link. Combining a minor magnitude with a high sensitivity equates to an effect which is considered as moderate in accordance with the significance matrix in Table 9.5 and **Significant** as per the EIA Regulations. Therefore, mitigation will be required to address this effect.

Pedestrian Delay and Amenity

9.5.46 With reference to Table 9.4, the magnitude of the change in HGV levels along the B1348 is considered to be minor. The sensitivity of the road link to an increased pedestrian delay and reduced amenity effect within the Study Area is considered to be high as there is a high level of pedestrian activity along this road link due to the number of residential properties. Combining a minor magnitude with a high sensitivity equates to an effect which is considered as moderate in accordance with the significance matrix in Table 9.5 and **Significant** as per the EIA Regulations. As a result, mitigation will be required to address this effect.

Accidents and Safety

9.5.47 It is considered that the magnitude of this effect is negligible but receptor sensitivity to this effect is always considered as high. When combined, the effect can be classified as moderate and **Significant** for all Traffic Counter locations within the Study Area. Therefore, mitigation will be required to address this effect.

Dust and Dirt

9.5.48 For all locations within the Study Area, the magnitude of the effect is considered to be negligible and the sensitivity of the receptors low. The overall significance of the environmental effect of dust and dirt at all receptors within the Study Area is regarded as minor and therefore **Not Significant**.

Summary of Cumulative Effects

9.5.49 It is anticipated that construction of the Proposed Development could potentially coincide with the construction phase of the Inch Cape Onshore Transmission Works. The cumulative effect of the concurrent construction programme for the Proposed Development and Inch Cape results in an increase in the magnitude of effect from negligible to minor on the B1348 and from minor to moderate for the B6371. As with the effects associated with Proposed Development, mitigation will be required to address the Significant effects that have been identified.

9.5.50 Both developments will implement a CTMP (discussed further in paragraphs 9.6.1 to 9.6.3) which will ensure that deliveries are scheduled appropriately to minimise the impact to the public road network and ensure that discernible cumulative effects are avoided.

9.6 Mitigation

Mitigation During Construction

9.6.1 The assessment predicts that, prior to mitigation measures, the effect of severance, driver delay, pedestrian delay and amenity, and accidents and safety as a result of increased levels of HGVs associated with the Proposed Development would be significant along the B6371 and B1348 corridors. Therefore, in accordance with the EIA Regulations, mitigation is required to address the potential effects associated with increased traffic from the Proposed Development and cumulative effects associated with increased traffic from other developments in addition to the Proposed Development developments. It is proposed to prepare and implement a comprehensive CTMP which is intended to mitigate the identified significant effects from the Proposed Development and from other developments acting cumulatively by ensuring that they are minimised as far as possible within the Study Area to a level which is considered to be not significant.

9.6.2 The CTMP would identify measures to reduce the number of construction vehicles as well as considering reducing or avoiding the impact of vehicles through construction programming/ routing and identification of an individual with responsibilities for managing traffic and transport impacts and effects.

9.6.3 The CTMP will identify measures to reduce the number of construction vehicles as well as identifying measures to mitigate the impact of vehicles. The CTMP will identify the programme of works, the agreed routes to Site and details of a Site Liaison Officer who would have responsibilities for managing traffic and transport impacts and effects. The CTMP will also identify measures to reduce and manage construction staff travel by private car, particularly single occupancy trips. The CTMP would include the following measures as a minimum:

- Immediately upon commencement, all deliveries, operatives and visitors to the Site would report to the security gate. This would be communicated to all early works contractors at their pre-start meeting.
- The main contractor would develop a logistics plan highlighting the access point for the project, loading bay, pedestrian/ vehicular segregation, welfare, storage, security and material handling that would be enforced following full Site establishment.
- Approved haul routes would be identified to the Site and protocols put in place to ensure that HGVs adhere to these routes.
- All contractors would be provided with a Site induction pack containing information on delivery routes and any restrictions on routes.

- Temporary construction Site signage would be erected along the identified construction traffic routes to warn people of construction activities and associated construction vehicles.
- A construction traffic speed limit (for example, 20 mph) would be imposed through the sensitive area along the B1348 and on approach to the main site access point on the B6371.
- The construction material 'lay down' areas would allow for a staggered delivery schedule throughout the day, avoiding peak and unsociable hours (i.e. before 06:00 and after 22:00).
- An integral part of the progress meetings held with all trade contractors is the delivery schedule pro-forma. All contractors would be required to give details of proposed timing of material deliveries to the Site. At this stage, they would be given a specific area for delivery.
- The CTMP and the control measures therein would be included within all trade contractor tender enquiries to ensure early understanding and acceptance/ compliance with the rules that would be enforced on this project.
- Under no circumstances would HGVs be allowed to lay-up in surrounding roads. All personnel in the team would be in contact with each other and with Site management, who in turn would have mobile and telephone contact with the subcontractors.
- Roads would be maintained in a clean and safe condition.
- A wheel washing/ wheel cleaning facility would be installed on-site during the construction period in order to reduce mud and debris being deposited onto the local road network.

9.7 Assessment of Residual Effects

9.7.1 Following implementation of the CTMP as a mitigation measure, the following paragraphs assess the likely residual effects of increased traffic levels within the Study Area during construction of the Proposed Development.

9.7.2 The CTMP will ensure that the volume of HGV trips is minimised by implementing good practice measures, such as the recycling and reuse of materials. The CTMP will ensure that there is appropriate signage along the construction routes to make residents and other road users aware of the temporary increase in HGV traffic and to provide the opportunity to plan accordingly. The CTMP will also ensure that construction HGVs adhere to the speed limit to improve safety/ reduce the intimidation to other road users. Residents and other road users will have the opportunity to report any issues to the Site Liaison Officer. These measures will contribute to minimising the level of effect experienced along the routes and isolated properties within the Study Area.

9.7.3 Furthermore, it is important to recognise that all effects associated with increased construction traffic will be temporary and local in nature and that this assessment has considered the worst-case impact possible at each location.

9.7.4 The residual effects of severance, driver delay, pedestrian delay and amenity, and accidents and safety after implementation of a CTMP are therefore considered to be minor and **Not Significant.**

9.8 Summary

9.8.1 This assessment has considered the effects on the local road network of HGV traffic associated with the construction phase of the Proposed Development.

9.8.2 The construction programme associated with the Proposed Development is anticipated to cover a 22-month period. During this time 10,354 HGVs would access the Site, which equates to 112 daily two-way HGV trips during the busiest construction months (Months 15 to 17).

9.8.3 A robust assessment has been undertaken using the worst-case scenario for two-way construction traffic movements and the worst-case scenario for each link by assuming the distribution of traffic along each road. The impact of construction traffic could increase traffic flows along the road links within the Study Area by the following:

- 4.3% along the B6371;
- 0.6% along the B1348;
- 1% along the A198;
- 0.4% along the A1 east; and
- 0.4% along the A1 west.

9.8.4 The percentage increase in HGVs associated with the worst-case month of the construction programme for the Proposed Development could increase HGV levels by the following:

- 72.3% along the B6371;
- 7.2% along the B1348;
- 30.1% along the A198;
- 3.3% along the A1 east; and
- 3.3% along the A1 west.

9.8.5 The significance of the predicted effects of the Proposed Development on the traffic and transport resource during the construction phase has been discussed in this chapter and is summarised in Table 9.13.

Table 9.13: Summary of Potential Significant Effects of the Proposed Development

Likely Significant Effect	Mitigation Proposed	Means of Implementation	Outcome/ Residual Effect
Construction			
Severance	CTMP	Managed through Site Liaison Officer	Not Significant
Driver Delay	CTMP	Managed through Site Liaison Officer	Not Significant
Pedestrian Delay and Amenity	CTMP	Managed through Site Liaison Officer	Not Significant
Accidents and Safety	CTMP	Managed through Site Liaison Officer	Not Significant
Dust and Dirt	Not required	Not required	Not Significant
Cumulative			
Severance	CTMP	Managed through Site Liaison Officer	Not Significant
Driver Delay	CTMP	Managed through Site Liaison Officer	Not Significant

Table 9.13: Summary of Potential Significant Effects of the Proposed Development			
Likely Significant Effect	**Mitigation Proposed**	**Means of Implementation**	**Outcome/ Residual Effect**
Pedestrian Delay and Amenity	CTMP	Managed through Site Liaison Officer	Not Significant
Accidents and Safety	CTMP	Managed through Site Liaison Officer	Not Significant
Dust and Dirt	Not required	Not required	Not Significant

9.8.6 With reference to Table 9.13, this chapter concludes that effects of increased traffic as a result of the Proposed Development are deemed to be **Not Significant** once mitigation is put in place.

9.8.7 The assessment also concludes that no significant cumulative effects are predicted during construction of the Proposed Development, particularly during concurrent construction works with Inch Cape Onshore Transmission Works.

9.8.8 It is also noted that the increased traffic leads to potential effects that are temporary in nature, can be accommodated by the existing road network within the Study Area, and can be managed effectively by implementation of a Construction Traffic Management Plan.

10 Noise and Vibration

10.1 Introduction

10.1.1 This chapter considers the likely significant effects on noise and vibration associated with the construction, operation and decommissioning of the Proposed Development. The effects associated with the construction phase of the Proposed Development on noise and vibration can be considered to be representative of reasonable worst-case decommissioning effects, therefore a separate assessment of the decommissioning phase has not been undertaken as part of this assessment.

10.1.2 The specific objectives of the chapter are to:

- describe the noise and vibration baseline;
- describe the assessment methodology and significance criteria used in completing the impact assessment;
- describe the potential effects, including direct, indirect and cumulative effects;
- describe the mitigation measures proposed to address likely significant effects; and
- assess the residual effects remaining following the implementation of mitigation.

10.1.3 The assessment has been carried out by Matthew Cand Dipl. Eng., PhD, MIOA, of Hoare Lea LLP. Matthew is a full member of the Institute of Acoustics. Within Hoare Lea LLP, Matthew is a Senior Associate running the environmental noise group, which has a focus on Environmental Impact Assessments (EIAs). He has over 15 years' experience in the assessment of environmental acoustics and has conducted more than 40 noise assessments for EIA. The assessment has followed standard noise and vibration published guidance.

10.1.4 This chapter is supported by the following figures and technical appendices:

- Figure 10.1: Reference Noise-Sensitive Locations;
- Technical Appendix 10.1: Noise Measurement Surveys.

10.1.5 Figures and technical appendices are referenced in the text where relevant.

10.2 Scope of Assessment

10.2.1 This chapter considers the potential for likely significant effects on:

- disturbance to daily human resting activities from construction noise (activity and road traffic);
- human response to construction vibration;
- building damage from construction vibration; and
- disturbance to daily human resting activities from operation of the Proposed Development.

10.2.2 The chapter assesses the potential for additional cumulative effects when considered in addition to other proposed and consented developments. The chapter considers the following cumulative development scenarios:

- the proposed Seagreen Offshore Wind Farm (SG1A) offshore export cable, construction cabling works overlapping;
- the consented Inch Cape onshore transmission works, construction phases overlapping; and

- the consented Inch Cape onshore transmission works, operational.

10.2.3 The assessment is based on the Proposed Development as described in **Chapter 2: Development Description**.

Consultation

10.2.4 The scope of the assessment has been informed by consultation responses summarised in Table 10.1 and the following local policy:

- Policy NH13 of the East Lothian Local Development Plan 2018[1].

10.2.5 Table 10.1 summarises the consultation responses received regarding noise and vibration and provides information on where and/ or how they have been addressed in this assessment. The following organisation made comment on noise and vibration:

- Environmental Health Department, East Lothian Council (ELC).

10.2.6 Full details on the consultation responses can be reviewed in **Technical Appendix 1.1: Consultation Register**.

Table 10.1: Consultation Responses

Consultee and Date	Consultation	Issue Raised	Response / Action Taken	Where Issue is Addressed in EIAR
ELC Environmental Health (in writing) on 27 November 2020 and by email on 9 February 2021.	Reference noise levels from historical surveys (2014 and 2017) to form baseline conditions. This is due to COVID-19 lockdown effects.	Accepted that previous Inch Cape onshore transmission works survey data can be used, confirmed by email on 9 February 2021.	Adopted for establishing the baseline.	Chapter 10: Noise and Vibration, Section 10.4.
ELC Environmental Health (in writing) on 27 November 2020.	Construction and Decommissioning noise assessment proposed to be in accordance with BS5228-1 (2009, amended 2014)[2].	The scope of the assessment was confirmed by email on 19 January 2021.	Assessment has been conducted in accordance with BS5228-1 (2009, amended 2014).	Chapter 10: Noise and Vibration, Section 10.5.
ELC Environmental Health (in writing) on 27 November 2020.	Construction and Decommissioning vibration assessment proposed to be in accordance with BS5228-2 (2009, amended 2014)[3].	The scope of the assessment was confirmed by email on 19 January 2021.	Assessment has been conducted in accordance with BS5228-2 (2009, amended 2014).	Chapter 10: Noise and Vibration, Section 10.5.
ELC Environmental Health (in writing) on 27 November 2020.	Operational noise proposed to be assessed in accordance with BS4142 (2014, amended 2019)[4].	The scope of the assessment was confirmed by email on 19 January 2021.	Assessment has been conducted in accordance with BS4142 (2014, amended 2019).	Chapter 10: Noise and Vibration, Section 10.5.

[1] East Lothian Council, Local Development Plan 2018

[2] British Standard, (2009 + A1:2014), BS 5228 Code of practice for noise and vibration control on construction and open sites, Part 1, Noise

[3] British Standard, (2009 + A1:2014), BS 5228 Code of practice for noise and vibration control on construction and open sites, Part 2, Vibration

[4] British Standard, (2014 + A1:2019), BS 4142 Methods for rating and assessing industrial and commercial sound

Table 10.1: Consultation Responses				
Consultee and Date	**Consultation**	**Issue Raised**	**Response / Action Taken**	**Where Issue is Addressed in EIAR**
ELC Environmental Health (in writing) on 27 November 2020.	Consideration to be given to the cumulative effects with consented Inch Cape onshore transmission works.	The scope of the assessment was confirmed by email on 19 January 2021.	Cumulative assessment has been undertaken with Inch Cape onshore transmission works.	Chapter 10: Noise and Vibration, Section 10.5.
ELC Environmental Health (by email) on 9 February 2021	Operational noise assessment methodology details. Confirming acceptability of previously measured baseline noise levels in area given COVID-19 situation. BS4142 allows consideration of absolute noise levels where background levels are considered low, particularly at night: in these cases, a rated noise level criterion of 35 dB $L_{Ar,Tr}$ is proposed.	Confirmed reference could be made to previous baseline data. Adoption of the proposed fixed criterion in cases of low background levels was accepted.	A noise criterion $L_{Ar,Tr}$ 35 dB has been considered for the assessment in cases of low background levels, particularly at night.	Chapter 10: Noise and Vibration, Section 10.3 and Section 10.5.

Potential Effects Scoped Out

10.2.7 The scope of this assessment takes account of the committed mitigation measures both incorporated into the design and standard construction and decommissioning mitigation measures incorporated into the Proposed Development, as described in **Chapter 2: Development Description,** and **Technical Appendix 2.2: Outline Construction Environmental Management Plan (CEMP).** Table 10.2 summarises the issues scoped out of the assessment:

Table 10.2: Issues Scoped Out of EIA	
Potential Effect	**Basis for Scoping Out**
Construction road traffic noise and vibration.	There is unlikely to be a significant quantity of spoil removal or import to the Site. The greatest quantity of vehicular movements would be during the concrete foundation works. A Construction and Environmental Management Plan (CEMP) would be developed and can be enforced by a condition attached to the planning permission. The CEMP would contain dedicated routes (via the A1, the A198 and the B6371) for construction road traffic which would be directed away from larger groupings of residential properties to minimise disturbance. All construction road traffic (except personnel vehicles) would adhere to the daytime working hours.
Operational road traffic noise.	No personnel would be permanently based at the Proposed Development. Therefore, visits would only occur sporadically for maintenance and safeguarding purposes. The expected increase in road traffic onto the B1348 Edinburgh Road or the B6371 is considered to be negligible (see **Chapter 9: Access, Traffic and Transport**) resulting in no likely significance of effect.

Table 10.2: Issues Scoped Out of EIA	
Potential Effect	**Basis for Scoping Out**
Operational road traffic vibration.	Vehicles likely to attend the Site would be light goods vehicles or cars, which inherently have minimal capacity to generate significant vibration levels into the ground or surrounding structures. It is considered there would be no likely significance of effect.
Operational vibration.	Standard design practice of installing anti-vibration mounts would be adopted for any rotating plant item, or item of plant comprising pumps or compressors. There are enough separation distances to nearest sensitive receptors for potential vibration levels to become imperceptible. Therefore, it is considered there would be no likely significance of effect.
Cumulative construction and operational noise and vibration – Blindwells development	The consented Blindwells development is a large mixed-use development located south-east of Prestonpans, between the A1 and A198. The development site is located more than 1 km from the proposed substation and any of the noise-generating construction activities on Site, and more than 1 km from the noise-sensitive receptors considered in this chapter. Even if the construction periods for both developments overlapped, the associated noise and vibration effects would be localised and negligible cumulative effects would arise. New residential receptors associated with the Blindwells development are located further away than those considered for the Proposed Development in the chapter which are therefore representative for the assessment of operational impacts.

10.3 Assessment Methodology and Significance Criteria

Method of Baseline Characterisation

Extent of the Study Area

10.3.1 The study area for noise and vibration has been concentrated around the nearest residential properties and includes the following:

- The Site;
- B1348 Edinburgh Road between the junctions of Boatyard and Appin Drive;
- Atholl View;
- Hawthorn Terrace;
- Whin Park;
- The Chimneys development off the B6371; and
- Alder Road between the junctions of Cedar Drive and the B6371.

10.3.2 The study area for noise and vibration is shown on **Figure 10.1**.

Desk Study

10.3.3 The assessment has been carried out in accordance with the principles contained within the following legislation:

- Environmental Protection Act 1990 (EPA)[5]; and
- Control of Pollution Act 1974 (CopA)[6].

[5] Her Majesty's Government (1990) (HMSO), London, 1990, Environmental Protection Act (as amended)

[6] Her Majesty's Stationary Office (HMSO), London, 1974, Control of Pollution Act

10.3.4 Advice on the role of the planning system in helping to prevent and limit the adverse effects of noise is provided in Planning Advice Note 1/2011 (PAN1/2011)[7]. This is accompanied by more detailed advice provided in Technical Advice Note: Assessment of Noise (TAN-Noise)[8].

10.3.5 For detailed guidance on construction noise and its control through the planning system, TAN-Noise states that the 2009 version of British Standard BS5228 (BS5228) is applicable. This version of BS5228 was updated in 2014, therefore, the updated version has been adopted as the relevant version upon which to base the construction noise assessment.

10.3.6 The guidance of BS5228 has been used as a reference for source levels, calculations and threshold criteria selection. BS5228 guidance also supports the adaptation of these criteria for the duration of activities, as supported by the example approach of Planning Advice Note 50/1996 (PAN50/1996)[9] for groundworks.

10.3.7 The construction noise and vibration assessment has been carried out as desk-based work. The data source used for the construction noise assessment was BS5228-1 and for the vibration assessment was BS5228-2. This has been supplemented with information provided by the Applicant on the likely type of construction machinery to be adopted on the Site, vehicle usage of the proposed construction access and programme.

10.3.8 The methodology adopted for the assessment of construction noise is outlined below:

- Determine the reasonable worst-case working location of construction plant items;
- Assign sound power levels appropriate to the activity of the construction plant items;
- Predict the average sound pressure level for the daily construction working period at the sensitive receptor location, taking into account the percentage on-time, distance attenuation and screening attenuation;
- Compare the predicted sound pressure levels to the assessment criteria and consider any cumulative effects;
- Recommend mitigation and enhancement methods; and
- Determine the residual effects.

10.3.9 The methodology adopted for the assessment of construction vibration is outlined below:

- Identify which construction activity and associated plant could generate significant vibration;
- Determine the reasonable worst-case working location of the identified construction plant;
- Predict the magnitude of Peak Particle Velocity (PPV) at the sensitive receptor location;
- Compare the predicted PPV to the assessment criteria and consider any cumulative effects;
- Recommend mitigation and enhancement methods; and
- Determine the residual effects.

10.3.10 The operational noise assessment has been carried out as desk-based work, based on an indicative design for the Site considered representative of a reasonable worst-case in terms of noise emissions. The data source used for the associated operational plant and equipment has been provided by the Applicant, along with a potential installation location layout.

[7] The Scottish Government, Planning Advice Note 1/2011 Planning and Noise, March 2011

[8] The Scottish Government, Technical Advice Note: Assessment of Noise, March 2011

[9] The Scottish Government, Planning Advice Note 50: controlling the environmental effects of surface mineral workings, October 1996

Prediction of sound propagation has been undertaken in accordance with ISO9613-2[10] and adopting the rating methodology of BS4142 (2014). The CadnaA®[11] three-dimensional prediction software package has been used for the predictive calculations.

Field Survey

10.3.11 A baseline noise survey of the area had initially been planned for early 2021. However, COVID-19 lockdown requirements have affected many aspects of normal daily routine. Undertaking a normal environmental noise measurement survey representative of typical conditions on and around the Proposed Development would involve considerable uncertainties due to the potential changes from typical local conditions and those prevailing at the time of any new survey. Joint guidance[12] from the Institute of Acoustics (IOA) and the Association of Noise Consultants (ANC) indicates that reliable desk-based assessment and reference to historical data represent acceptable alternatives to a traditional field survey. A significant noise contribution to the prevailing background noise level at the sensitive receptors is road traffic, especially from the B1348 Edinburgh Road. The Department for Transport (DfT)[13] statistics published during the periods affected by COVID-19 restrictions indicate a general reduction in light vehicular flows, particularly in early 2021, meaning that current noise conditions would not be representative of the more generally prevailing environment if directly measured.

10.3.12 A review of the Planning Permission in Principle applications for the consented Inch Cape onshore transmission works has been undertaken. Noise surveys were undertaken in 2014 and 2017 for these applications for a similar study area. Those measurements were not affected by COVID-19 restrictions. Therefore, they have been considered to be the best available field survey information and referenced as part of this chapter. Use of the historical baseline surveys has been accepted by ELC Environmental Health Department (see Table 10.1).

10.3.13 To establish a level of certainty regarding the above, preliminary short duration attended sample measurements were undertaken between 26 and 27 November 2020 (see **Technical Appendix 10.1: Noise Measurement Surveys**) as part of a site visit, during both day and night periods. During this period, the level of restrictions related to the COVID-19 pandemic was more limited. The findings indicate a reasonable correlation to the historical measurement survey noise levels. On this basis, the historic survey data is considered to be a robust representation of the pre COVID-19 prevailing conditions.

[10] International Organization for Standardization (ISO) 9613 Acoustics – Attenuation of sound during propagation outdoors, Part 2: General method of calculation

[11] DataKustik GmbH, Computer Aided Noise Abatement (CadnaA®) software package, (Link https://www.datakustik.com/products/cadnaa/cadnaa/)

[12] Association of Noise Consultants (ANC) and the Institute of Acoustics (IOA), Joint Guidance on the impact of COVID-19 on the Practicality and Reliability of Baseline Sound Level Surveying and the Provision of Sound & Noise Impact Assessments, 2021 update Version 6 (Link https://www.ioa.org.uk/news/joint-guidance-impact-covid-19-practicality-and-reliability-baseline-sound-level-surveying-1)

[13] Department for Transport, Coronavirus (COVID-19): 2020 in charts, Chart 2: Lockdown to stop the spread changed how and when we travelled (Link https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/conditionsanddiseases/articles/coronaviruscovid192020incharts/2020-12-18)

Criteria for the Assessment Effects

Criteria for Assessing the Sensitivity of Receptors

10.3.14 Sensitivity has been determined on the basis of following the guidance provided in TAN-Noise. The assignment of sensitivity to various noise sensitive receptor types is given in TAN-Noise as per Table 10.3 with additional inclusions based on professional judgement.

Table 10.3: Sensitivity of Receptor

Sensitivity	Description	Example Noise Sensitive Receptor Type
High	Receptors where people or operations are particularly susceptible to noise.	Residential, including private gardens where appropriate. Certain quiet outdoor areas. Conference facilities. Theatres/ Auditoria/ Studios. Schools during the daytime. Hospitals/ residential care homes. Places of worship.
Medium	Receptors moderately sensitive to noise, where it may cause some distraction or disturbance.	Offices. Bars/ Cafes/ Restaurants where external noise may be intrusive. Sports grounds when spectator noise is not a normal part of the event and where quiet conditions are necessary (e.g. tennis, golf, bowls). General outdoor areas used for recreation.
Low	Receptors where distraction or disturbance from noise is minimal.	Buildings not occupied during working hours. Factories and working environments with existing high noise levels. Sports grounds when spectator noise is a normal part of the event. Night Clubs.

Criteria for Assessing the Magnitude of Change

10.3.15 For the noise and vibration assessments in this chapter, the absolute magnitude or magnitude of an excess to a threshold level is more relevant than consideration of the magnitude of change. Therefore, all criteria have been established as magnitude thresholds.

10.3.16 The magnitude of effect has been assessed based on the descriptive definitions contained in TAN-Noise, as provided in Table 10.4.

Table 10.4: Descriptive Definitions of Magnitude

Magnitude of Effect Descriptor	Description of Effect on Residential Receptors
Major	Significant changes in behaviour and/ or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/ awakening; loss of appetite, significant, medically definable harm. Trigger level for temporary rehousing, or reasonable cost thereof, as set out in BS5228.
Moderate	Causes an important change in behaviour and/ or attitude, e.g. avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in character of the area. Trigger level for noise insulation works or cost thereof as set-out in BS5228.

Table 10.4: Descriptive Definitions of Magnitude	
Magnitude of Effect Descriptor	**Description of Effect on Residential Receptors**
Minor	Noise can be heard and may cause small changes in behaviour and/ or attitude, e.g. turning up volume of television; speaking more loudly; closing windows more often. Potential for non-awakening sleep disturbance. Can slightly affect the character of the area but not such that there is a perceived change in the quality of life. Most stringent threshold value from BS5228 method relevant to the site.
Negligible	Noise can be heard but does not cause any change in behaviour or attitude, e.g. increasing volume of television; speaking more loudly; closing windows. Can slightly affect the character of the area but not such that there is a perceived change in the quality of life.

10.3.17 BS5228-1 informative Annex E provides various example criteria of absolute noise limits for construction activities which have been used to determine the significance of any construction noise effects within this assessment (see Table 10.5). The criteria do not represent mandatory limits but rather a set of example approaches intended to reflect the type of methods commonly applied to construction noise. In broad terms, the example criteria are based on a set of fixed limit values which, if exceeded, may result in a significant effect unless ambient noise levels are sufficiently high to provide a degree of masking of construction noise.

10.3.18 The range of guidance values detailed in BS5228-1 Annex E has been used to numerically define the magnitude levels, as per Table 10.5, based in part on consideration of existing baseline ambient noise levels (described in section 10.4 below). The presented levels have been normalised to free-field daytime noise levels occurring over a time period, T, equal to the duration of a working day on the Site. BS5228-1 Annex E provides varied definitions for the range of daytime working hours which can be grouped for equal consideration. The values presented in Table 10.5 have been chosen to relate to different working periods of a week based on BS5228-1 guidance (see **Chapter 2: Development Description** for the proposed working periods). For construction activities which may be expected to occur for less than 4 weeks in a year, the magnitude of corresponding effects has been reduced.

10.3.19 There could be specific construction activities associated with cable laying works (e.g. horizontal directional drilling or other trenchless techniques) which would be required outside of the assumed daytime hours (i.e. evening, Sundays, Bank Holidays or at night). For this purpose, BS5228-1 Annex E provides guidance criteria for evening working or working on Saturday afternoons applying a reduction in the thresholds of 10 dB(A).

10.3.20 For working on Sundays, Bank Holidays or at night a reduction in the thresholds of 20 dB(A) is applicable. This results in a threshold for moderate effects of 45 dB L_{Aeq} at night; although, in some cases, higher existing baseline levels (46 dB(A) to 54 dB(A)) were measured during some night-time periods (see Table 10.8), the corresponding L_{A90} levels measured for the same period are substantially lower, meaning that these measured L_{Aeq} levels were likely influenced by sporadic road traffic events: because of this, a precautionary approach of considering a threshold of 45 dB L_{Aeq} for night-time work was applied.

10.3.21 BS5228-2 Annex B provides example criteria for the magnitude of construction vibration. Particular regard has been given to Section B.2 of BS5228-2 which provides advice on human response to vibration and Table B.1 of BS5228-2 which considers the effects of vibration levels in terms of PPV. PPV is considered more appropriate when providing guidance for construction activity which is likely to result in events with ranging vibration magnitude. Table 10.5 provides the magnitude of construction vibration impacts considered.

10.3.22 BS4142 (2014, amended 2019) guidance criteria have been used to establish the magnitude criteria for the assessment of operational noise. BS4142 defines the impact of an excess level obtained by the subtraction of the background level from the Rating Level determined, subject to context. The Rating Level $L_{Ar,Tr}$ dB is the predicted L_{Aeq} sound pressure level over the assessment period (daytime being a 1 hour period between 07:00 and 23:00 hours and night being a 15 minute period between 23:00 and 07:00 hours), corrected for character such as tonality. A contextual analysis is fundamental in BS4142, and this requires consideration of factors such as the nature of the area and, particularly at night-time, the absolute level of the noise. For contextual purposes, an external free-field noise Rating Level criterion of $L_{Ar,Tr}$ 35 dB is proposed at receptor locations in cases where the background levels are low (below 30 dB L_{A90}), as agreed with ELC Environmental Health Department. This would provide satisfactory external amenity during the daytime and suitable internal noise levels at night with windows open for ventilation, taking into account the character of the noise. If the fixed Rating Level criterion of $L_{Ar,Tr}$ 35 dB proposed is not exceeded, irrespective of the determined excess above background noise levels, the Magnitude of Effect is considered to be Minor. This philosophy has been used to define the magnitude criteria of Table 10.5.

Table 10.5: Classification of Magnitude of Effect

Magnitude of Effect	Construction Noise Daytime Criteria	Short Duration Construction Noise Criteria: Activity Duration up to 4 Weeks	Construction Vibration Criteria	Operational Noise Excess Criteria
Major	Monday to Friday (day) + Saturday (AM), > $L_{Aeq(working)}$ 75 dB Monday to Friday (eve) + Saturday (PM + eve), > $L_{Aeq(working)}$ 65 dB Sunday, Bank Holiday + All nights, > $L_{Aeq(working)}$ 55 dB	Monday to Friday (day) + Saturday (AM), > $L_{Aeq(working)}$ 85 dB	> 10.0 mm.s^{-1} (Vibration above 10 mm.s^{-1} is likely to be intolerable, even during brief exposures. Cosmetic damage may start to occur in some light-weight structures above 10 mm.s^{-1})	A difference of +10 dB or more is likely to be an indication of a significant adverse impact, depending on context according to BS 4142. In particular, if a Rating Level of $L_{Ar,Tr}$ 35 dB is not exceeded, in cases of low background noise levels at night, the Magnitude of Effect is Minor.
Moderate	Monday to Friday (day) + Saturday (AM), > $L_{Aeq(working)}$ 65 dB ≤ $L_{Aeq(working)}$ 75 dB Monday to Friday (eve) + Saturday (PM + eve), > $L_{Aeq(working)}$ 55 dB ≤ $L_{Aeq(working)}$ 65 dB Sunday, Bank Holiday + All nights, > $L_{Aeq(working)}$ 45 dB ≤ $L_{Aeq(working)}$ 55 dB	Monday to Friday (day) + Saturday (AM), > $L_{Aeq(working)}$ 75 dB ≤ $L_{Aeq(working)}$ 85 dB	> 1.0 to ≤ 10.0 mm.s.$^{-1}$ (Vibration in this range is likely to become intolerable for any more than short duration exposure. There will be a perception of damage risk to property, but damage risk is very low)	A difference of +5 dB is likely to be an indication of an adverse impact, depending on context. In particular, if a Rating Level of $L_{Ar,Tr}$ 35 dB is not exceeded, in cases of low background noise levels at night, the Magnitude of Effect is Minor.
Minor	Monday to Friday (day) + Saturday (AM), > $L_{Aeq(working)}$ 55 dB	Monday to Friday (day) + Saturday (AM), > $L_{Aeq(working)}$ 65 dB	≥ 0.3 to ≤ 1.0 mm.s^{-1} (The threshold of which construction vibration might be perceptible in	> -5 to < 5 dB (The lower the rating level is relative to the measured background

Table 10.5: Classification of Magnitude of Effect				
Magnitude of Effect	**Construction Noise Daytime Criteria**	**Short Duration Construction Noise Criteria: Activity Duration up to 4 Weeks**	**Construction Vibration Criteria**	**Operational Noise Excess Criteria**
	≤ $L_{Aeq(working)}$ 65 dB Monday to Friday (eve) + Saturday (PM + eve), > $L_{Aeq(working)}$ 45 dB ≤ $L_{Aeq(working)}$ 55 dB Sunday, Bank Holiday + All nights, > $L_{Aeq(working)}$ 35 dB ≤ $L_{Aeq(working)}$ 45 dB	≤ $L_{Aeq(working)}$ 75 dB	residential environments. The upper value may cause complaint if prior warning is not given)	sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context). Where the Rating Level does not exceed $L_{Ar,Tr}$ 35 dB in cases of low background noise levels at night, the Magnitude of Effect is Minor.
Negligible	Monday to Friday (day) + Saturday (AM), ≤ $L_{Aeq(working)}$ 55 dB Monday to Friday (eve) + Saturday (PM + eve), ≤ $L_{Aeq(working)}$ 45 dB Sunday, Bank Holiday + All nights, ≤ $L_{Aeq(working)}$ 35 dB	Monday to Friday (day) + Saturday (AM), ≤ $L_{Aeq(working)}$ 65 dB	< 0.3 $mm.s^{-1}$ (Vibration levels below this level are unlikely to be perceptible in residential environments)	≤ -5 dB (Where the rating level is 5 dB lower or more than the background sound level, this is an indication of the specific sound source not contributing to the overall noise climate, even if it emits constant noise and therefore would have a negligible impact, regardless of the context)
(day) is the daytime hours of 07:00 to 19:00 (eve) is the evening hours of 19:00 to 22:00 nights is the night period of 22:00 to 07:00 AM is the morning period of 07:00 to 13:00 PM is the afternoon period of 13:00 to 19:00				

10.3.23 Only the Adverse effect descriptions have been included in Table 10.5 as the introduction of noise and vibration sources to a receptor location is unlikely to be viewed as Beneficial.

Criteria for Assessing Cumulative Effects

10.3.24 Cumulative effects have been assessed using the criteria defined in Table 10.5.

Criteria for Assessing Significance

10.3.25 The identified receptors are predominantly residential properties, along with a nursery, a dental practice and the coastal recreational area around Prestonpans Beach. All identified receptors are of 'High' sensitivity except for the coastal recreational area around Prestonpans Beach which is 'Medium' sensitivity due to the transient nature of the space. Therefore, there

are only two levels of sensitivity to consider, those of 'High' and 'Medium'. Furthermore, typical recreational use of the coastal area would mainly be restricted to day-time and evening periods.

10.3.26 The relationship applied between magnitude of effect and sensitivity to determine the level of significance is provided in Table 10.6. The principle of TAN-Noise has been followed, although, the references used have been labelled differently to those of TAN-Noise as defined in Table 10.7.

Table 10.6: Significance of Effects

Magnitude of Effect	Level of Significance at 'High' Sensitivity Receptor	Level of Significance at 'Medium' Sensitivity Receptor
Major	Major	Moderate
Moderate	Moderate	Minor
Minor	Minor	Minor
Negligible	None	None

Table 10.7: Significance Descriptor Equivalence to TAN-noise

Significance of Effect	Equivalent TAN-noise Descriptor
Major	Very Large: These effects represent key factors in the decision-making process. They are generally, but not exclusively, associated with impacts where mitigation is not practical or would be ineffective.
Moderate	Large: These effects are likely to be important considerations but where mitigation may be effectively employed such that resultant adverse effects are likely to have a Moderate or Slight significance.
Minor	Moderate: These effects, if adverse, while important, are not likely to be key decision-making issues.
None	Slight: These effects may be raised but are unlikely to be of importance in the decision-making process.

10.3.27 For this assessment, **Major** and **Moderate** effects are considered to be **significant** in the context of the EIA Regulations.

Limitations and Assumptions

10.3.28 An assumption has been made that the 2014 and 2017 measured baseline noise levels of the Inch Cape onshore transmission works remain representative of the prevailing conditions. Acknowledgment needs to be given to the likelihood that road traffic noise contributions may have increased since 2017 along the B1348 Edinburgh Road, but that increase is envisaged to be marginal. The COVID-19 restrictions have made it difficult at the time of assessment to quantify any increase in the normal ambient and background noise environment. This is expected to provide worst-case baseline sound levels as in practice generally an increase would be expected over time.

10.3.29 The level of construction noise that occurs at the surrounding properties will be highly dependent on a number of factors such as the final site programme, equipment types used for each process, and the operating conditions that prevail during construction. It is not practically feasible to specify each and every element of the factors that may affect noise levels, therefore it is necessary to make reasonable allowance for the level of noise emissions that may be associated with key phases of the construction.

10.3.30 The construction noise calculations have been based on specific construction plant noise levels provided as guidance in BS5228-1. It is stated in BS5228-1 *"Values of the sound power levels for a particular type and size of machine and the equivalent continuous sound pressure levels for the site activities … will apply in the majority of cases, but can be lower or higher due to the make and maintenance of the machines, their operation and the procedures adopted when work is carried out."* Therefore, there could be potential for uncertainty of the actual construction source noise levels.

10.3.31 The construction vibration levels used in the assessment are representative of the activity rather than the actual plant item to be selected. Therefore, there could be potential for uncertainty of the actual construction vibration source magnitudes.

10.3.32 An assumption has been made that the noise and vibration from the decommissioning works would not be any greater than the construction works.

10.3.33 An assumption has been made that operational noise emissions would be dominated by external plant and the breakout noise from plant located within buildings will be an insignificant contribution as both the internal plant selection and the building fabric sound attenuation can be controlled by the detailed design.

10.3.34 The cumulative assessment has been undertaken on the basis of information presented in the Environmental Impact Assessment Report (EIAR) for the Inch Cape onshore transmission works. This was representative information presented on a worst-case basis to support a Planning Permission in Principle application and the final detailed design of that development may therefore ultimately differ.

10.4 Baseline Conditions

Current Baseline

10.4.1 The prevailing noise levels (in the absence of COVID-19 restrictions) have been assumed to be represented by the 2014/ 2017 noise surveys as reported in the 2014 Environmental Statement and the 2018 EIAR for the Inch Cape onshore transmission works Planning Permission in Principle applications. Table 10.8 provides a summary of the prevailing conditions based on this information. The background noise levels $L_{A90,T}$ dB at night are considered to be low. The relevant locations are shown on **Figure 10.1**.

Table 10.8: Prevailing Noise Levels

Location Name (and Inch Cape Substation Reference ID)	Period of Day - Date; Time Stamp	$L_{Aeq,T}$ dB	$L_{A90,T}$ dB
No.1 and No.2 Edinburgh Road (NSR01)**	Day – 03/09/17; 18:40 to 19:40 hours Night – 04/09/17; 00:20 to 00:50 hours	68 54	52 35
West Harbour Road (NSR02)**	Day – 03/09/17; 17:30 to 18:30 hours Night – 03/09/17; 23:00 to 23:30 hours	51 42	47 36
Cockenzie House and Gardens (NSR03)**	Day – 03/09/17; 17:30 to 18:30 hours Night – 03/09/17; 23:00 to 23:30 hours	51 42	47 36
Hawthorn Terrace (NSR04)***	Day – 24/04/14; 12:35 to 13:35 hours Night – 03 to 04/09/17; 23:40 to 00:10 hours	46 34	41 29
Hawthorn Terrace (NSR04)***	Day – 25/04/14; 08:35 to 09:35 hours	50	48
The Antiquaries (Preston Links) (NSR05)* #	Day – 27/05/14; 14:00 to 16:00 hours Night – 27 to 28/05/14; 23:05 to 01:05	60 51	52 30

Table 10.8: Prevailing Noise Levels			
Location Name (and Inch Cape Substation Reference ID)	**Period of Day - Date; Time Stamp**	**$L_{Aeq,T}$ dB**	**$L_{A90,T}$ dB**
Atholl View (NSR06)*	Day – 24/04/14; 13:45 to 14:45 hours Night – 04/09/17; 00:55 to 01:25 hours	46 44	34 26
Atholl View (NSR06)*	Day – 25/04/14; 09:55 to 10:55 hours	45	39
Appin Drive (NSR07)*	Day – 24/04/14; 12:40 to 13:30 hours Night – 04/09/17; 00:55 to 01:25 hours	64 44	42 26
Appin Drive (NSR07)*	Day – 25/04/14; 11:10 to 12:10 hours	46	42
Hawthorn Bank (NSR08)**	Day – 03/09/17; 18:40 to 19:40 hours Night – 04/09/17; 00:20 to 00:50 hours	68 54	52 35
Whin Park (south) (NSR09)	Day – 24/04/14; 12:35 to 13:35 hours Night – 03 to 04/09/17; 23:40 to 00:10 hours	46 34	41 29
Avenue Road B6371 (NSR10)	Day – 24/04/14; 13:45 to 14:45 hours Night – 25/04/14; 09:45 to 10:45 hours	58 45	41 35
Cedar Drive (NSR11)	Day – 24/04/14; 13:45 to 14:45 hours Night – 25/04/14; 09:45 to 10:45 hours	58 45	41 35
* 2014 measurement ** 2017 measurement *** Measured at Whin Park in 2014 and considered representative of Hawthorn Terrace # Measured levels also assumed to be representative of the coastal recreational area around Prestonpans Beach and along High Street, Prestonpans			

10.4.2 **Technical Appendix 10.1: Noise Measurement Surveys** provides details of sample noise measurements which were undertaken in 2020 during a site visit and which are consistent with the results set out in Table 10.8.

Future Baseline

10.4.3 Under a "do nothing" scenario where there is no Proposed Development, the local noise levels of the noise and vibration study area are considered likely to marginally increase over time due to the following:

- Natural increase in road traffic along the B1348 Edinburgh Road; and
- Other commercial or industrial usage on the Site.

Summary of Sensitive Receptors

Table 10.9: Summary of Receptor Sensitivity		
Receptor	**Sensitivity**	**Justification**
NSR01, Seahorse Nursery and No.2 Edinburgh Road	High	Seahorse Nursery is an education establishment open during the daytime and No.2 Edinburgh Road is a residential property.
NSR02, West Harbour Road	High	There are residential properties on West Harbour Road.
NSR03, Cockenzie House and Gardens	High	The gardens provide relatively quiet outdoor relaxation spaces used for recreation and house contains studios.
NSR04, Hawthorn Terrace/ Whin Park	High	There are residential properties on Hawthorn Terrace and Whin Park.

Table 10.9: Summary of Receptor Sensitivity		
Receptor	**Sensitivity**	**Justification**
NSR05, The Antiquaries	High	Residential properties and dental healthcare facility.
NSR06, Atholl View	High	There are residential properties on Atholl View.
NSR07, Appin Drive	High	There are residential properties on Appin Drive.
NSR08, Hawthorn Bank	High	There are residential properties on Hawthorn Bank.
NSR09, Whin Park (south)	High	There are residential properties on Whin Park.
NSR10, Avenue Road B6371	High	There are residential properties on the west side of Avenue Road B6371.
NSR11, Cedar Drive	High	There are residential properties on Cedar Drive.
NSR12, 1A High Street	High	There are residential properties on High Street.
NSR13, Coastal Recreation Area	Medium	Outdoor area used for transient recreation activities. Use is also restricted to day-time or evening periods, with recreational use at night atypical.

10.5 Assessment of Likely Effects

Potential Construction Effects

Noise Assessment

10.5.1 The predictive calculations for construction noise have been based on the estimated minimum distances given in Table 10.10 to the sensitive receptor locations. **Figure 2.1: Proposed Onshore Infrastructure Development Zones** provides the areas where each of the key construction activities may occur, which were used to estimate distances for the assessment on a reasonable worst-case basis (i.e. activities occurring at the closest likely distance from each of the receptors considered).

Table 10.10: Receptor Distances (in metres) for the Construction Noise Assessment							
Receptor	**HDD Works (Landfall/ B1348)**	**HDD Works (near Substation)**	**Transition Joint Bay**	**Onshore Export Cable**	**Joint Bay**	**Temporary Pulling Pits**	**Onshore Substation and Platform**
NSR01	720	440	750	450	680	440	340
NSR02	900	630	1000	640	850	630	540
NSR03	940	670	1000	750	875	670	580
NSR04	700	425	700	420	640	425	315
NSR05	40	300	70	60	100	40	300
NSR06	210	90	340	100	150	100	90
NSR07	70	190	190	80	95	70	270
NSR08	800	520	800	520	720	500	440
NSR09	670	390	750	390	600	390	290

Table 10.10: Receptor Distances (in metres) for the Construction Noise Assessment							
Receptor	**HDD Works (Landfall/ B1348)**	**HDD Works (near Substation)**	**Transition Joint Bay**	**Onshore Export Cable**	**Joint Bay**	**Temporary Pulling Pits**	**Onshore Substation and Platform**
NSR10	890	600	1000	600	830	600	490
NSR11	1000	800	1150	800	1000	770	660
NSR12	90	280	100	100	130	95	340
NSR13*	5 / 360	50 / 360	20 / 420	20 / 370	80 / 460	20 / 350	60 / 350
* Presentation of the distances is (Minimum) / (Maximum) for the area							

10.5.2 Source sound power levels have been estimated based on experience of similar activities and source power data provided in BS5228-1. The levels allocated to each activity are defined in Table 10.11. All plant has been assumed to be operational for the full working period as a worst-case.

Table 10.11: Source Sound Power Levels for the Construction Noise Assessment		
Construction Activity	**Assumed Plant**	**Sound Power Level of Activity L_{wA} dB**
HDD Works (Landfall/B1348) HDD Works (near Substation)	HDD Power Unit + Drill HDD Generator Bentonite Pump Bentonite Mixer Generator for Welfare Facility	115
Transition Joint Bay	Sheet Steel Vibratory Piling Rig	119
Onshore Export Cable Joint Bay Temporary Pulling Pits	Tracked Excavator Wheeled Backhoe Mini Tracked Excavator	105
Onshore Substation and Platform	Piling Works (assumed to be the worst-case noise activity)	119

10.5.3 The predictive calculations have allowed for distance attenuation and screening correction (where appropriate). No on-time corrections have been included or ground absorption.

10.5.4 Table 10.12 provides the noise contributions from each of the construction works activities.

Table 10.12: Predicted Construction Noise Activity Contributions							
Receptor	**HDD Works (Landfall/ B1348) $L_{Aeq(working)}$ dB**	**HDD Works (near Substation) $L_{Aeq(working)}$ dB**	**Transition Joint Bay $L_{Aeq(working)}$ dB**	**Onshore Export Cable $L_{Aeq(working)}$ dB**	**Joint Bay $L_{Aeq(working)}$ dB**	**Temporary Pulling Pits $L_{Aeq(working)}$ dB**	**Onshore Substation and Platform $L_{Aeq(working)}$ dB**
NSR01	40**	44**	43**	29***	25***	34**	45***
NSR02	43*	46*	46*	26***	23***	36*	41***
NSR03	32***	36***	36***	24***	23***	26***	41***
NSR04	40**	39***	39***	30***	26***	29***	51**
NSR05	75	57	75	61	57	65	61
NSR06	46***	53***	45***	42***	38***	42***	57***
NSR07	60**	46***	60*	44***	42***	45***	47***

Table 10.12: Predicted Construction Noise Activity Contributions

Receptor	HDD Works (Landfall/ B1348) $L_{Aeq(working)}$ dB	HDD Works (near Substation) $L_{Aeq(working)}$ dB	Transition Joint Bay $L_{Aeq(working)}$ dB	Onshore Export Cable $L_{Aeq(working)}$ dB	Joint Bay $L_{Aeq(working)}$ dB	Temporary Pulling Pits $L_{Aeq(working)}$ dB	Onshore Substation and Platform $L_{Aeq(working)}$ dB
NSR08	34***	38***	38***	28***	25***	28***	43***
NSR09	50	55	48*	45	41	45	62
NSR10	48	51	51	41	39	41	57
NSR11	42*	49	50	39	32*	39	55
NSR12	63*	58	66*	57	55	57	60
NSR13[#]	93 / 56	73 / 56	85 / 59	71 / 46	59 / 44	71 / 46	75 / 60

* Indicates that the contribution noise level includes a screening correction of -5 dB for partial line of sight

** Indicates that the contribution noise level includes a screening correction of -10 dB buildings

*** Indicates that the contribution noise level includes a screening correction of -15 dB to account for substantial intervening buildings or landscape features

[#] Presentation of the results is (at minimum distance) / (at maximum distance)

10.5.5 The worst-case would be all construction activities occurring simultaneously during the daytime. It is proposed in the first instance that Horizontal Directional Drilling (HDD) or other trenchless activities would be undertaken continuously, including during evenings, weekends and nights, with all other construction activities operating in the daytime working period only. The actual duration of the HDD drilling work required will depend on site investigations and other factors but would be expected to potentially last several weeks, with an expected duration of up to four weeks for the noisiest activities (drilling, etc.) if working 24 hours a day. In the event that HDD drilling operations are restricted to daytime and evenings, or daytime only, then the drilling and duct installation works may increase to approximately 11 weeks. Table 10.13 provides the daytime and night predicted construction noise levels along with the magnitude of effect, assuming as a worst-case that the construction activities of Table 10.11 (including HDD drilling at all potential sites) could occur simultaneously.

10.5.6 All other construction activities (e.g. welfare facilities, site clearance, storage, landscaping, site access etc.) have been considered to be **not significant**.

Table 10.13: Magnitude of Construction Noise Levels

Receptor	Daytime $L_{Aeq(working)}$ dB	Magnitude of Daytime Effect	Evening (inclusive of Saturday PM) $L_{Aeq(working)}$ dB	Magnitude of Evening Effect (inclusive of Saturday PM)	Night (Inclusive of Sunday and Bank Holiday) $L_{Aeq(working)}$ dB	Magnitude of Night Effect (Inclusive of Sunday and Bank Holiday)
NSR01, Seahorse Nursery and No.2 Edinburgh Road	50	Negligible	45	Negligible	45	Minor
NSR02, West Harbour Road	51	Negligible	48	Minor	48	Moderate
NSR03, Cockenzie	44	Negligible	38	Negligible	38	Minor

Table 10.13: Magnitude of Construction Noise Levels

Receptor	Daytime $L_{Aeq(working)}$ dB	Magnitude of Daytime Effect	Evening (inclusive of Saturday PM) $L_{Aeq(working)}$ dB	Magnitude of Evening Effect (inclusive of Saturday PM)	Night (Inclusive of Sunday and Bank Holiday) $L_{Aeq(working)}$ dB	Magnitude of Night Effect (Inclusive of Sunday and Bank Holiday)
House and Gardens						
NSR04, Hawthorn Terrace/ Whin Park	52	Negligible	43	Negligible	43	Minor
NSR05, The Antiquaries	78	Major	75	Major	75	Major
NSR06, Atholl View	59	Minor	54	Minor	54	Moderate
NSR07, Appin Drive	63	Minor	60	Moderate	60	Major
NSR08, Hawthorn Bank	46	Negligible	39	Negligible	39	Minor
NSR09, Whin Park (south)	63	Minor	56	Moderate	56	Major
NSR10, Avenue Road B6371	59	Minor	53	Minor	53	Moderate
NSR11, Cedar Drive	57	Minor	50	Minor	50	Moderate
NSR12, 1A High Street	70	Moderate	64	Moderate	64	Major
NSR13, Coastal Recreation Area*	94 / 64	Major/ Minor	93 / 59	Major/ Moderate	N/A	N/A

* Presentation of the results is (at minimum distance) / (at maximum distance)

10.5.7 Comparison to Table 10.6 indicates the following significance of effect:

- During the daytime working period NSR01 (Seahorse Nursery and No.2 Edinburgh Road), NSR02 (West Harbour Road), NSR03 (Cockenzie House and Gardens), NSR04 (Hawthorn Terrace/ Whin Park) and NSR08 (Hawthorn Bank) have a potential direct, temporary short-term Adverse effect significance of None, which is **not significant**;
- During the daytime working period NSR06 (Atholl View), NSR07 (Appin Drive), NSR09 (Whin Park (south)), NSR10 (Avenue Road B6371) and NSR11 (Cedar Drive) have a potential direct, temporary short-term Adverse effect significance of **Minor**, which is **not significant**;
- During the daytime working period NSR12 (1A High Street) has a potential direct, temporary short-term Adverse effect significance of **Moderate**, which is **significant**;

- During the daytime NSR05 (The Antiquaries) has a potential direct, temporary short-term Adverse effect significance of **Major**, which is **significant**;
- In the evening and Saturday afternoon and evening, NSR01 (Seahorse Nursery and No.2 Edinburgh Road), NSR03 (Cockenzie House and Gardens), NSR04 (Hawthorn Terrace/ Whin Park) and NSR08 (Hawthorn Bank) have a potential direct, temporary short-term Adverse effect significance of **None**, which is **not significant**;
- In the evening and Saturday afternoon and evening, NSR02 (West Harbour Road), NSR06 (Atholl View), NSR10 (Avenue Road B6371) and NSR11 (Cedar Drive) have a potential direct, temporary short-term Adverse effect significance of **Minor**, which is **not significant**;
- In the evening and Saturday afternoon and evening, NSR07 (Appin Drive), NSR09 (Whin Park (south)) and NSR12 (1A High Street) have a potential direct, temporary short-term Adverse effect significance of **Moderate**, which is **significant**;
- In the evening and Saturday afternoon and evening, NSR05 (The Antiquaries) has a potential direct, temporary short-term Adverse effect significance of **Major**, which is **significant**;
- At night and on Sunday or a Bank Holiday, NSR01 (Seahorse Nursery and No.2 Edinburgh Road), NSR03 (Cockenzie House and Gardens), NSR04 (Hawthorn Terrace) and NSR08 (Hawthorn Bank) have a potential direct, temporary short-term Adverse effect significance of **Minor**, which is **not significant**;
- At night and on Sunday or a Bank Holiday, NSR02 (West Harbour Road), NSR06 (Atholl View), NSR10 (Avenue Road B6371) and NSR11 (Cedar Drive) have a potential direct, temporary short-term Adverse effect significance of **Moderate**, which is **significant**; and
- At night and on Sunday or a Bank Holiday, NSR05 (The Antiquaries), NSR07 (Appin Drive), NSR09 (Whin Park (south)) and NSR12 (1A High Street) have a potential direct, temporary short-term Adverse effect significance of **Major**, which is **significant.**

10.5.8 At NSR13 (Coastal Recreation Area) the potential direct, temporary short-term adverse effect significance varies between ***Minor*** and ***Moderate***, depending on the location within the area. Based on the ability of transient users of the area to avoid the worst of the effect, it is therefore considered to be ***not significant***.

10.5.9 Aside from the HDD works at landfall, under the B1348 and near the proposed Substation, if the other noisier works assessed in Table 10.11 (such as piling work for the Transition Joint Bay and Onshore Substation and Platform, excavation for the onshore export cable or the pulling pits) did occur on Saturday afternoons, this would have increased effects. The potential direct, temporary short-term adverse effect at NSR05 (The Antiquaries), NSR06 (Atholl View), NSR07 (Appin Drive), NSR09 (Whin Park (south)), NSR10 (Avenue Road B6371) and NSR12 (1A High Street) would vary between ***Minor*** (not significant) and ***Moderate (significant)***.

Vibration Assessment

10.5.10 The potential sources of vibration which could have significance have been identified as listed below:

- HDD or other trenchless works under the B1348;
- HDD or other trenchless works on Site; and
- Sheet steel vibratory piling for safe working pits/ trenches.

10.5.11 All other construction activities are considered ***not significant*** due to distance from sensitive receptors.

10.5.12 HDD works is commonly considered to be similar to auger boring in terms of vibration generation from rotary boring. BS5228-2 indicates that vibration from such activities falls to below 1 $mm.s^{-1}$ within a distance of approximately 10 m to 15 m.

10.5.13 Vibratory driven sheet steel piling may be required for safe working practices to retain the sides of the working pits/ trenches. BS5228-2 indicates that vibration from such activities falls to below 1 $mm.s^{-1}$ at distances of greater than approximately 30 m.

10.5.14 Observation of the construction working distances provided by Table 10.10 indicates that all sensitive receptors are greater than 30 m from the construction activity with the exception of some footpaths within NSR13 (Coastal Recreation Area), with NSR05 (The Antiquaries) the next closest at approximately 40 m.

10.5.15 The magnitude of effect is Minor as a worst-case at NSR05 (The Antiquaries) but is likely to be Negligible at all other sensitive receptors considered.

10.5.16 Comparison to the significance criteria of Table 10.6 indicates:

- A potential direct, temporary, short-term Adverse effect significance of **Minor** at NSR05 (The Antiquaries), which is **not significant**; and
- a potential direct, temporary, short-term Adverse effect significance of **None** at all other sensitive receptors NSR01 to NSR04 and NSR06 to NSR12, which is **not significant**.

10.5.17 The magnitude of effect varies between Negligible and Moderate at NSR13 (Coastal Recreation Area). Therefore, the potential direct, temporary short-term Adverse effect significance varies between ***None*** and ***Minor***, depending on the location within the area. Based on the ability of users to avoid the worst of the effect, it is therefore considered to be ***not significant***.

Potential Operational Effects

10.5.18 The Proposed Development will contain various noise producing electrical and mechanical plant items, some internally within buildings and some located externally. **Figure 2.7: Indicative Substation Site Layout** shows the indicative substation layout on which this assessment is based. Plant items located internally within buildings have not been included in the assessment nor has breakout noise from the buildings. It has been assumed that the building fabric will provide sound attenuation by design sufficient to render the noise emissions insignificant as a contribution for consideration.

10.5.19 Table 10.14 provides the source sound power levels and description of the associated externally located plant items based upon the proposed indicative substation design. The only available information at this stage of the Proposed Development is the overall plant item sound power levels L_{wA} dB provided by the Applicant based on indicative plant selections. Octave band frequency values have been estimated from experience of similar plant items to allow more detail in the CadnaA® calculation process.

Table 10.14: Sound Power Levels of External Plant

Item of Plant	**L_{wA} dB**
SGT Transformer 1 ODAF	101
SGT Transformer 2 ODAF	101
Shunt Reactor 1	93
Shunt Reactor 2	93
DRC Heat Exchange Unit (2 banks)	79
Aux Transformer 1	75

Table 10.14: Sound Power Levels of External Plant	
Item of Plant	**L_{wA} dB**
Aux Transformer 2	75
SGT Transformer 1 Cooler	90
SGT Transformer 2 Cooler	90
Shunt Reactor 1 Cooler	78
Shunt Reactor 2 Cooler	78

10.5.20 The calculations have been undertaken using the commercial CadnaA® three-dimensional noise modelling package. The noise model includes the following:

- Existing ground terrain contours;
- Source locations and estimated height of source (1.5 m above ground for cooling/ heat exchange plant items and 2.0 m above ground for transformers);
- Receptor locations and estimated height of 4.0 m (to represent the worst-case of first floor bedrooms and higher levels);
- Noise screening and reflection off buildings on Site and the existing bund to the south west; and
- Noise propagation calculation methodology of ISO 9613-2, which represents favourable (i.e. worst-case) noise propagation conditions.

10.5.21 The predicted noise levels are considered to be the specific source noise in accordance with the BS4142 assessment methodology. Consideration has been given to the character of the noise sources in order to apply an appropriate penalty to determine the rating level as required by BS4142. In this case, as noise from electrical plant such as the transformers proposed tends to be tonal in nature, a correction of +4 dB was applied, corresponding to a 'clearly perceptible' tonal character according to BS4142. The predicted levels are based on continuous operation of all plant simultaneously both daytime and at night.

10.5.22 Table 10.15 provides a summary of the predicted specific noise level, the penalties applied, the Rating Level determined, the measured background noise level and the resultant magnitude of effect for each of the sensitive receptors.

Table 10.15: Operational Magnitude of Effect					
Receptor Location	**Specific Noise Level $L_{Aeq,T}$ dB***	**BS 4142 Penalty Applied dB***	**Rating Level $L_{Ar,Tr}$ dB***	**Prevailing Background Noise Level $L_{A90,T}$ dB***	**Magnitude of Effect***
NSR01, Seahorse Nursery and No.2 Edinburgh Road	25 / 25	+4 / +4	29 / 29	52 / 35	-23 / -6 Negligible/ Negligible
NSR02, West Harbour Road	24 / 24	+4 / +4	28 / 28	47 / 36	-19 / -8 Negligible/ Negligible
NSR03, Cockenzie House and Gardens	32 / 32	+4 / +4	36 / 36	47 / 36	-11 / 0 Negligible/ Minor
NSR04, Hawthorn	34 / 34	+4 / +4	38 / 38	41 / 29	-3 / +9 Minor/ Moderate

Table 10.15: Operational Magnitude of Effect

Receptor Location	Specific Noise Level $L_{Aeq,T}$ dB*	BS 4142 Penalty Applied dB*	Rating Level $L_{Ar,Tr}$ dB*	Prevailing Background Noise Level $L_{A90,T}$ dB*	Magnitude of Effect*
Terrace/ Whin Park					
NSR05, The Antiquaries	34 / 34	+4 / +4	38 / 38	52 / 30	-14 / +8 Negligible/ Moderate
NSR06, Atholl View	39 / 39	+4 / +4	43 / 43	34 / 26	+9 / +17 Moderate/ Major
NSR07, Appin Drive	34 / 34	+4 / +4	38 / 38	42 / 26	-4 / +12 Minor/ Major
NSR08, Hawthorn Bank	25 / 25	+4 / +4	29 / 29	52 / 35	-23 / -6 Negligible/ Negligible
NSR09, Whin Park (south)	46 / 46	+4 / +4	50 / 50	41 / 29	+9 / +21 Moderate/ Major
NSR10, Avenue Road B6371	37 / 37	+4 / +4	41 / 41	41 / 35	+0 / +6 Minor/ Moderate
NSR11, Cedar Drive	30 / 30	+4 / +4	34 / 34	41 / 35	-7 / -1 Negligible/ Negligible
NSR12, 1A High Street	33 / 33	+4 / +4	37 / 37	52 / 30	-15 / +7 Negligible/ Moderate
NSR13, Coastal Recreation Area	34 / N/A	+4 / N/A	38 / N/A	52 / N/A	-14 / N/A Negligible/ N/A

* Format of presentation is [daytime] / [night]

Context analysis taken into account as the Rating Level does not exceed $L_{Ar,Tr}$ 35 dB

10.5.23 Comparison has been made of the magnitude of effect from Table 10.15 with the significance of effect from Table 10.6 to determine the following:

- At sensitive receptors NSR01 (Seahorse Nursery and No.2 Edinburgh Road), NSR02 (West Harbour Road), NSR05 (The Antiquaries), NSR08 (Hawthorn Bank), NSR11 (Cedar Drive), NSR12 (1A High Street) and NSR13 (Coastal Recreation Area) during the daytime the potential direct, permanent Adverse effect significance is **None**, which is **not significant**;
- At sensitive receptors NSR04 (Hawthorn Terrace/ Whin Park), NSR07 (Appin Drive) and NSR10 (Avenue Road B6371) during the daytime the potential direct, permanent Adverse effect significance is **Minor**, which is **not significant**;
- At sensitive receptors NSR06 (Atholl View) and NSR09 (Whin Park (south)) during the daytime the potential direct, permanent Adverse effect significance is **Moderate**, which is **significant**;
- At sensitive receptors NSR01 (Seahorse Nursery and No.2 Edinburgh Road), NSR08 (Hawthorn Bank) and NSR02 (West Harbour Road) at night the potential direct, permanent Adverse effect significance is **None**, which is **not significant**;
- At sensitive receptors NSR03 (Cockenzie House and Gardens)and NSR11 (Cedar Park) at night the potential direct, permanent Adverse effect significance is **Minor**, which is **not significant**;

- At sensitive receptors NSR04 (Hawthorn Terrace/ Whin Park), NSR05 (The Antiquaries), NSR10 (Avenue Road B6371) and NSR12 (1A High Street) at night the potential direct, permanent Adverse effect significance is **Moderate**, which is **significant**; and
- At sensitive receptors NSR06 (Athol View), NSR07 (Appin Drive) and NSR09 (Whin Park (south)) at night the potential direct, permanent Adverse effect significance is **Major**, which is **significant**.

Potential Cumulative Effects

Construction Works Associated with Inch Cape Substation

10.5.24 The Inch Cape onshore transmission works could potentially be in construction simultaneously with the Proposed Development. Therefore, the cumulative construction noise effect has been considered. Table 10.16 provides the magnitude of effect with both developments during the construction works assuming the worst-case works of each occurring at the same time, based on the information provided in the 2018 EIAR for the Inch Cape onshore transmission works. The assessment is limited to the sensitive receptor locations NSR01 to NSR08 inclusive as available data for the Inch Cape onshore transmission works exists only at these locations for comparison; however, this assessment is considered representative of the other receptors considered.

Table 10.16: Cumulative Construction Effect Magnitude with Inch Cape

Receptor Location	Inch Cape Contribution $L_{Aeq(working)}$ dB*	The Proposed Development Contribution $L_{Aeq(working)}$ dB*	Total Cumulative Noise Level $L_{Aeq(working)}$ dB*	Magnitude of Effect*
NSR01, Seahorse Nursery and No.2 Edinburgh Road	53 / 40	50 / 45	55 / 46	Negligible/ Moderate
NSR02, West Harbour Road	48 / 37	51 / 48	53 / 48	Negligible/ Moderate
NSR03, Cockenzie House and Gardens	47 / 36	44 / 38	49 / 40	Negligible/ Minor
NSR04, Hawthorn Terrace/ Whin Park	53 / 39	52 / 43	56 / 44	Minor/ Minor
NSR05, The Antiquaries	43 / 37	78 / 75	78 / 75	Major/ Major
NSR06, Atholl View	34 / 25	59 / 54	59 / 54	Minor/ Moderate
NSR07, Appin Drive	43 / 37	63 / 60	63 / 60	Minor/ Major
NSR08, Hawthorn Bank	49 / 37	46 / 39	51 / 41	Negligible/ Minor
* Format of presentation is [daytime] / [night]				

10.5.25 Comparison has been made of the magnitude of effect from Table 10.16 with the significance of effect from Table 10.6 to determine the following:

- During the daytime working period NSR01 (Seahorse Nursery and No.2 Edinburgh Road), NSR02 (West Harbour Road), NSR03 (Cockenzie House and Gardens) and NSR08 (Hawthorn Bank) have a potential direct, temporary short-term Adverse effect significance of **None**, which is **not significant**;
- During the daytime working period NSR06 (Atholl View), NSR04 (Hawthorn Terrace/ Whin Park) and NSR07 (Appin Drive) have a potential direct, temporary short-term Adverse effect significance of **Minor**, which is **not significant**;

- During the daytime NSR05 (The Antiquaries) has a potential direct, temporary short-term Adverse effect significance of **Major**, which is **significant**;
- At night NSR03 (Cockenzie House and Gardens), NSR04 (Hawthorn Terrace/ Whin Park) and NSR08 (Hawthorn Bank) have a potential direct, temporary short-term Adverse effect significance of **Minor**, which is **not significant**;
- At night NSR01 (Seahorse Nursery and No.2 Edinburgh Road), NSR02 (West Harbour Road) and NSR06 (Atholl View) and have a potential direct, temporary short-term Adverse effect significance of **Moderate**, which is **significant**;
- At night NSR05 (The Antiquaries) and NSR07 (Appin Drive) has a potential direct, temporary short-term Adverse effect significance of **Major**, which is **significant**.

10.5.26 The only in-addition cumulative effect is at NSR01 (Seahorse Nursery and No.2 Edinburgh Road) where a marginal increase of 1 dB(A) results in the effect significance to subsequently increase to become ***Moderate***, which is ***significant***.

Construction Works Associated with the Offshore Export Cable of Seagreen Windfarm

10.5.27 There is potential for a cable laying sea vessel to be inshore for a period of time which would coincide with the construction period of the Proposed Development. Therefore, the cumulative impact of these construction activities has been assessed.

10.5.28 Source noise from the cable laying sea vessel has been estimated by assuming that it is similar to a dredging vessel for which BS5228-1 provides an example (as BS5228-1 table entry C.7.2) with a sound power level of L_{wA} 110 dB (estimated from a representative level of $L_{Aeq,T}$ 82 dB measured at 10 m distance as set out in the standard).

10.5.29 The position of the cable laying sea vessel may vary and for the purpose of assessment it has been taken as being 100 m offshore from the Mean Low Water Spring (MLWS).

10.5.30 Table 10.17 provides the predicted contribution noise levels from the inshore activity of the offshore export cable for Seagreen Offshore Wind Farm. Also provided in Table 10.17 is the cumulative estimated magnitude of effect.

Table 10.17: Cumulative Construction Effect Magnitude with Offshore Export Cable Works

Receptor Location	Offshore Export Cable Works Contribution $L_{Aeq(working)}$ dB*	The Proposed Development Contribution $L_{Aeq(working)}$ dB*	Total Cumulative Noise Level $L_{Aeq(working)}$ dB*	Magnitude of Effect*
NSR01, Seahorse Nursery and No.2 Edinburgh Road	38 / 38 / 38	50 / 45 / 45	50 / 46 / 46	Negligible/ Minor/ Moderate
NSR02, West Harbour Road	36 / 36 / 36	51 / 48 / 48	51 / 48 / 48	Negligible/ Minor/ Moderate
NSR03, Cockenzie House and Gardens	36 / 36 / 36	44 / 38 / 38	45 / 40 / 40	Negligible/ Negligible/ Minor
NSR04, Hawthorn Terrace/ Whin Park	38 / 38 / 38	52 / 43 / 43	52 / 44 / 44	Negligible/ Negligible/ Minor
NSR05, The Antiquaries	53 / 53 / 53	78 / 75 / 75	78 / 75 / 75	Major/ Major/ Major
NSR06, Atholl View	32 / 32 / 32	59 / 54 / 54	59 / 54 / 54	Minor/ Minor/ Moderate
NSR07, Appin Drive	49 / 49 / 49	63 / 60 / 60	63 / 60 / 60	Minor/ Moderate/ Major
NSR08, Hawthorn Bank	37 / 37 / 37	45 / 39 / 39	46 / 41 / 41	Negligible/ Negligible/ Minor

Table 10.17: Cumulative Construction Effect Magnitude with Offshore Export Cable Works				
Receptor Location	**Offshore Export Cable Works Contribution $L_{Aeq(working)}$ dB***	**The Proposed Development Contribution $L_{Aeq(working)}$ dB***	**Total Cumulative Noise Level $L_{Aeq(working)}$ dB***	**Magnitude of Effect***
NSR09, Whin Park (south)	38 / 38 / 38	63 / 56 / 56	63 / 56 / 56	Minor / Moderate / Major
NSR10, Avenue Road B6371	36 / 36 / 36	59 / 53 / 53	59 / 53 / 53	Minor / Minor / Moderate
NSR11, Cedar Drive	34 / 34 / 34	57 / 50 / 50	57 / 50 / 50	Minor / Minor / Moderate
NSR12, 1A High Street	47 / 47 / 47	70 / 64 / 64	70 / 64 / 64	Moderate / Moderate / Major
NSR13, Coastal Recreation Area (Minimum Distance)	62 / 62 / 62	94 / 93 / N/A	94 / 93 / N/A	Major / Major / N/A
NSR13, Coastal Recreation Area (Maximum Distance)	49 / 49 / 49	64 / 59 / N/A	64 / 59 / N/A	Minor / Moderate / N/A
* Format of presentation is [daytime] / [evening] / [night]				

10.5.31 Comparison to Table 10.6 indicates the following significance of effect:

- During the daytime working period NSR01 (Seahorse Nursery and No.2 Edinburgh Road), NSR02 (West Harbour Road), NSR03 (Cockenzie House and Gardens), NSR04 (Hawthorn Terrace/ Whin Park) and NSR08 (Hawthorn Bank) have a potential direct, temporary short-term Adverse effect significance of **None**, which is **not significant**;
- During the daytime working period NSR06 (Atholl View), NSR07 (Appin Drive), NSR09 (Whin Park (south)), NSR10 (Avenue Road B6371) and NSR11 (Cedar Drive) have a potential direct, temporary short-term Adverse effect significance of **Minor**, which is **not significant**;
- During the daytime NSR12 (1A High Street) has a potential direct, temporary short-term Adverse effect significance of **Moderate**, which is **significant**;
- During the daytime NSR05 (The Antiquaries) has a potential direct, temporary short-term Adverse effect significance of **Major**, which is **significant**;
- In the evening and Saturday afternoon and evening, NSR03 (Cockenzie House and Gardens), NSR04 (Hawthorn Terrace/ Whin Park) and NSR08 (Hawthorn Bank) have a potential direct, temporary short-term Adverse effect significance of **None**, which is **not significant**;
- In the evening and Saturday afternoon and evening, NSR01 (Seahorse Nursery and No.2 Edinburgh Road), NSR02 (West Harbour Road), NSR06 (Atholl View), NSR10 (Avenue Road B6371) and NSR11 (Cedar Park) have a potential direct, temporary short-term Adverse effect significance of **Minor**, which is **not significant**;
- In the evening and Saturday afternoon and evening, NSR07 (Appin Drive), NSR09 (Whin Park (south)) and NSR12 (1A High Street) have a potential direct, temporary short-term Adverse effect significance of **Moderate**, which is **significant**;
- In the evening and Saturday afternoon and evening, NSR05 (The antiquaries) has a potential direct, temporary short-term Adverse effects significance of **Major**, which is **significant**;

- At night and on Sunday or a Bank Holiday, NSR03 (Cockenzie House and Gardens), NSR04 (Hawthorn Terrace/ Whin Park) and NSR08 (Hawthorn Bank) have a potential direct, temporary short-term Adverse effect significance of **Minor**, which is **not significant**;
- At night and on Sunday or a Bank Holiday, NSR01 (Seahorse Nursery and No.2 Edinburgh Road), NSR02 (West Harbour Road), NSR06 (Atholl View), NSR10 (Avenue Road B6371) and NSR11 (Cedar Drive) have a potential direct, temporary short-term Adverse effect significance of **Moderate**, which is **significant**; and
- At night and on Sunday or a Bank Holiday, NSR05 (The Antiquaries), NSR07 (Appin Drive), NSR09 (Whin Park (south)) and NSR12 (1A High Street) have a potential direct, temporary short-term Adverse effect significance of **Major**, which is **significant.**

10.5.32 At NSR13 (Coastal Recreation Area) the potential direct, temporary short-term Adverse effect significance varies between ***Minor*** and ***Moderate***, depending on the location within the area. Based on the ability of transient users to avoid the worst of the effect. It is therefore considered to be ***not significant***.

10.5.33 The only in-addition change associated with the cumulative effects is:

- NSR01 (Seahorse Nursery and No.2 Edinburgh Road) where the effect significance increases in the evening to be **Minor**, which is **not significant** and at night to be **Moderate**, which is **significant**.

Operational Inch Cape Onshore Substation

10.5.34 The Inch Cape onshore transmission works would, if constructed, operate simultaneously with the Proposed Development. Therefore, the cumulative operational effect has been considered. Table 10.18 provides the magnitude of effect with both developments operational, based on the assessment set out in the 2018 Inch Cape EIAR. The assessment is limited to the sensitive receptor locations NSR01 to NSR08 inclusive as available data for the Inch Cape onshore transmission works exists only at these locations for comparison; however, this assessment is considered representative of the other receptors considered.

Table 10.18: Cumulative Operational Effect Magnitude with Inch Cape Onshore Substation

Receptor Location	Inch Cape Substation Contribution $L_{Ar,Tr}$ dB*	The Proposed Development Contribution $L_{Ar,Tr}$ dB*	Total Cumulative Rating Level $L_{Ar,Tr}$ dB*	Prevailing Background Noise Level $L_{A90,T}$ dB*	Magnitude of Effect*
NSR01, Seahorse Nursery and No.2 Edinburgh Road	33 / 33	29 / 29	34 / 34	52 / 35	-18 / -1 Negligible/ Minor
NSR02, West Harbour Road	30 / 31	28 / 28	32 / 33	47 / 36	-15 / -3 Negligible/ Minor
NSR03, Cockenzie House and Gardens	28 / 29	36 / 36	37 / 37	47 / 36	-10 / +1 Negligible/ Minor
NSR04, Hawthorn Terrace/ Whin Park	34 / 34	38 / 38	39 / 39	41 / 29	-2 / +10 Minor/ Major
NSR05, The Antiquaries	29 / 30	38 / 38	39 / 39	52 / 30	-13 / +9 Negligible/ Moderate

Table 10.18: Cumulative Operational Effect Magnitude with Inch Cape Onshore Substation					
Receptor Location	**Inch Cape Substation Contribution $L_{Ar,Tr}$ dB***	**The Proposed Development Contribution $L_{Ar,Tr}$ dB***	**Total Cumulative Rating Level $L_{Ar,Tr}$ dB***	**Prevailing Background Noise Level $L_{A90,T}$ dB***	**Magnitude of Effect***
NSR06, Atholl View	21 / 24	42 / 42	42 / 42	34 / 26	+8 / +16 Moderate/ Major
NSR07, Appin Drive	28 / 30	38 / 38	38 / 39	42 / 26	-4 / +13 Minor/ Major
NSR08, Hawthorn Bank	31 / 31	29 / 29	33 / 33	52 / 35	-19 / -2 Negligible/ Minor
NSR09, Whin Park (south)**	26 / 26	50 / 50	50 / 50	41 / 29	+9 / +21 Moderate/ Major
* Format of presentation is [daytime] / [night] ** Although not assessed in the 2018 Inch Cape EIAR, noise levels were assessed at this location based on the levels predicted at NSR04 (Hawthorn Terrace/ Whin Park) with an 8 dB reduction applied to account for additional screening and distance attenuation from Inch Cape.					

10.5.35 Comparison has been made of the magnitude of effect from Table 10.18 with the significance of effect from Table 10.6 to determine the following:

- At sensitive receptors NSR01 (Seahorse Nursery and No.2 Edinburgh Road), NSR02 (West Harbour Road), NSR03 (Cockenzie House and Gardens), NSR05 (The Antiquaries) and NSR08 (Hawthorn Bank) during the daytime the potential direct, permanent Adverse effect significance is **None**, which is **not significant**;
- At sensitive receptors NSR04 (Hawthorn Terrace/ Whin Park) and NSR07 (Appin Drive) during the daytime the potential direct, permanent Adverse effect significance is **Minor**, which is **not significant**;
- At sensitive receptors NSR06 (Atholl View) and NSR09 (Whin Park (south)) during the daytime the potential direct, permanent Adverse effect significance is **Moderate**, which is **significant**;
- At sensitive receptors NSR01 Seahorse Nursery and No.2 Edinburgh Road), NSR02 (West Harbour Road), NSR03 (Cockenzie House and Gardens) and NSR08 (Hawthorn Bank) at night the potential direct, permanent Adverse effect significance is **Minor**, which is **not significant**;
- At sensitive receptor NSR05 (The Antiquaries) at night the potential direct, permanent Adverse effect significance is **Moderate**, which is **significant**; and
- At sensitive receptors NSR04 (Hawthorn Terrace/ Whin Park), NSR06 (Athol View) NSR07 (Appin Drive) and NSR09 (Whin Park (south)) at night the potential direct, permanent Adverse effect significance is **Major**, which is **significant**.

10.5.36 The in-addition cumulative effect are as follows:

- NSR01 (Seahorse Nursery and No.2 Edinburgh Road) where the effect significance increases at night to be **Minor**, which is **not significant**;
- NSR02 (West Harbour Road) where the effect significance increases at night to be **Minor**, which is **not significant**; and
- NSR04 (Hawthorn Terrace / Whin Park) where the effect significance increases at night to be **Major**, which is **significant**.

10.6 Mitigation

Mitigation during Construction

10.6.1 The assessment of likely effects has indicated that mitigation will be necessary to reduce the impact of noise on some of the sensitive receptors. The quantity of sensitive receptors affected is greater at night than during the evening or daytime.

10.6.2 This section discusses indicative mitigation measures identified to reduce the potential significant effects identified, based on the worst-case assumptions made at this stage in the above assessment. Whilst the following discussion highlights mitigation measures that could potentially be applied, the suitability of the proposed mitigation measures discussed below will need to be determined at a later stage, in particular once the final locations from which HDD works will be conducted and the necessary equipment have been determined. The worst-case noise levels predicted above for HDD work assumed as a worst-case a location for the drilling rig at ground level (and not down in a pit) and at the closest point to the nearest-noise sensitive receivers: locating this further way would reduce noise levels. Furthermore, the assumed source levels for this activity (Table 10.11) may not arise in practice based on many factors, including soil condition and type of equipment used.

10.6.3 Residual effects in the chapter will be assessed based on *indicative* construction mitigation measures as described below. The final mitigation required is expected to be developed as the site design progresses between the main contractor (or their representative) and consultation with ELC, to form method statements, inclusions for the CEMP or other agreement.

10.6.4 Several good practice management measures are first proposed:

- Mobile plant and stationary plant items to be routed or located to maximise separation distance from noise-sensitive receptors (where possible), accounting for site-specific constraints;
- Select quieter plant units where possible;
- All plant when not in use is to be switched off;
- Operate only well-maintained construction plant selected for the specific activity; and
- Provide Site specific induction inclusive of good neighbourly behaviour.

10.6.5 The above would represent best practice. Further guidance in this regard in BS5228-1 will also be referenced. Combined with acknowledgement that plant will not in reality operate at full power continuously (as per the worst-case assumptions of the pre-mitigation assessment), the predicted noise levels stated would be expected to potentially be reduced by approximately 5 dB(A).

10.6.6 Signage should be added for transient users of the Coastal Recreation Area and the John Muir Way to warn them of the construction work and route them away from the construction works if possible.

10.6.7 Work during Saturday afternoons and evenings should be avoided for the noisier works considered above (such as piling work for the Transition Joint Bay and Onshore Substation and Platform, excavation for the onshore export cable or the pulling pits) and restricted to daytime hours of 07:00 to 19:00 during weekdays or Saturday mornings (until 13:00 hours), unless otherwise agreed with ELC. All other construction activities (e.g. welfare facilities, site clearance, storage, landscaping, site access etc.) may continue during Saturday afternoons.

10.6.8 To minimise noise levels from the HDD activities associated with the proposed trenchless work, local temporary solid screening is proposed as follows (at this stage and based on the worst-case assumptions made):

- around the HDD working areas (at landfall and under the B1348) and Transition Joint Bay working area. The height and mass of which would provide at least a 13 dB(A) reduction in sound pressure level contribution to NSR05 (The Antiquaries).
- around the HDD works at the Site substation location. The height and mass of which would provide at least 12 dB(A) reduction in sound pressure level at NSR05 (The Antiquaries), NSR09 (Whin Park (south)) and NSR12 (1A High Street).

10.6.9 The acoustic screening performance could be achieved for example using temporary solid barriers or metal containers, with a height of 4 m to 5 m in proximity (around 10 m or less) of the trenchless drilling work, although a similar acoustic performance could be achieved in other ways. The indicative screening reduction requirements may be offset by taking into account more detail of the likely noise emissions, final locations (including above/ below ground working), and working on-times of the associated plant.

10.6.10 Furthermore, during periods of HDD drilling at landfall and under the B1348, continuous noise monitoring would be installed for the period of the HDD works at locations representative of the nearest noise-sensitive locations (such as NSR05 (The Antiquaries), NSR07 (Appin Drive), NSR09 (Whin Park (south) and/ or NSR12 (1A High Street)), in consultation with ELC. If the monitoring determines that relevant threshold noise levels (65 dB(A) during the day-time, 55 dB(A) during evening periods (and afternoon on a Saturday) and 45 dB(A) at night-time) are being exceeded, then drilling would cease until measures have been put in place to suitably control noise levels to within these threshold values. Whilst drilling is interrupted, it is likely that ancillary plant such as pumps and generators could continue to run during evening and night periods as these are substantially quieter and more amenable to mitigate with enclosures etc. Drilling interruption during evening and night periods may however increase the likely duration of the drilling works from approximately four weeks to 11 weeks in each instance. As baseline levels in the area can be already above 45 dB L_{Aeq} at night (see Table 10.8), the monitoring would need to consider the specific contribution of the construction work with care.

10.6.11 For HDD works near the proposed Substation, following implementation of the above indicative mitigation, it is considered unlikely that night-time thresholds of 45 dB(A) would be exceeded at the nearest residential properties and therefore no additional mitigation is proposed.

10.6.12 The determination and implementation of the final mitigation measures can be secured at the matters specified application stage by condition.

Mitigation during Operation

10.6.13 The assessment of likely significant effects has indicated that mitigation is likely to be necessary to reduce the impact of operational noise on some of the sensitive receptors.

10.6.14 The final specification of noise mitigation measures will be determined once the detailed design of the Site has been finalised, including selection of final plant. This should be determined such that cumulative rated noise levels $L_{Ar,Tr}$, including the applicable character correction and the assumed contribution of the Inch Cape substation, do not exceed either 35 dB or 4 dB above prevailing background noise levels of Table 10.8. The assessment below shows that this is achievable in practice if predicted rated noise levels from the proposed substation in isolation do not exceed a level of 35 dB $L_{Ar,Tr.}$

10.6.15 Based on the above predictive assessment including the indicative sound emission noise levels of Table 10.14, the following indicative operational noise mitigation measures would achieve the required reduction in noise levels:

- Incorporation of a 3 m high (above local ground level) solid noise barrier along the north eastern platform boundary of the onshore substation (the extent of the screening required would take into account the existing Cockenzie Substation building which provides substantial screening of the proposed substation to properties on Whin Park such as NSR04 or NSR09);
- Enclosures selected to provide a minimum 11 dB(A) reduction to SGT Transformer 1 and SGT Transformer 2;
- Enclosures selected to provide a minimum 5 dB(A) reduction to Shunt Reactor 1 and Shunt Reactor 2; and
- Noise control to provide a minimum 7 dB(A) reduction to the SGT Transformer 1 and SGT Transformer 2 cooling plant.

10.6.16 These measures are all considered achievable using standard noise mitigation measures. Alternatively, selection of quieter plant may reduce the need for screening/ attenuation measures as set out above.

10.6.17 The final site design and mitigation can be secured at the matters specified application stage by condition.

10.7 Assessment of Residual Effects

Residual Construction Effects

Noise Assessment

10.7.1 Table 10.19 provides the predicted noise levels incorporating the screening elements of the proposed indicative mitigation, but assuming as previously as a worst-case that the construction activities of Table 10.11 (including trenchless work at all potential sites) could occur simultaneously.

Table 10.19: Magnitude of Construction Noise Levels Post Mitigation

Receptor	Daytime $L_{Aeq(working)}$ dB	Magnitude of Daytime Effect	Evening (inclusive of Saturday PM) $L_{Aeq(working)}$ dB	Magnitude of Evening Effect (inclusive of Saturday PM)	Night (Inclusive of Sunday and Bank Holiday) $L_{Aeq(working)}$ dB	Magnitude of Night Effect (Inclusive of Sunday and Bank Holiday)
NSR01, Seahorse Nursery and No.2 Edinburgh Road	46	Negligible	33	Negligible	33	Negligible
NSR02, West Harbour Road	44	Negligible	35	Negligible	35	Negligible
NSR03, Cockenzie House and Gardens	41	Negligible	25	Negligible	25	Negligible
NSR04, Hawthorn	51	Negligible	30	Negligible	30	Negligible

Table 10.19: Magnitude of Construction Noise Levels Post Mitigation

Receptor	Daytime $L_{Aeq(working)}$ dB	Magnitude of Daytime Effect	Evening (inclusive of Saturday PM) $L_{Aeq(working)}$ dB	Magnitude of Evening Effect (inclusive of Saturday PM)	Night (Inclusive of Sunday and Bank Holiday) $L_{Aeq(working)}$ dB	Magnitude of Night Effect (Inclusive of Sunday and Bank Holiday)
Terrace/ Whin Park						
NSR05, The Antiquaries	70[+]	Moderate[+]	62	Moderate[#]	62	Major[#]
NSR06, Atholl View	58	Minor	44	Negligible	44	Minor
NSR07, Appin Drive	54	Negligible	47	Minor	47[+]	Moderate[#+]
NSR08, Hawthorn Bank	43	Negligible	27	Negligible	27	Negligible
NSR09, Whin Park (south)	62	Minor	44	Negligible	44	Minor
NSR10, Avenue Road B6371	57	Minor	40	Negligible	40	Minor
NSR11, Cedar Drive	55	Negligible	38	Negligible	38	Minor
NSR12, 1A High Street	64	Minor	51	Minor	51	Moderate[#]
NSR13, Coastal Recreation Area*	82 / 61	Major / Minor	80 / 47	Major / Minor	N/A	N/A

* Presentation of the results is (at minimum distance) / (at maximum distance)

[#] Magnitude of effect does not include the proposed mitigation proposed, including management of HDD noise through continuous monitoring. Accounting for these aspects of the mitigation it is reasonable to consider the magnitude of effect as Minor.

[+] The mitigation proposed for best practice indicates that the predicted level could be up to 5 dB(A) lower through managed activity. Therefore, the magnitude of effect could likely reduce to Minor in any case.

10.7.2 The initial assessment of effect significance set out in Table 10.19 does not account for the proposed mitigation measures described in section 10.6 for trenchless work. Specifically, subject to a finalised assessment of the proposed works, noise from HDD activities at the landfall/ B1348 sites will be monitored and interrupted during evening/nights if required.

10.7.3 Accounting for this and the likely reductions in noise emissions levels associated with good practice measures, the following residual magnitudes of effects are determined:

- During the daytime at sensitive receptors NSR01 (Seahorse Nursery and No.2 Edinburgh Road), NSR02 (West Harbour Road), NSR03 (Cockenzie House and Gardens), NSR04 (Hawthorn Terrace/ Whin Park) , NSR07 (Appin Drive), NSR08 (Hawthorn Bank) and NSR11 (Cedar Drive) the potential direct, temporary Adverse residual effect significance is **None**, which is **not significant**;
- During the daytime at sensitive receptors NSR05 (The Antiquaries), NSR06 (Atholl View), NSR09 (Whin Park (south)), NSR10 (Avenue Road B6371) and NSR12 (1A High Street) the potential direct, temporary Adverse residual effect significance is **Minor**, which is **not significant**;

- During the evening at sensitive receptors NSR01 (Seahorse Nursery and No.2 Edinburgh Road), NSR02 (West Harbour Road), NSR03 (Cockenzie House and Gardens), NSR04 (Hawthorn Terrace/ Whin Park), NSR06 (Atholl View), NSR08 (Hawthorn Bank), NSR09 (Whin Park (south)), NSR10 Avenue Road B6371) and NSR11 (Cedar Drive) the potential direct, temporary Adverse residual effect significance is **None**, which is **not significant**;
- During the evening at sensitive receptors NSR05 (The Antiquaries), NSR07 (Appin Drive) and NSR12 (1A High Street) the potential direct, temporary Adverse residual effect significance is **Minor**, which is **not significant**;
- At night at sensitive receptors NSR01 (Seahorse Nursery and No.2 Edinburgh Road), NSR03 (Cockenzie House and Gardens), NSR04 (Hawthorn Terrace/ Whin Park) and NSR08 (Hawthorn Bank) the potential direct, temporary Adverse residual effect significance is **None**, which is **not significant**; and
- At night at sensitive receptors NSR02 (West Harbour Road), NSR05 (The Antiquaries), NSR06 (Atholl View), NSR07 (Appin Drive), NSR09 (Whin Park (south)), NSR10 Avenue Road B6371), NSR11 (Cedar Drive) and NSR12 (1A High Street) the potential direct, temporary Adverse residual effect significance is **Minor**, which is **not significant**.

10.7.4 At NSR13 (Coastal Recreation Area) the potential direct, temporary short-term Adverse effect significance varies between **Minor** and **Moderate**, depending on the location within the area. Based on the ability of transient users to avoid the worst of the effect and accounting for the proposed mitigation measures, it is therefore considered to be **not significant**.

Vibration Assessment

10.7.5 No specific mitigation or enhancement is proposed other than best practice working. The residual effects remain the same as the assessment effects:

- A potential direct, temporary, short-term Adverse effect significance of **Minor** at NSR05 (The Antiquaries), which is **not significant**; and
- a potential direct, temporary, short-term Adverse effect significance of **None** at all other sensitive receptors NSR01 to NSR04 and NSR06 to NSR12, which is **not significant**.

10.7.6 The magnitude of effect varies between Negligible and Moderate at NSR13 (Coastal Recreation Area). Therefore, the potential direct, temporary short-term Adverse effect significance varies between **None** and **Minor**, depending on the location within the area. Based on the ability of transient users to avoid the worst of the effect and accounting for the proposed mitigation measures, it is therefore considered to be **not significant**.

Residual Operational Effects

10.7.7 Table 10.20 provides the predicted noise levels incorporating proposed indicative mitigation measures described in section 10.6 above (solid noise barrier and enclosures/ noise control measures).

Table 10.20: Operational Magnitude of Effect Post Mitigation

Receptor Location	Specific Noise Level $L_{Aeq,T}$ dB*	BS 4142 Penalty Applied dB*	Rating Level $L_{Ar,Tr}$ dB*	Prevailing Background Noise Level $L_{A90,T}$ dB*	Magnitude of Effect*
NSR01, Seahorse Nursery and No.2 Edinburgh Road	13 / 13	+4 / +4	17 / 17	52 / 35	-35 / -18 Negligible/ Negligible

Table 10.20: Operational Magnitude of Effect Post Mitigation

Receptor Location	Specific Noise Level $L_{Aeq,T}$ dB*	BS 4142 Penalty Applied dB*	Rating Level $L_{Ar,Tr}$ dB*	Prevailing Background Noise Level $L_{A90,T}$ dB*	Magnitude of Effect*
NSR02, West Harbour Road	12 / 12	+4 / +4	16 / 16	47 / 36	-31 / -20 Negligible/ Negligible
NSR03, Cockenzie House and Gardens	22 / 22	+4 / +4	26 / 26	47 / 36	-22 / -11 Negligible/ Negligible
NSR04, Hawthorn Terrace/ Whin Park	25 / 25	+4 / +4	29 / 29	41 / 29	-12 / 0 Negligible/ Minor
NSR05, The Antiquaries	25 / 25	+4 / +4	29 / 29	52 / 30	-24 / -1 Negligible/ Minor
NSR06, Atholl View	29 / 29	+4 / +4	33 / 33	34 / 26	-1 / +7 Minor/ Minor[#]
NSR07, Appin Drive	25 / 25	+4 / +4	29 / 29	42 / 26	-13 / +3 Negligible/ Minor
NSR08, Hawthorn Bank	14 / 14	+4 / +4	18 / 18	52 / 35	-34 / -17 Negligible/ Negligible
NSR09, Whin Park (south)	30 / 30	+4 / +4	34 / 34	41 / 29	-7 / +5 Negligible/ Minor[#]
NSR10, Avenue Road B6371	25 / 25	+4 / +4	29 / 29	41 / 35	-12 / -6 Negligible/ Negligible
NSR11, Cedar Drive	21 / 21	+4 / +4	25 / 25	41 / 35	-16 / -10 Negligible/ Negligible
NSR12, 1A High Street	24 / 24	+4 / +4	28 / 28	52 / 30	-24 / -2 Negligible/ Minor
NSR13, Coastal Recreation Area	29 / N/A	+4 / N/A	33 / N/A	52 / N/A	-19 / N/A Negligible/ N/A

* Format of presentation is [daytime] / [night]

[#] Context analysis taken into account as the Rating Level does not exceed $L_{Ar,Tr}$ 35 dB

10.7.8 Comparison has been made of the magnitude of effect from Table 10.20 with the significance of effect from Table 10.6 to determine the following:

- During the daytime at sensitive receptors NSR01 (Seahorse Nursery and No.2 Edinburgh Road), NSR02 (West Harbour Road), NSR03 (Cockenzie House and Gardens), NSR04 (Hawthorn Terrace/ Whin Park), NSR05 (The Antiquaries), NSR07 (Appin Drive), NSR08 (Hawthorn Bank), NSR09 (Whin Park (south)), NSR10 (Avenue Road B6371), NSR11 (Cedar Drive), NSR12 (1A High Street) and NSR13 (Coastal Recreation Area) the potential direct, permanent Adverse residual effect significance is **None**, which is **not significant**;
- During the daytime at sensitive receptor NSR06 (Atholl View) the potential direct, permanent Adverse residual effect significance is **Minor**, which is **not significant**;
- At night at sensitive receptors NSR01 (Seahorse Nursery and No.2 Edinburgh Road), NSR02 (West Harbour Road), NSR03 (Cockenzie House and Gardens), NSR08 (Hawthorn Bank), NSR10 (Avenue Road B6371 and NSR11 (Cedar Drive) the potential direct, permanent Adverse residual effect significance is **None**, which is **not significant**; and

- At night at sensitive receptors NSR04 (Hawthorn Terrace/ Whin Park), NSR05 (The Antiquaries), NSR06 (Atholl View), NSR07 (Appin Drive), NSR09 (Whin Park (south) and NSR12 (1A High Street) the potential direct, permanent Adverse residual effect significance is **Minor**, which is **not significant**.

Residual Cumulative Effects

Construction Works Associated with Inch Cape Substation

10.7.9 Table 10.21 provides the cumulative assessment based on the residual noise levels.

Table 10.21: Cumulative Construction Effect Magnitude with Inch Cape Post Mitigation

Receptor Location	Inch Cape Contribution $L_{Aeq(working)}$ dB*	The Proposed Development Contribution $L_{Aeq(working)}$ dB*	Total Cumulative Noise Level $L_{Aeq(working)}$ dB*	Magnitude of Effect*
NSR01, Seahorse Nursery and No.2 Edinburgh Road	53 / 40	46 / 33	54 / 41	Negligible/ Minor
NSR02, West Harbour Road	48 / 37	44 / 35	49 / 39	Negligible/ Minor
NSR03, Cockenzie House and Gardens	47 / 36	41 / 25	48 / 36	Negligible/ Minor
NSR04, Hawthorn Terrace/ Whin Park	53 / 39	51 / 30	55 / 40	Negligible/ Minor
NSR05, The Antiquaries	43 / 37	70^{+} / 62	70^{+} / 62	Moderate^{+}/ Major$^{\#}$
NSR06, Atholl View	34 / 25	58 / 44	58 / 44	Minor/ Minor
NSR07, Appin Drive	43 / 37	54 / 47	54 / 47	Negligible/ Moderate$^{+\#}$
NSR08, Hawthorn Bank	49 / 37	43 / 27	50 / 37	Negligible/ Minor

* Format of presentation is [daytime] / [night]

$^{\#}$ Magnitude of effect does not include the proposed mitigation proposed, including management of HDD noise through continuous monitoring. Accounting for these aspects of the mitigation it is reasonable to consider the magnitude of effect as Minor.

$^{+}$ The mitigation proposed for best practice indicates that the predicted level could be up to 5 dB(A) lower through managed activity. Therefore, the magnitude of effect could likely reduce to Minor in any case.

10.7.10 As for Table 10.19, the initial assessment of effect significance set out in Table 10.21 does not account for the proposed mitigation measures described in section 10.6 for trenchless work. Accounting for this and the likely reductions in noise emissions levels associated with good practice measures, the following residual magnitudes of effects are determined:

- During the daytime working period NSR01 (Seahorse Nursery and No.2 Edinburgh Road), NSR02 (West Harbour Road), NSR03 (Cockenzie House and Gardens), NSR04 (Hawthorn Terrace/ Whin Park), NSR07 (Appin Drive) and NSR08 (Hawthorn Bank) have a potential direct, temporary short-term Adverse effect significance of **None**, which is **not significant**;
- During the daytime NSR05 (The Antiquaries) and NSR06 (Atholl View) has a potential direct, temporary short-term Adverse effect significance of **Minor**, which is **not significant**; and
- At night NSR01 (Seahorse Nursery and No.2 Edinburgh Road), NSR02 (West Harbour Road), NSR03 (Cockenzie House and Gardens), NSR04 (Hawthorn Terrace/ Whin Park), NSR05 (The Antiquaries), NSR06 (Atholl View), NSR07 (Appin Drive) and NSR08

(Hawthorn Bank) have a potential direct, temporary short-term Adverse effect significance of **Minor**, which is **not significant**.

Construction Works Associated with the Offshore Export Cable of Seagreen Windfarm

10.7.11 Table 10.22 provides the cumulative assessment based on the residual noise levels.

Table 10.22: Cumulative Construction Effect Magnitude with Offshore Export Cable Works Post Mitigation

Receptor Location	Offshore Export Cable Works Contribution $L_{Aeq(working)}$ dB*	The Proposed Development Contribution $L_{Aeq(working)}$ dB*	Total Cumulative Noise Level $L_{Aeq(working)}$ dB*	Magnitude of Effect*
NSR01, Seahorse Nursery and No.2 Edinburgh Road	38 / 38 / 38	46 / 33 / 33	47 / 39 / 39	Negligible/ Negligible/ Minor
NSR02, West Harbour Road	36 / 36 / 36	44 / 35 / 35	45 / 39 / 39	Negligible/ Negligible/ Minor
NSR03, Cockenzie House and Gardens	36 / 36 / 36	41 / 25 / 25	42 / 36 / 36	Negligible/ Negligible/ Minor
NSR04, Hawthorn Terrace/ Whin Park	38 / 38 / 38	51 / 30 / 30	51 / 39 / 39	Negligible/ Negligible/ Minor
NSR05, The Antiquaries	53 / 53 / 53	70[+] / 62 / 62	70[+] / 63 / 63	Moderate[+] / Moderate[#] / Major[#]
NSR06, Atholl View	32 / 32 / 32	58 / 44/ 44	58 / 44 / 44	Minor/ Negligible/ Minor
NSR07, Appin Drive	49 / 49 / 49	54 / 47 / 47	55 / 51 / 51	Negligible/ Minor/ Moderate[#]
NSR08, Hawthorn Bank	37 / 37 / 37	43 / 27 / 27	44 / 37 / 37	Negligible/ Negligible/ Minor
NSR09, Whin Park (south)	38 / 38 / 38	62 / 44 / 44	62 / 45 / 45	Minor/ Negligible/ Minor
NSR10, Avenue Road B6371	36 / 36 / 36	57 / 40 / 40	57 / 41 / 41	Minor/ Negligible/ Minor
NSR11, Cedar Drive	34 / 34 / 34	55 / 38 / 38	55 / 39 / 39	Negligible/ Negligible/ Minor
NSR12, 1A High Street	47 / 47 / 47	64 / 51 / 51	64 / 52 / 52	Minor/ Minor/ Moderate[#]
NSR13, Coastal Recreation Area (Minimum Distance)	62 / 62 / 62	82 / 80 / N/A	82 / 80 / N/A	Major/ Major/ N/A
NSR13, Coastal Recreation Area (Maximum Distance)	49 / 49 / 49	61 / 47 / N/A	61 / 51 / N/A	Minor/ Minor/ N/A

* Format of presentation is [daytime] / [evening] / [night]

[#] Magnitude of effect does not include the proposed mitigation proposed, including management of HDD noise through continuous monitoring. Accounting for these aspects of the mitigation it is reasonable to consider the magnitude of effect as Minor.

[+] The mitigation proposed for best practice indicates that the predicted level could be up to 5 dB(A) lower through managed activity. Therefore, the magnitude of effect could likely reduce to Minor in any case.

10.7.12 As for Table 10.19, the initial assessment of effect significance set out in Table 10.22 does not account for the proposed mitigation measures described in section 10.6 for trenchless work. Accounting for this and the likely reductions in noise emissions levels associated with good practice measures, the following residual magnitudes of effects are determined:

- During the daytime working period NSR01 (Seahorse Nursery and No.2 Edinburgh Road), NSR02 (West Harbour Road), NSR03 (Cockenzie House and Gardens), NSR04 (Hawthorn Terrace/ Whin Park), NSR07 (Appin Drive), NSR08 (Hawthorn Bank) and NSR11 (Cedar Park) have a potential direct, temporary short-term Adverse effect significance of **None**, which is **not significant**;
- During the daytime working period NSR05 (The Antiquaries), NSR06 (Atholl View), NSR09 (Whin Park (south)), NSR10 (Avenue Road B6371) and NSR12 (1A High Street) have a potential direct, temporary short-term Adverse effect significance of **Minor**, which is **not significant**;
- In the evening and Saturday afternoon and evening, NSR01 (Seahorse Nursery and No.2 Edinburgh Road), NSR02 (West Harbour Road), NSR03 (Cockenzie House and Gardens), NSR04 (Hawthorn Terrace/ Whin Park), NSR06 (Atholl View), NSR07 (Appin Drive), NSR08 (Hawthorn Bank), NSR09 (Whin Park (south), NSR10 (Avenue Road B6371) and NSR11 (Cedar Park) have a potential direct, temporary short-term Adverse effect significance of **None**, which is **not significant**;
- In the evening and Saturday afternoon and evening, NSR05 (The Antiquaries) and NSR12 (1A High Street) have a potential direct, temporary short-term Adverse effect significance of **Minor**, which is **not significant**;
- At night and on Sunday or a Bank Holiday, NSR01 (Seahorse Nursery and No.2 Edinburgh Road), NSR02 (West Harbour Road), NSR03 (Cockenzie House and Gardens), NSR04 (Hawthorn Terrace/ Whin Park), NSR05 (The Antiquaries), NSR06 (Atholl View), NSR09 (Whin Park (south)), NSR08 (Hawthorn Bank), NSR10 (Avenue Road B6371), NSR11 (Cedar Park) and NSR12 (1A High Street) have a potential direct, temporary short-term Adverse effect significance of **Minor**, which is **not significant**; and
- At night and on Sunday or a Bank Holiday, NSR07 (Appin Drive) has a potential direct, temporary short-term Adverse effect significance of **Moderate**, which is **significant**. This is due in part to the contribution of the offshore Windfarm cable laying sea vessel which exceeds the threshold used in this assessment between **Minor** and **Moderate** by +4 dB(A). The proposed mitigation measures, including screening around the HDD area will potentially reduce these effects too although this was not taken into account in the analysis. By controlling HDD noise levels at NSR07 (Appin Drive) through the proposed monitoring will reduce the specific cumulative contribution of the Proposed Development, resulting in a maximum increase of +1 dB(A) which is unlikely to be perceptible. The in-addition cumulative effect of the Proposed Development is therefore considered **not significant** on balance.

10.7.13 At NSR13 (Coastal Recreation Area) the potential direct, temporary short-term Adverse effect significance varies between **Minor** and **Moderate**, depending on the location within the area. Based on the ability of transient users to avoid the worst of the effect and accounting for the proposed mitigation measures, it is therefore considered to be **not significant**.

Operational Inch Cape Onshore Substation

10.7.14 Table 10.23 provides the residual cumulative assessment after accounting for the proposed mitigation.

Table 10.23: Cumulative Operational Effect Magnitude with Inch Cape Onshore Substation Post Mitigation

Receptor Location	Inch Cape Substation Contribution $L_{Ar,Tr}$ dB*	The Proposed Development Contribution $L_{Ar,Tr}$ dB*	Total Cumulative Rating Level $L_{Ar,Tr}$ dB*	Prevailing Background Noise Level $L_{A90,T}$ dB*	Magnitude of Effect*
NSR01, Seahorse Nursery and No.2 Edinburgh Road	33 / 33	20 / 20	33 / 33	52 / 35	-19 / -2 Negligible/ Minor
NSR02, West Harbour Road	30 / 31	19 / 19	30 / 31	47 / 36	-17 / -5 Negligible/ Negligible
NSR03, Cockenzie House and Gardens	28 / 29	27 / 27	31 / 31	47 / 36	-16 / -5 Negligible/ Negligible
NSR04, Hawthorn Terrace/ Whin Park	34 / 34	30 / 30	35 / 35	41 / 29	-6 / +6 Minor/ Minor[#]
NSR05, The Antiquaries	29 / 30	29 / 29	32 / 33	52 / 30	-20 / +3 Negligible/ Minor
NSR06, Atholl View	21 / 24	34 / 34	34 / 34	34 / 26	-0 / +8 Negligible/ Minor[#]
NSR07, Appin Drive	28 / 30	29 / 29	32 / 33	42 / 26	-10 / +7 Negligible/ Minor[#]
NSR08, Hawthorn Bank	31 / 31	21 / 21	31 / 31	52 / 35	-21 / -4 Negligible/ Minor[#]
NSR09, Whin Park (south)**	26 / 26	34 / 34	34 / 34	41 / 29	-6 / +6 Negligible/ Minor[#]

* Format of presentation is [daytime] / [night]

** Although not assessed in the 2018 Inch Cape EIAR, noise levels were assessed at this location based on the levels predicted at NSR04 (Hawthorn Terrace / Whin Park) with an 8 dB reduction applied to account for additional screening and distance attenuation from Inch Cape.

[#] Context analysis taken into account as the Rating Level does not exceed $L_{Ar,Tr}$ 35 dB

10.7.15 Comparison has been made of the magnitude of effect from Table 10.23 with the significance of effect from Table 10.6 to determine the following:

- During the daytime at sensitive receptors NSR01 (Seahorse Nursery and No.2 Edinburgh Road), NSR02 (West Harbour Road), NSR03 (Cockenzie House and Gardens), NSR05 (The Antiquaries), NSR06 (Atholl View), NSR07 (Appin Drive), NSR08 (Hawthorn Bank) and NSR09 (Whin Park (south)) the potential direct, permanent Adverse effect significance is **None**, which is **not significant**;

- During the daytime at sensitive receptor NSR04 (Hawthorn Terrace/ Whin Park) the potential direct, permanent Adverse effect significance is **Minor**, which is **not significant**;
- At night at sensitive receptors NSR02 (West Harbour Road) and NSR03 (Cockenzie House and Gardens) the potential direct, permanent Adverse effect significance is **None**, which is **not significant**; and
- At night at sensitive receptors NSR01 Seahorse Nursery and No.2 Edinburgh Road), NSR04 (Hawthorn Terrace/ Whin Park), NSR05 (The Antiquaries), NSR06 (Atholl View), NSR07 (Appin Drive), NSR08 (Hawthorn Bank) and NSR09 (Whin Park (south)) the potential direct, permanent Adverse effect significance is **Minor**, which is **not significant**.

10.8 Summary

10.8.1 The scope of the assessment and prevailing baseline conditions have been accepted by ELC as appropriate for the Proposed Development and under the COVID-19 circumstances.

10.8.2 Worst-case sensitive receptor locations have been identified and used in the assessment.

10.8.3 Construction working may require periods of evening and night activity to complete the trenchless works, expected to last for a period of several weeks' durations on each occasion. The assessment indicates that mitigation is required to be developed within construction method statements, and this will be finalised at a later stage once the final locations from which HDD works will be conducted and the necessary equipment have been determined. In addition to good practice measures, the associated mitigation could involve local use of screening barriers, as well as continuous noise monitoring with HDD drilling interrupted if applicable thresholds are exceeded. This is proposed to be developed in conjunction with ELC and can be conditioned. The residual effects are stated in Table 10.24.

10.8.4 Operational noise has been assessed and the results indicate that noise control mitigation is necessary to some of the plant and equipment. An indicative mitigation strategy combining a solid barrier to the north-east boundary of the substation with sound reduction levels for enclosures and other noise control to cooling plant have been set out based on initial plant selections. The details can be conditioned by ELC. The residual effects are stated in Table 10.24.

10.8.5 Cumulative effects have been considered for three potential circumstances:

- Inch Cape onshore transmission works construction occurring simultaneously with the Proposed Development construction works with worst-case working assumed;
- Seagreen Offshore Windfarm offshore export cable works construction occurring simultaneously with the Proposed Development construction works with worst-case working assumed; and
- The combined operation of Inch Cape onshore transmission works and the Proposed Development.

10.8.6 The cumulative effects were assessed both without mitigation and with the proposed mitigation. The residual effects are stated in Table 10.24.

10.8.7 Construction works of the Proposed Development post mitigation are expected to be **not significant**.

10.8.8 All Proposed Development operational noise post mitigation would be **not significant**. Similarly, the predicted cumulative effect is also **not significant.**

Table 10.24: Summary of Potential Significant Effects of the Proposed Development

Likely Significant Effect	Mitigation Proposed	Means of Implementation	Outcome/ Residual Effect
Construction			
Likely significant effect during daytime works at NSR 12 (1A High Street) and NSR05 (The Antiquaries).	Control construction noise levels based on final site design and likely works location, with potential measures including: temporary solid screening around the HDD working areas; Provision for noise monitoring at noise-sensitive locations for the duration of the HDD works, in consultation with ELC, with drilling interrupted if noise levels exceed relevant thresholds. Noisier construction works (including piling and excavating but excluding HDD) to be restricted to daytime hours of 07:00 to 19:00 during weekdays or Saturday mornings (until 13:00 hours). Adding signage for transient users of the Coastal Recreation Area; Good practice measures in line with BS5228-1 advice, including selection of quieter plant and maximising separation distances where possible.	Planning Condition (Methods of working to be developed and agreed between main contractor and ELC)	Potential direct, temporary Adverse effect of **Minor**, **not significant**
Likely significant effect during evening/ Saturday afternoon works at NSR07 (Appin Drive), NSR09 (Whin Park (south)), NSR12 (1A High Street) and NSR05 (The Antiquaries).			
Likely significant effect during night, on Bank Holiday or Sundays during works at NSR02 (West Harbour Road), NSR06 (Atholl View), NSR10 (Avenue Road B6371), NSR11 (Cedar Drive), NSR05 (The Antiquaries), NSR07 (Appin Drive), NSR09 (Whin Park (south)) and NSR12 (1A High Street)			
Operation			
Likely significant effect during daytime at NSR06 (Atholl View) and NSR09 (Whin Park (south))	Detailed design to incorporate measures to control noise levels from the proposed electrical and cooling plant based on final plant selections. This could include selection of quiet plant, noise control measures for the plant such as enclosures and attenuation, and solid screening particularly on the north-east site boundary.	Planning Condition (Detailed design to be approved by ELC)	Potential direct, permanent Adverse effect of **Minor**, **not significant**
Likely significant effect during the night at NSR04 (Hawthorn Terrace/ Whin Park), NSR05 (The Antiquaries), NSR06 (Athol View), NSR07 (Appin Drive), NSR09 (Whin Park (south)), NSR10 (Avenue Road B6371) and NSR12 (1A High Street)			
Cumulative			
Inch Cape onshore transmission works - Construction			
Likely significant effect during daytime at NSR05 (The Antiquaries)	Same as for **Construction** (above)	Planning Condition (Methods of working to be developed and agreed between main contractor and ELC)	Potential direct, temporary Adverse effect of **Minor**, **not significant**
Likely significant effect during nigh at NSR01 (Seahorse Nursery, No.2 Edinburgh Road), NSR02 (West Harbour Road), NSR06 (Atholl View), NSR05 (The Antiquaries) and NSR07 (Appin Drive)			
Seagreen Windfarm offshore cable works - Construction			
Likely significant effect during daytime at NSR05 (The	Same as for **Construction** (above)	Planning Condition	Potential direct, temporary Adverse

Table 10.24: Summary of Potential Significant Effects of the Proposed Development			
Likely Significant Effect	**Mitigation Proposed**	**Means of Implementation**	**Outcome/ Residual Effect**
Antiquaries) and NSR12 (1A High Street)		(Methods of working to be developed and agreed between main contractor and ELC)	effect of **Minor**, **not significant**
Likely significant effect during the evening and Saturday afternoon and evening, NSR07 (Appin Drive), NSR09 (Whin Park (south)), NSR12 (1A High Street) and NSR05 (The antiquaries)			
Likely significant effect during the night and on Sunday or a Bank Holiday, NSR01 (Seahorse Nursery and No.2 Edinburgh Road), NSR02 (West Harbour Road), NSR06 (Atholl View), NSR10 (Avenue Road B6371) and NSR11 (Cedar Drive), NSR05 (The Antiquaries), NSR07 (Appin Drive), NSR09 (Whin Park (south)) and NSR12 (1A High Street)			
Inch Cape onshore transmission works - Operational			
Likely significant effect during the daytime at NSR06 (Atholl View) and NSR09 (Whin Park (south))	Same as for **Operation** (above)	Planning Condition (Detailed design to be approved by ELC)	Potential direct, permanent Adverse effect of **Minor**, **not significant**
Likely significant effect during the night NSR05 (The Antiquaries), NSR04 (Hawthorn Terrace/ Whin Park), NSR06 (Atholl View) NSR07 (Appin Drive) and NSR09 (Whin Park (south))			

11 Land Use, Socio-economics and Tourism

11.1 Introduction

11.1.1 This chapter considers the likely significant effects on land use, socio-economic, recreation and tourism associated with the construction and operation of the Proposed Development.

11.1.2 The specific objectives of the chapter are to:

- describe the land use, socio-economics and tourism baseline;
- describe the assessment methodology and significance criteria used in completing the impact assessment;
- describe the potential effects, including direct, indirect and cumulative effects;
- describe the mitigation measures proposed to address likely significant effects; and
- assess the residual effects remaining following the implementation of mitigation.

11.1.3 The assessment has been undertaken by Graeme Blackett, of BiGGAR Economics Ltd, a specialist economic consultancy. He received his undergraduate degree in Economics from the University of Strathclyde and is a member of the Institute for Economic Development and the Economic Development Association Scotland. Graeme has over 25 years' of experience in consultancy, covering a range of sectors including energy, tourism and economic regeneration.

11.2 Scope of Assessment

11.2.1 This chapter considers the potential for likely significant effects on:

- socio-economics, such as job creation and local expenditure;
- land-use, including consideration of whether there will be changes to existing land use or constraints on future land use;
- public access and recreational routes, including whether there are effects on public access to recreation; and
- tourism assets, including any effect on visitor numbers or expenditure.

11.2.2 The chapter assesses the potential for additional cumulative effects when considered in addition to other consented developments. The chapter considers the following cumulative development scenarios:

- Seagreen Offshore Wind Farm is developed; and
- Inch Cape Offshore Wind Farm's Onshore Transmission Works at the site of the former Cockenzie Power Station are developed.

11.2.3 The assessment is based on the Proposed Development as described in **Chapter 2: Development Description**.

Consultation

11.2.4 No formal consultation has been undertaken, though scoping responses from East Lothian Council (ELC) to the 2018 Inch Cape Onshore Transmission Works EIAR[1] and 2014 Inch Cape

[1] Inch Cape Offshore Limited (2018). Inch Cape Onshore Transmission Works: Chapter 12 Socio-Economics, Tourism, Land Use and Recreation

Onshore Transmission Works Environmental Statement[2] in relation to land use, socio-economics and tourism have been noted. This has included:

- impacts on outdoor recreation, including Core Paths, the John Muir Way, rights of way, cycle routes and the Greenhills area, which are considered in Section 11.5;
- the East Lothian Council Active Travel Improvement Plan is considered in Section 11.4; and
- impacts on visitors to the coast road B1348 are considered in Section 11.5 and key tourism documents are considered in Section 11.4.

Potential Effects Scoped Out

11.2.5 The scope of this assessment takes account of the committed mitigation measures both incorporated into the design and those standard construction and decommissioning mitigation measures incorporated into the Proposed Development, as described in **Chapter 2: Proposed Development**, and **Technical Appendix 2.1: Outline Construction Environmental Management Plan**.

11.2.6 The effects associated with the construction phase of the Proposed Development on land use, socio-economic, recreation and tourism can be considered to be representative of decommissioning effects, therefore a separate assessment of the decommissioning phase has not been undertaken as part of this assessment.

11.3 Assessment Methodology and Significance Criteria

Method of Baseline Characterisation

Extent of the Study Area

11.3.1 The study areas relevant for this assessment are:

- for potential socio-economic effects: the local authority area of East Lothian and Scotland as a whole;
- for effects on land use: the Site itself;
- for effects on public access and recreation routes: the Site and its immediate vicinity; and
- for effects on tourism assets: the vicinity of the Proposed Development (Prestonpans and Cockenzie).

Desk Study

11.3.2 The desk study considered:

- the East Lothian Council Local Development Plan;
- the Cockenzie Masterplan;
- the Scottish Government's Economic Action Plan;
- the Advisory Group on Economic Recovery's report to the Scottish Government;
- the Scottish Government's Economic Recovery Implementation Plan;
- the Scottish Government's 2020/21 Programme for Government;
- the Scottish Government's Climate Change Plan 2018-2032 Update;

[2] Inch Cape Offshore Limited (2018). Inch Cape Onshore Transmission Works: Chapter 12, Socio-Economics, Tourism, Land Use and Recreation

- the Revised East Lothian Economic Development Strategy;
- statistics for population and population projections;
- employment statistics broken by industrial structure;
- East Lothian Active Travel Implementation Plan;
- the East Lothian core paths plan;
- day visitor and domestic overnight visitors and spending statistics;
- sustainable tourism Gross Value Added (GVA) and employment statistics available from the Scottish growth sector database;
- the Scottish tourism strategy;
- a survey of East Lothian visitors;
- the East Lothian Action Plan 2016-2018;
- the Annual Business Survey Revised 2018; and
- the Scottish Input Output Tables 2017.

Field Survey

11.3.3 A field survey was undertaken to determine the current uses of the Site, as well as observing the recreation and tourism assets in the vicinity of the Site.

Criteria for the Assessment of Effects

11.3.4 The methodology combines the sensitivity of the asset and the magnitude of the impact to assess the significance of effects.

Criteria for Assessing Sensitivity

11.3.5 The criteria for assessing the sensitivity of assets is detailed in the table below. Assessments of sensitivity have been based on the baseline assessment undertaken.

Table 11.1: Sensitivity of Socio-economics, Tourism and Recreational, and Land Use Assets

Sensitivity to Impact	Definition
High	Nationally important/ rare with limited potential for offsetting/ compensation. Feature or asset has very limited capacity to accommodate the proposed form of change.
Medium	Regionally important/ rare with limited potential for offsetting/ compensation. Feature or asset has limited capacity to accommodate the proposed form of change.
Low	Locally important. Feature or asset has some tolerance to accommodate the proposed change.
Negligible	Not considered to be important. Feature or asset is generally tolerant and can accommodate the proposed change.

Criteria for Assessing the Magnitude of Change

11.3.6 In determining the magnitude of impact, the main features of the asset affected are defined and how the Proposed Development impacts these features is assessed, proportional to the degree of change.

11.3.7 The criteria for assessing the magnitude of change, either positive or adverse, is detailed in the table below.

Table 11.2: Magnitude of Impacts	
Sensitivity to Impact	**Definition**
High	Total loss or major alteration of the socio-economic, recreational or land use asset.
Medium	Loss of, or alteration to, one or more key elements of the socio-economic, recreational or land use asset.
Low	Slight alteration of the socio-economic, recreational or land use asset.
Negligible	Barely perceptible alteration of the socio-economic, recreational or land use asset.

Criteria for Assessing Cumulative Effects

11.3.8 Cumulative effects are assessed using the approach described above.

Criteria for Assessing Significance

11.3.9 The significance of an impact on a socio-economic, tourism, recreational, or land use asset is assessed by combining the magnitude of the impact and the sensitivity of the asset. The evaluation of significance presented in the table below provides a guide to how the assessments have been made. Predicted impacts of 'major' or 'moderate' are considered to be significant in terms of the EIA Regulations.

Table 11.3: Criteria for Assessing Significance				
	Magnitude of Impact			
Sensitivity of Impact	**High**	**Medium**	**Low**	**Negligible**
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

Limitations and Assumptions

11.3.10 The description of the baseline is limited by the time delay of statistical releases, which means that in some cases changes in the economy, including the adverse economic impact of COVID-19, have not been described.

11.4 Baseline Conditions

Current Baseline

Land Use

11.4.1 The Site covers an area of approximately 0.24 km^2 and is located on open land between Prestonpans and Cockenzie in East Lothian. The Site is owned by ELC.

11.4.2 The Site is comprised of an area of rough grassland to the north of the B1348 called the Greenhills, with a network of public footpaths crossing it (including the John Muir Way). To the south of the B1348 the land was formerly part of the Cockenzie Power Station, which has now been demolished and includes an existing substation. There is also a coal store area and service road that was associated with the former Power Station, as well areas of open space.

11.4.3 According to the adopted East Lothian Local Development Plan[3], the site formerly occupied by Cockenzie Power Station has been designated for energy use, with the remainder of the land designated as open space. It is noted that Cockenzie has the potential to provide onshore grid connections to offshore renewable energy projects and this is endorsed by ELC.

11.4.4 Uses for the Site that have been proposed include:

- converting the power station to a gas-fired power station (however, the consent has lapsed and the power station has now been demolished);
- an equipment testing facility (which was refused planning permission);
- plans for a marine energy park (which it is understood are not being pursued);
- the Cockenzie Masterplan (discussed below), which has not been formally adopted; and
- onshore transmission works related to Inch Cape Offshore Wind Farm, which has been consented.

11.4.5 Currently, part of the Site is leased by a small car wash business. When planning permission was sought the move was described as temporary in order to protect future aspirations of the Site. The car wash moved to the Site from a previous location less than 500 m away.

FORMER COCKENZIE POWER STATION AND SURROUNDING AREA MASTERPLAN REPORT[4]

11.4.6 The Cockenzie Masterplan was published in 2017 but has not been formally adopted by ELC. It proposes redevelopment of the site of the former Cockenzie Power Station, split into four zones:

- a coastal zone, for mixed use with the potential for elements of new energy facilities, such as off-shore energy components;
- an energy quarter, including elements such as new electrical infrastructure, offices, retail and restaurants;
- the coal store, an employment-based zone, including potential for a number of mixed-use developments such as manufacturing, office, retail and restaurants; and
- the Battle of Prestonpans area, which would not be developed.

11.4.7 The Masterplan indicates that there could be about 1,600 jobs created in East Lothian, and that the approximate cost of redeveloping the site would be around £450 million.

LAND USE SUMMARY

11.4.8 The site of the former Cockenzie Power Station is owned by ELC. Part of this site is temporarily leased by a car wash company, and the remainder is unoccupied. The section of the Site where the substation would be built has the potential to accommodate onshore grid connections for offshore wind farms and has been identified for energy use. The remainder has been designated as open space.

11.4.9 The Site can be considered to be of regional importance, as a result of its potential for redevelopment. It is therefore able to accommodate change, especially in the area where the substation would be built, which is designated for energy use. On this basis, the Site is assessed as low sensitivity to change in land use.

[3] East Lothian Council (2018). Local Development Plan

[4] East Lothian Council/Peter Brett Associates (2017). Former Cockenzie Power Station and Surrounding Area Masterplan Report

11.4.10 The car wash operates on a temporary lease and has previously moved from another site in the area and so its sensitivity to change is assessed as low.

Socio-economics

SCOTLAND'S ECONOMIC ACTION PLAN

11.4.11 Scotland's Economic Action Plan 2019-20[5] sets out how it plans to make Scotland a leader in technological and social innovations. It aims to deliver higher productivity and greater competitiveness while transitioning to a carbon-neutral economy through measures that support business, and encourage investment, innovation and upskilling.

11.4.12 At the heart of this strategy is inclusive growth, combining increased prosperity with greater equity, which requires getting the fundamentals right. These include:

- investment: boosting private and public investment and delivering world-class infrastructure;
- enterprise: ensuring a competitive business environment;
- international: growing exports and attracting international investment;
- innovation: supporting world-leading innovation;
- skills: providing a highly-skilled workforce;
- place: supporting thriving places;
- people: ensuring a sustainable working population where everyone can participate in and benefit from increased prosperity; and
- sustainability: seizing the economic opportunities in the low carbon transition.

COVID RECOVERY

11.4.13 The COVID-19 pandemic has had a major detrimental impact on local, regional and national economy. It will be some time until the longer-term consequences are known, although it is already clear that it has resulted in structural economic changes.

11.4.14 Prior to COVID-19 the renewable energy sector was a priority sector and its role in the supporting the recovery was recognised in the Advisory Group on Economic Recovery[6] in its June 2020 report to the Scottish Government. The recommendations included "prioritisation and delivery of green investments", and it notes that the green economic recovery is central to recovery overall.

11.4.15 The Scottish Government's response[7], published in August 2020, sets out how it intends to take forward the AGER's recommendations. It prioritises a sustainable recovery that supports all parts of Scotland, while meeting its climate change and wider environmental objectives.

11.4.16 The 2020/21 Programme for Government[8] indicates the longer term economic strategic priorities. It focuses on economic recovery, making clear that the aim is not a return to business as usual, but transition to a "fairer, greener and wealthier country". The Programme is centred around three commitments:

- the creation of new jobs, good jobs and green jobs;

[5] Scottish Government (2020). Scotland's Economic Action Plan

[6] Advisory Group on Economic Recovery (2020). Advisory Group on Economic Recovery's report to the Scottish Government

[7] Scottish Government. (2020). Economic Recovery Implementation Plan

[8] Scottish Government. (2020). Programme for Government: Protecting Scotland, Renewing Scotland

- promoting lifelong health and well-being; and
- promoting equality and supporting young people to reach their potential.

11.4.17 Investment in renewable energy is part of the Scottish Government's first commitment. In particular, the plan sets out a range of measures to "protect biodiversity, create green jobs and accelerate a just transition to net-zero". Specific commitments include significant investments in a Green New Deal, including £100 million committed for a Green Job Fund and £60 million to help industrial and manufacturing sectors decarbonise, grow and diversify.

11.4.18 In December 2020, the Scottish Government published an update to its 2018-2032 Climate Change Plan[9] to set out its pathway to the new and ambitious targets set in the Climate Change Act 2019. It is a key strategic document on the country's green recovery from the COVID-19 pandemic and demonstrates its commitment to bring about a recovery that moves the country towards the net zero emissions target.

11.4.19 The renewable energy sector is therefore well placed to make an important contribution to national and regional economic recovery and transformation in Scotland. Investments that drive economic recovery (at the national and regional level) should ideally have three main features, they should be labour intensive in the short term, improve economic competitiveness in the longer term and deliver wider benefits, including environmental benefits.

EAST LOTHIAN ECONOMIC STRATEGY

11.4.20 The East Lothian Economic Development Strategy[10] provides context for the East Lothian economy and sets out objectives to increase prosperity in the area.

11.4.21 The strategy notes that East Lothian has diverse business base in areas such as food and drink and tourism, but also that there are limited numbers of large employers, that many residents commute to Edinburgh and that there is limited space for development.

11.4.22 The overarching goals of the strategy are to increase the number of businesses in East Lothian with growth potential and increase the number of residents working in East Lothian.

11.4.23 The strategy also makes reference to the Cockenzie Masterplan.

POPULATION

11.4.24 According to National Records Scotland[11] East Lothian has a population of 107,090, representing 2.0% of the Scottish population. The population has a lower proportion of adults of working age (61.3%, compared to 64.0% for the national population), and has a larger proportion of the population aged under 16 (18.4%, compared to 16.9%) and aged over 65 (20.3%, compared to 19.1%).

[9] Scottish Government. (2020). Securing a Green Recovery on a Path to Net Zero: Climate Change Plan 2018-2032 - Update

[10] East Lothian Partnership. (2018). Revised East Lothian Economy Development Strategy

[11] National Records Scotland. (2020). Mid-Year Population Estimates 2019

Table 11.4: Population		
	East Lothian	**Scotland**
2019 Population	107,090	5,463,300
Aged 0-15	18.4%	16.9%
Aged 16-64	61.3%	64.0%
Aged 65+	20.3%	19.1%

11.4.25 Population projections from National Records Scotland[12] suggest that East Lothian's population is expected to grow by 15.1% between 2018 and 2043, compared to a projected population increase in Scotland of 2.5%.

Table 11.5: Population Projections		
	East Lothian	**Scotland**
2018 Population	105,790	5,438,100
2043 Population	121,743	5,574,819

INDUSTRIAL STRUCTURE

11.4.26 There are 33,000 jobs in East Lothian[13], representing 1.3% of the total jobs in Scotland. This is lower than East Lothian's share of the population (2.0%), in part due to higher share of the population not being of working age, and in part due to high levels of commuting out of the area.

11.4.27 East Lothian has a higher proportion of construction related employment than Scotland (7.6%) compared to Scotland as a whole (5.5%), suggesting that there may be scope to secure construction related contracts.

11.4.28 East Lothian's share of employment from accommodation and food services (10.6%), and arts, entertainment and recreation (5.3%) were also higher than for Scotland as whole, for which the figures are respectively 8.2% and 2.7%. These sectors are typically associated with tourism, suggesting its relative importance, though they tend to be associated with lower wages.

11.4.29 In addition, East Lothian has a high proportion of workers in professional, scientific and technical services (9.1%, compared to 7.1%), which tend to be office-based jobs that can lend themselves to working from home.

Table 11.6: Industrial Structure		
	East Lothian	**Scotland**
Agriculture, forestry and fishery	4.5%	3.3%
Mining and quarrying	0.0%	1.1%
Manufacturing	6.1%	6.5%
Electricity, gas, steam, and air conditioning	1.8%	0.7%
Water supply, sewage, waste management	1.1%	0.7%
Construction	7.6%	5.5%
Wholesale and Retail Trade	12.1%	13.3%
Transportation and storage	2.7%	4.1%

[12] National Records Scotland. (2020). Population Projections for Scottish Areas (2018-based)

[13] ONS. (2020). Business Register and Employment Survey 2019

Table 11.6: Industrial Structure		
	East Lothian	**Scotland**
Accommodation and food services	10.6%	8.2%
Information and communication	2.1%	3.3%
Financial and insurance	1.1%	3.2%
Real estate activities	1.2%	1.5%
Professional, scientific and technical activities	9.1%	7.1%
Administrative and support services	6.1%	7.8%
Public administration	4.5%	6.0%
Education	9.1%	7.9%
Human health and social care activities	15.2%	15.4%
Arts, entertainment and recreation	5.3%	2.7%
Other	1.4%	1.7%
Total	33,000	2,602,000

SOCIO-ECONOMICS SUMMARY

11.4.30 East Lothian has a lower share of the population that are working age compared to Scotland, but is projected to grow more quickly than Scotland as a whole. East Lothian's share of Scottish jobs is lower than its population share, suggesting that many people commute outside of the area, particularly to Edinburgh. The priorities for the local economy include accommodating population growth and increasing the number of businesses located in the area. The priorities across Scotland are to support the economic recovery from COVID-19, and the renewable energy sector has been recognised as a key driver of that recovery.

11.4.31 The following assessments of sensitivity have been made:

- East Lothian economy: given the scale of the economy, which had 33,000 employees in 2019, and the significant increase in population that has been projected, it is expected that there will be some capacity to accommodate change in the local economy. Therefore, the sensitivity is assessed as low; and
- Scottish economy: given the scale of the economy, which had 2.6 million employees in 2019, it is expected that the any change will be easy to accommodate in the Scottish economy as a whole and therefore the sensitivity is assessed as negligible.

Public Access and Recreation

EAST LOTHIAN ACTIVE TRAVEL IMPROVEMENT PLAN 2018-24

11.4.32 ELC's Active Travel Improvement Plan[14] highlights the importance of active travel, and aims to encourage travel such as cycling and walking over motorised vehicles.

11.4.33 The overarching aim of the plan is to make active travel the first choice for journeys, and identifies a number of benefits from active travel:

- improve health and wellbeing;
- reduce carbon emissions and improve air quality;
- remove vehicles from busy streets;

[14] East Lothian Council. (2018). Active Travel Improvement Plan 2018-24

- create better places for people; and
- improve access to jobs, services and amenities.

11.4.34 In order to deliver these benefits, the plan highlights the importance of improving infrastructure, such as core paths, and encouraging behaviour change to increase walking and cycling.

11.4.35 Within the action plan, there are a small number of actions relating to Cockenzie and Prestonpans, including improving the linking path between them (core path 276/ John Muir Way), and assessing the feasibility of increasing accessibility.

RECREATIONAL ROUTES

11.4.36 The following recreational routes are identified as crossing the Site or are on the Site boundary (a map of core paths is presented in **Figure 4.14**):

- Core path 276, which forms part of the John Muir Way. This is a 215 km (134 mile) coast to coast long distance route for walkers and cyclists between Helensburgh on the west coast and Dunbar on the east coast, and is one of Scotland's Great Trails. Less than 0.2 km of the route passes through the Site;
- National Cycle Route 76 (NCR76) is a section of the B1348 that has been identified as 'On-road route not on the National Cycle Network', connecting traffic-free sections of the route in Cockenzie and Musselburgh;
- Core path 284, which crosses the Site to the south of the proposed substation;
- Core path 147, which is on the southern boundary of the Site, along the B6371; and
- Core path 145, which is on the western boundary of the Site.

RECREATION

11.4.37 In addition, the Greenhills area, which is in the northern part of the Site and is used by walkers, dog walkers and other recreational users, is identified as a local recreation asset.

11.4.38 Prestonpans Beach, including the car park, which is to the north of the Greenhills area and is also used by walkers and other recreational users, is identified as local recreation asset.

11.4.39 The Prestonpans Yachting and Boating Club, which is located next to the Lidl car park at the edge of the Greenhills area, is also identified as a local recreation asset.

PUBLIC ACCESS AND RECREATION SUMMARY

11.4.40 There is a network of core paths and cycle paths that either cross the Site, or skirt the boundary, as well as the Greenhills area that is used by walkers.

11.4.41 The following assessments of sensitivity have been made:

- Core path 276/ John Muir Way: though of national importance, only a small section of the John Muir Way is likely to be affected, and therefore the sensitivity is assessed as medium;
- NCR76: though of national importance, only a small section of NCR76 is likely to be affected, and therefore the sensitivity is assessed as medium;
- Core path network: the core path network is mainly used by locals and therefore its sensitivity is assessed as low;
- Greenhills: mainly used by locals and therefore its sensitivity is assessed as low;

- Prestonpans Beach: mainly used by locals and therefore its sensitivity is assessed as low; and
- Prestonpans Yachting and Boating Club: mainly used by locals and therefore its sensitivity is assessed as low.

Tourism

EAST LOTHIAN TOURISM ECONOMY

11.4.42 In 2018, there were 4.46 million day visits to East Lothian with associated visitor expenditure of £54 million[15], and there were 0.16 million GB overnight visits with associated spending of £32 million[16] (Kantar/TNS, 2019a).

Table 11.7: Visitor Spending, 2018

	Visitor volumes (m)	Visitor spending (£m)
Day Visitors	4.46	54
GB Overnight	0.16	32

11.4.43 In 2018, the sustainable tourism economy of East Lothian employed 3,500 with a GVA of £51 million, compared to employment of 218,000 and £4.1 billion in Scotland.

Table 11.8: Tourism Economy, 2018

	Employment	GVA (£m)
East Lothian	3,500	51
Scotland	218,000	4,141

NATIONAL TOURISM STRATEGY

11.4.44 Scotland's Outlook 2030[17], developed by a collaborative network of industry experts, focuses on creating a world-leading tourism sector in Scotland that is sustainable in the long-term.

11.4.45 The strategy focuses on four key priorities: people, places, businesses and experiences. The strategy recognises the effects of climate change, technological advancements, Brexit and changing consumer behaviour on tourism and highlights the need for collaboration between government, communities and the public and private sectors.

11.4.46 There are six conditions that the strategy has highlighted as being crucial for success:

- using technological advancements and information to understand changes and trends in tourist behaviours;
- ensuring policies are in place that support the vision;
- enabling investment opportunities into Scotland's tourism market;
- improving transport and digital infrastructure;
- greater collaboration between businesses in the industry; and
- positioning Scotland as a great place to live and visit locally and globally.

[15] Kantar/TNS. (2019). Great Britain Day Visitor Survey, 2018

[16] Kantar/TNS. (2019). Great Britain Tourist Survey 2018

[17] Scottish Tourism Alliance. (2020). Scotland's Outlook 2030, Responsible tourism for a sustainable future

EAST LOTHIAN TOURISM SURVEY

11.4.47 In 2018, STR conducted a survey of visitors to East Lothian[18], asking a range of questions about their experience.

11.4.48 The most popular visitor destinations were North Berwick (66% of those surveyed visited North Berwick), Dunbar (41%), Gullane (34%) and Musselburgh (24%). Of those surveyed, 9% visited Cockenzie/ Port Seton and 6% visited Prestonpans.

11.4.49 The main reasons for visiting East Lothian were visiting the beach (62%), sightseeing (55%), going to cafes (40%) and countryside/ parks (35%). The most common sporting activities undertaken were hiking/walking (24%) followed by golf (12%).

11.4.50 The most visited East Lothian attractions were also listed, including the Scottish Seabird Centre, the National Museum of Flight, and Tantallon Castle. All of the main attractions are more than 20 km from the Site (with the exception of the John Muir Way, which passes through the Site).

EAST LOTHIAN TOURISM STRATEGY

11.4.51 The most recent tourism action plan for East Lothian relates to the years 2016-18[19], and tourism strategy is also discussed in the economic development strategy[20]. The economic strategy highlights that tourism is a key sector for East Lothian, and sets an objective to become 'Scotland's leading coastal, leisure and food and drink destination'.

LOCAL TOURISM ASSETS

11.4.52 The main tourist asset identified within the vicinity of the Proposed Development is the Prestonpans Battlefield Viewpoint, though there is no information on visitor numbers.

11.4.53 This viewpoint offers a panorama of the Prestonpans battlefield, where the Jacobite army defeated government forces in 1745. There are also a number of interpretation boards and three stone monuments that relate to the battle. Parking is at the nearby Meadowmill Sports Centre, and the viewpoint is about 1.2 km from the Proposed Development.

11.4.54 Plans have been developed for a visitor centre for the battlefield, though funding has not been secured.

11.4.55 Other visitor attractions with the vicinity of the Site include:

- the Prestongrange Museum, which focuses on the area's industrial heritage and is about 2.8 km from the Proposed Development; and
- the Wagonway Museum, a small museum for the first railway line in Scotland, built in 1722, which is about 0.5 km from the Proposed Development.

11.4.56 Scotland's Golf Coast Road is a 30 mile long route, which begins in Edinburgh and connects 21 golf courses throughout East Lothian. It passes through the Site on the same stretch of B1348 as the NCR76.

TOURISM SUMMARY

11.4.57 Tourism is relatively important to East Lothian, particularly in areas such as North Berwick, Dunbar and Musselburgh, and golf, the coast, walking and cycling have been identified as

[18] STR. (2019). East Lothian Visitor Survey 2018

[19] East Lothian Council. (2015). East Lothian Tourism Action Plan: 2016-18

[20] East Lothian Partnership. (2018). Revised East Lothian Economy Development Strategy

important areas of growth. There are a number of important visitor attractions, such as the National Museum of Flight, though none are within 20 km of the Site.

11.4.58 The following assessments of sensitivity have been made about local tourism assets:

- Prestonpans Battlefield: due to the limited tourism infrastructure, e.g. car park, café etc, the Battlefield as a tourism asset is considered to be of mainly local importance in socio-economic and tourism terms. Therefore, the sensitivity is assessed as low;
- Prestongrange Museum: mainly of local importance and therefore its sensitivity is assessed as low;
- Wagonway Museum: mainly of local importance and therefore its sensitivity is assessed as low; and
- Scotland's Golf Coast Road: though connecting a number of regional golf courses, only a small section would be affected and therefore the sensitivity is assessed as low.

Future Baseline

Land Use

11.4.59 Changes to the land use baseline may be expected if the Cockenzie Masterplan is adopted and the site of the former Cockenzie Power Station is developed as a result. However, the Masterplan, which has not been adopted by ELC, includes provision for increased infrastructure associated electricity generation and transmission. While the exact composition of future land use is currently uncertain, it is reasonable to conclude that uses in the vicinity of the Site are likely to include energy generation/ transmission and therefore the Proposed Development would be consistent with such a change to land use.

Socio-economics

11.4.60 The socio-economics baseline may change as a result of the changes brought about by COVID-19, though there is uncertainty about the scale and persistence of these changes.

Public Access and Recreation

11.4.61 Consultations are currently underway related to the draft ClimatEvolution Vision and Action Plan, which may form Supplementary Planning Guidance to the Local Development Plan. A proposed leisure route along a realigned water way is identified on the western boundary of the Site.

Tourism

11.4.62 The economic impact of COVID-19 on the tourism sector has been severe during 2020. It is uncertain to what extent the sector will recover and how long that might take.

Summary of Sensitivity

11.4.63 The assessed sensitivity of each asset is summarised in the table below.

Table 11.9: Summary of Sensitivity		
	Sensitivity	**Justification**
Cockenzie site	Low	Land is of regional importance, though expected to have high capacity to accommodate change
On-site Car Wash	Low	Lease is temporary, with potential to move to another site.
East Lothian Economy	Low	Has capacity to accommodate change
Scottish Economy	Negligible	Has substantial capacity to accommodate change
Core path 276/ John Muir Way	Medium	Though of national importance, only a small section is likely to be affected
National Cycle Route 76	Medium	Though of national importance, only a small section is likely to be affected
Core path network	Low	Considered to be of mainly local importance
Greenhills	Low	Considered to be of mainly local importance
Prestonpans Beach	Low	Considered to be of mainly local importance
Prestonpans Yachting and Boating Club	Low	Considered to be of mainly local importance
Prestonpans Battlefield	Low	Due to the limited tourism infrastructure, the Battlefield is considered to be of local importance in socio-economic and tourism terms
Prestongrange Museum	Low	Considered to be of mainly local importance
Wagonway Museum	Low	Considered to be of mainly local importance
Scotland Golf Coast Road	Low	Though of regional importance, only a small section is likely to be affected

11.5 Assessment of Likely Effects

Potential Construction Effects

11.5.1 It is anticipated that the construction phase will consist of a number of key components (discussed in more detail in **Chapter 2:Development Description**):

- a shore end export cable, that would run underground and be installed using trenchless technology, requiring no construction work on the beach;
- a transition joint bay, located south of the beach connecting the shore end export cable with the onshore export cable;
- the onshore export cable, running for up to 1 km from the transition joint bay to the substation and from the substation to the grid connection point, and including up to one joint bay and two temporary pulling pits;
- the substation and platform; and
- temporary construction compounds for each component, as well as temporary access and site tracks.

Land Use

11.5.2 It is anticipated that the land take associated with construction of the Proposed Development will include three temporary construction compounds for each construction element:

- the landfall works area, with a footprint of 2,500 m;
- the onshore export cable, with a land take of 50 m x 50 m; and
- the substation, with a land take of 125 m x 110 m.

11.5.3 There would also be a temporary haul road extending the full length of the cable corridor with a maximum width of 5 m.

11.5.4 The construction works land take required on the Site, which is assessed as low sensitivity, would be minimal, temporary and on land designated for energy use, within the Local Development Plan (effects on recreational areas, such as Greenhills, are considered below). Overall, the magnitude of impact is considered low, and the significance of the effect is considered **Negligible** and **not significant**.

11.5.5 Following construction, the Site would be reinstated, and there are not expected to be any long-term effects associated with construction.

11.5.6 Part of the Site is also leased by a small car wash company, which is assessed as low sensitivity, and would be required to move. This is expected to be a temporary arrangement and they will have made plans to move to another location, and therefore the magnitude is assessed as negligible. The effect is assessed as **Negligible** and **not significant**.

Socio-economics

11.5.7 The expenditure associated with the Proposed Development is expected to be around £60 million. The main categories of expenditure are expected to be enabling works, civil engineering, buildings and structures, electrical installation and commissioning. All of the civil engineering is expected to be awarded to Scottish contractors, though a substantial share of expenditure will be on equipment, which is expected to be sourced from outside of Scotland and the UK.

11.5.8 It is likely that companies in East Lothian will be able to secure a share of civil engineering contracts, directly supporting employment. This aligns with the Scottish Government's strategic objectives in its response to COVID-19, supporting jobs in construction and the green economy.

11.5.9 In addition, companies that have secured contracts would support impacts in the wider economy, as they spend in their supply chain (the indirect impact), and their employees spend their wages (the induced impact).

11.5.10 Given the relative size of the East Lothian economy, which had 33,000 employees in 2019, the sensitivity is assessed as low and magnitude of change as medium. Therefore, the effect is assessed as **Minor** and **not significant**.

11.5.11 Given the relative size of the Scottish economy, which had 2.6 million employees in 2019, the sensitivity is assessed as low, and the magnitude of change as negligible. Therefore, the effect is assessed as **Negligible** and **not significant**.

Public Access and Recreation

11.5.12 The construction phase is expected to lead to the diversion of a subsection of the John Muir Way (represented by Core Path 276) and as a result there is expected to be some disruption for a period of up to several weeks. There will be a public access plan put in place to minimise disruption, for example diverting to the B1348, and other sections of the John Muir Way will not be affected, and as a result the magnitude of impact is assessed as low. Therefore, the effect is assessed as **Minor** and **not significant**.

11.5.13 Similarly, a short section of the NCR76 along the B1348 is expected to experience localised traffic management for a period of several weeks and some temporary overnight road closures may be necessary, though the road will continue to be in use throughout the day. The

sensitivity is assessed as medium and the magnitude of impact is expected to be low and therefore the effect is expected to be **Minor** and **not significant**.

11.5.14 The core path network, which is assessed as low sensitivity, is expected to be largely unaffected. Core Paths 145 and 147, which skirt the boundary of the Site are not expected to close during construction. Core Path 284, which passes through the Site, is expected to be rerouted for a period of up to 100 weeks and would be considered within a public access plan. Overall, the magnitude of impact is expected to be low. Therefore, the effect is assessed as **Negligible** and **not significant**.

11.5.15 The Greenhills area, which is to the north of the Site, is assessed as having a low sensitivity as it is mainly used locally, and is expected to experience some temporary disruption during construction. As a result, for a period of several weeks part of the areas will not be accessible to walkers and other recreational users. However, the majority of the area will still be usable, and therefore the impact is assessed as medium. The effect is assessed as **Minor** and **not significant**. Reinstatement will take place after the construction phase.

11.5.16 Similarly, Prestonpans Beach, which is to the north of the Greenhills area, is assessed as low sensitivity and would experience some disruption as parts of the beach are not accessible. However, the car park will remain accessible, though there may be temporary closures to parts of it, as will the majority of the beach area. Therefore, the impact is assessed as medium. The effect is therefore assessed as **Minor** and **not significant**. Reinstatement will take place after the construction phase.

11.5.17 The Prestonpans Yachting and Boating Club, which is assessed as low sensitivity as it is mainly used locally, is not expected to experience disruption during construction. The developer has committed to maintaining access to the clubhouse and therefore, the impact is assessed as negligible. The effect is therefore assessed **Negligible** and **not significant**.

Tourism

11.5.18 The Prestonpans Battlefield is assessed as low sensitivity, due to its relatively low importance to the regional tourism economy. The Battlefield as a tourism asset is not expected to experience any impact on the features that make it attractive, i.e. its historical significance (as discussed in **Chapter 8: Cultural Heritage and Archaeology**, which found no significant impacts), as a result of construction and the magnitude of impact is assessed as negligible. Therefore, the effect is assessed as **Negligible** and **not significant**.

11.5.19 Both the Wagonway Museum and the Prestongrange Museum have been assessed as low sensitivity as they are mainly of local importance. The features which make the sites attractive, their presentation of local history and heritage, are not expected to be affected by the construction of the Proposed Development, and therefore the magnitude of impact is assessed as negligible. The effect has therefore been assessed as **Negligible** and **not significant**.

11.5.20 The Scottish Golf Coast Road, which is on the same stretch of the B1348 as NCR76 and is assessed as low sensitivity, would also experience some disruption due to traffic management. The route will still be in use, and its main attraction, the number of golf courses in East Lothian and views out to sea, would be unaffected. Therefore, the magnitude of impact is assessed as low. Therefore, the effect is assessed as **Negligible** and **not significant**.

Potential Operational Effects

Land Use

11.5.21 The cables connecting the substation to Seagreen 1A Offshore Wind Farm will be underground. Though they will not constrain current recreational uses, it would not be possible to place built infrastructure or trees over the cable route and therefore it may constrain future land use. No plans exist for development of this area, which includes the Greenhills area, but the design of any future development would need to take account of the cable route.

11.5.22 The substation is expected to have a land take of approximately 22,000 m^2, which is a relatively small area given the size of the wider Cockenzie site. In addition, the land has been designated as suitable for onshore links to offshore wind installations in the Local Development Plan. As a result, the magnitude of impact is assessed as negligible. Therefore, the effect is assessed as **Negligible** and **not significant**.

11.5.23 In addition, it should be noted that, although the Cockenzie Masterplan has not been adopted, it is not expected that the Proposed Development will constrain wider plans for the site, as the substation is located within the area designated for the energy quarter. Similarly, the ClimatEvolution document, which has not been adopted to date but may form Supplementary Planning Guidance, would not be constrained.

Socio-economics

11.5.24 It is expected that there would be a requirement for monthly inspections, with maintenance required every four to six years and requiring about one week on-site. This would be expected to support around 25 days per year of employment.

11.5.25 Given the scale of the East Lothian economy, which has low sensitivity, and the magnitude of impact, which is likely to be negligible, it is expected that the effect would be **Negligible** and **not significant**. Similarly, the effect on the Scottish economy is expected to be **Negligible** and **not significant**.

Public Access and Recreation

11.5.26 Once the initial construction phase has been completed it is not expected that there will be any effect on public access and recreation, with the exception of Core Path 284 which may require permanent rerouting depending upon the final detailed substation layout and design. Therefore, effects on recreational assets, such as Greenhills, the John Muir Way, NC76 and the core path network, are expected to be **Negligible** and **not significant**.

Tourism

11.5.27 It is not expected that the elements of the Prestonpans Battlefield that make it attractive to visitors, i.e. its historical significance, will be detrimentally affected (as discussed in **Chapter 8:Cultural Heritage and Archaeology**, which found no significant impacts), and therefore the impact is assessed as **Negligible** and **not significant**.

11.5.28 Similarly, the impacts and effects on the Wagonway Museum and the Prestongrange Museum have been assessed as **Negligible** and **not significant**.

11.5.29 Though there will be visibility of the substation from the Scotland's Golf Coast Road, this is not expected to affect its attractiveness of the route, since it is a section of the road where there is existing development. Therefore, the effect is assessed as **Negligible** and **not significant**.

Potential Cumulative Effects

11.5.30 The potential cumulative effects considered relate to those from the Seagreen Offshore Wind Farm, for which the Proposed Development would provide a grid connection and the Inch Cape Offshore Wind Farm Onshore Transmission Works at the site of the former Cockenzie Power Station. These potential cumulative effects are considered separately.

SEAGREEN OFFSHORE WIND FARM

11.5.31 The Proposed Development would provide the grid connection for approximately 24% of the Seagreen 1A Offshore Wind Farm generation capacity, with the grid connection site in Angus providing for the balance.

11.5.32 The economic impact associated with Seagreen Offshore Wind Fam was estimated as part of the socio-economics chapter included in the EIA report for Seagreen Offshore Wind Farm[21]. The impact was estimated based on available evidence on the cost per MW of capital expenditure and operational expenditure and the typical breakdown by category for an offshore wind farm. The share of spend associated with each of these categories that could be secured in Scotland was then used to estimate the direct GVA and jobs impact, and wider impacts associated with supply chain spending and staff spending were captured using GVA and employment multipliers.

11.5.33 On this basis, it was found that Seagreen Offshore Wind Farm could support:

- £549 million GVA and 8,540 years of employment in Scotland, during the construction phase; and
- £19 million GVA and 320 jobs annually during each year of operation.

11.5.34 Given that the Proposed Development would provide the grid connection for approximately 24% of the Seagreen Offshore Wind Farm generation capacity, it is reasonable to include 24% of its economic impact in the cumulative assessment. This would support:

- £132 million GVA and 2,050 years of employment in Scotland, during the construction phase. These effects were assessed as **Moderate** beneficial and therefore **significant**; and
- £5 million GVA and 80 jobs annually during each year of operation. These effects were assessed as **Minor** beneficial and therefore **not significant**.

INCH CAPE OFFSHORE WIND FARM ONSHORE TRANSMISSION WORKS

11.5.35 There may be potential cumulative effects associated with works related to Inch Cape Offshore Wind Farm, which has received Planning Permission in Principle for onshore grid connection works in an area that has some overlap with the Site. To date Inch Cape Wind Farm has not received a Contract for Difference, the UK Government's main mechanism for supporting low carbon electricity, which means that there is no certainty in relation to timescales. Should the construction of the Proposed Development coincide with the works associated with the Inch Cape development, some coordination will be desirable to minimise disruption.

11.5.36 The East Lothian LDP notes that developers should work together to minimise impacts where possible[22]. There may be potential for some synergies with this project, particularly in reducing disruptions to public access and recreation, as well as in developing a local supply chain, depending on when the construction and operation phases of Inch Cape onshore

[21] Seagreen Wind Energy Limited (2018). EIA Report Volume 1. Chapter 15: Socio-economics

[22] East Lothian Council. (2018). Local Development Plan

transmission works begin. Cumulative effects on land use, recreation, socio-economics and tourism are expected to be **Negligible** and **not significant**.

11.6 Mitigation

Mitigation during Construction

11.6.1 With the exception of a public access plan to manage access to the core path network where it crosses the Site, no mitigation is required as there are no significant effects as a result of the construction of the Proposed Development.

Mitigation during Operation

11.6.2 No mitigation is required as there are no significant effects as a result of the operation of the Proposed Development.

11.7 Assessment of Residual Effects

Residual Construction Effects

11.7.1 The residual construction effects are expected to be:

- the former Cockenzie Power Station site: given a sensitivity of low and a magnitude of low, the effect is assessed as **Negligible** and **not significant**;
- on-site car wash: given a sensitivity of low and a magnitude of negligible, the effect is assessed as **Negligible** and **not significant**;
- East Lothian economy: given a sensitivity of low and a magnitude of medium, the effect is assessed as positive, **Minor** and **not significant**;
- Scottish economy: given a sensitivity of negligible and a magnitude of negligible, the effect is assessed as positive, **Negligible** and **not significant**;
- Core Path 276/John Muir Way: given a sensitivity of medium and a magnitude of low, the effect is assessed as **Minor** and **not significant**;
- NCR76: given a sensitivity of medium and a magnitude of low, the effect is assessed **Minor** and **not significant**;
- Core path network: given a sensitivity of low and a magnitude of low, the effect is assessed as **Negligible** and **not significant**;
- Greenhills: given a sensitivity of low and a magnitude of medium, the effect is assessed as **Minor** and **not significant**;
- Prestonpans Beach: given a sensitivity of low and a magnitude of medium, the effect is assessed as **Minor** and **not significant**;
- Prestonpans Yachting and Boating Club: given a sensitivity of low and a magnitude of negligible, the effect is assessed as **Negligible** and **not significant**;
- Prestonpans Battlefield: given a sensitivity of low and a magnitude of negligible, the effect is assessed as **Negligible** and **not significant**;
- Prestongrange Museum: given a sensitivity of low and a magnitude of negligible, the effect is assessed as **Negligible** and **not significant**;
- Wagonway Museum: given a sensitivity of low and a magnitude of negligible, the effect is assessed as **Negligible** and **not significant**; and

- Scottish Golf Coast Road: given a sensitivity of low and a magnitude of low, the effect is assessed as **Negligible** and **not significant**.

Residual Operational Effects

11.7.2 All residual operational effects are expected to be negligible.

Residual Cumulative Effects

11.7.3 The following residual cumulative effects associated with Seagreen Offshore Wind Farm are expected:

- the effect on the Scottish economy during the construction phase is assessed as positive, **Moderate** and **significant**; and
- the effect on the Scottish economy during the operational phase is assessed as positive, **Minor** and **not significant**.

11.7.4 The residual cumulative effects associated with the Inch Cape Wind Farm Onshore Transmission Works on the East Lothian and Scottish economies are expected are assessed as positive, **Negligible** and **not significant.**

11.8 Summary

11.8.1 This chapter has assessed the land use, socio-economics, tourism and recreation effects of the Proposed Development.

11.8.2 The assessment found that the land is identified as appropriate for energy use, including onshore works for offshore wind farms. The local economy has a relatively high level of out-commuting, as well as a proportionally higher share of employment in the construction sector. Tourism is relatively important to the regional economy, though there are a limited number of tourism assets in the vicinity of the Proposed Development. There are also a number of core paths, as well as national recreational routs that pass through the Site.

11.8.3 The Proposed Development would be sited in an area that has been designated for onshore works related to offshore wind farms, and that it would not constrain future uses of the Cockenzie site identified in the Cockenzie Masterplan, which has not been adopted, or in the ClimatEvolution Vision and Action Plan, which is expected to form Supplementary Planning Guidance. Over the proposed cable route some uses, such as building and tree planting may be constrained, but current uses will not be affected and no plans exist for further development.

11.8.4 During the development and construction phase, the Proposed Development could support employment in the construction sector in East Lothian and Scotland, as well as in the wider economy, though the effect is not expected to be significant. The economic impact in East Lothian and Scotland during the operation and development phase is expected to be negligible.

11.8.5 It is also found that the effects on recreational routes, such as the John Muir Way and NCR76 would not be significant, though there would be some minor disruption to recreational routes during construction and development. No significant effects on local recreation are expected during operation.

11.8.6 There are also no effects no significant effects found on tourism assets in the local area, such as the Prestonpans Battlefield, Prestongrange Museum and the Wagonway Museum.

11.8.7 There may be cumulative effects associated with onshore works for the Inch Cape Offshore Wind Farm, which has Planning Permission in Principle to connect to the grid at site of the former Cockenzie Power Station, though to date there is no certainty over if and when this may be taken forward. No significant effects are expected.

11.8.8 There would also be beneficial cumulative effects associated with Seagreen Offshore Wind Farm, which is expected to have significant beneficial effects on the Scottish economy during its construction, as the Proposed Development is needed for it to export electricity to the grid at full potential.

11.8.9 Overall, there are no significant adverse effects found, and there is a significant beneficial socio-economic cumulative effect found related to the construction of Seagreen Offshore Wind Farm.

Table 11.10: Summary of Potential Significant Effects of the Proposed Development

Likely Significant Effect	Mitigation Proposed	Means of Implementation	Outcome/ Residual Effect
Construction			
Cockenzie Site	n/a	n/a	Not significant
On-site car wash	n/a	n/a	Not significant
East Lothian Economy	n/a	n/a	Not significant
Scottish Economy	n/a	n/a	Not significant
Core path 276/John Muir Way	n/a	n/a	Not significant
National Cycle Route 76	n/a	n/a	Not significant
Core path network	n/a	n/a	Not significant
Greenhills	n/a	n/a	Not significant
Prestonpans Beach	n/a	n/a	Not significant
Prestonpans Yachting and Boating Club	n/a	n/a	Not significant
Prestonpans Battlefield	n/a	n/a	Not significant
Prestongrange Museum	n/a	n/a	Not significant
Wagonway Museum	n/a	n/a	Not significant
Scottish Golf Coast Road	n/a	n/a	Not significant
Operation			
Cockenzie Site	n/a	n/a	Not significant
East Lothian Economy	n/a	n/a	Not significant
Scottish Economy	n/a	n/a	Not significant
Core path 276/John Muir Way	n/a	n/a	Not significant
National Cycle Route 76	n/a	n/a	Not significant
Core path network	n/a	n/a	Not significant
Greenhills	n/a	n/a	Not significant
Prestonpans Beach	n/a	n/a	Not significant
Prestonpans Yachting and Boating Club	n/a	n/a	Not significant
Prestonpans Battlefield	n/a	n/a	Not significant
Prestongrange Museum	n/a	n/a	Not significant
Wagonway Museum	n/a	n/a	Not significant

Table 11.10: Summary of Potential Significant Effects of the Proposed Development			
Likely Significant Effect	**Mitigation Proposed**	**Means of Implementation**	**Outcome/ Residual Effect**
Scottish Golf Coast Road	n/a	n/a	Not significant
Cumulative			
Inch Cape Offshore Wind Farm Onshore Works	n/a	n/a	Not significant
Seagreen Offshore Wind Farm - Construction	n/a	n/a	Significant
Seagreen Offshore Wind Farm - Operation	n/a	n/a	Not significant

12 Summary and Schedule of Mitigation

12.1 Introduction

12.1.1 The purpose of this chapter is to summarise the mitigation measures proposed in each of the technical chapters. In some cases mitigation measures are proposed to avoid, reduce or offset impacts which could otherwise give rise to significant residual environmental effects. The chapter also summarises mitigation proposed as additional good practice measures, which are not required to address likely significant effects.

12.1.2 The main aim of the design process was to 'design out' potential for environmental effects as far as possible. This chapter does not summarise 'mitigation by design'. This chapter covers the mitigation measures proposed to avoid, reduce or off-set significant residual environmental effects of the proposed development during the construction and operation phases (Table 12.1). It is anticipated that the mitigation measures outlined below would be secured through appropriately worded planning conditions.

12.1.3 Most of the pre-construction and construction phase mitigation would be delivered through a Construction Environmental Management Plan (CEMP). The outline content of the proposed CEMP is provided in **Technical Appendix 2.2: Outline CEMP**. Further details on specific measures to be included in the final CEMP are contained in each of the technical chapters of the EIAR, where relevant.

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Table 12.1: Mitigation Summary Table				
Topic	**Mitigation Proposed**	**Reason**	**Means of Implementation**	**Outcome/ Residual Effect**
Construction				
Seascape, Landscape and Visual	Construction			
	Given that no significant construction impacts on landscape fabric, seascape, landscape character or designations are anticipated no additional mitigation is required. Compliance with the outline Construction Environmental Management Plan (CEMP) and the Institute of Lighting Professionals (2020) Guidance Note 1 for the reduction of obtrusive light will minimise residual effects.	Good Practice – to minimise effects on landscape Fabric, character and designations.	It is anticipated that a suitably worded planning condition will require the CEMP and lighting specification.	Not significant.
	No other mitigation to address temporary effects on visual amenity is considered feasible.	N/A	N/A	Localised Significant effects (viewpoint 7 and 12 on mound north of Preston Cres only).
Ecology	Pre-construction			
	Pre-construction walkover surveys of suitable habitats (woodland and scrub) to identify if protected species have started utilising these areas in the time between initial survey and construction beginning.	To confirm absence/ presence of protected species within the Site and comply with relevant nature conservation legislation.	It is anticipated that a suitably worded planning condition will require the provision of an ECoW to monitor compliance with this mitigation commitment.	Not significant.
	Construction			
	Avoid removing woodland and scrub habitat or micrositing infrastructure where possible. Compensatory planting post construction with native species rich planting design to compensate for any habitat loss and enhance overall biodiversity of Site.	To avoid or compensate for loss of habitat – woodland and scrub.	It is anticipated that a suitably worded planning will require a detailed landscaping scheme to be submitted for the approval of ELC, incorporating proposals to compensate for any loss of woodland or scrub habitat.	Not significant.

Table 12.1: Mitigation Summary Table

Topic	Mitigation Proposed	Reason	Means of Implementation	Outcome/ Residual Effect
	Bat friendly lighting designing including methods such as dimming, minimal light trespass and adapted lamp spectra.	To minimise disturbance to foraging and commuting bats (from 24 hr lighting of landfall).	It is anticipated that a suitably worded planning condition will require the provision of final lighting design for the approval of ELC.	Not significant.
	No vegetation removal to occur within the breeding season (March to- August, inclusive). If this cannot be avoided a suitably qualified ecologist will need to survey areas of vegetation before clearance to check for active nests.	To avoid disturbance to breeding birds.	It is anticipated that a suitably worded planning condition will require the provision of an ECoW to monitor compliance with this mitigation commitment.	Not significant.
Ornithology	Construction			
	Minimisation of disturbance, particularly during non-breeding season September to March. Reduction of disturbance from noise through use of sound walls and drilling rig modifications to reduce noise levels. Reduction of disturbance from near-shore vessel based operations through minimisation of vessel speeds and area of operation. Construction activity to be advised by suitably qualified and competent ornithologist. If construction during breeding bird season, pre-construction surveys and nest checks required.	To avoid or minimise disturbance of internationally important populations of non-breeding waders, waterfowl and seabirds (SPA populations).	It is anticipated that a suitably worded planning condition will require the use of sound walls and drilling rig modifications to reduce noise levels. Minimisation of boat speeds and area of operation. Construction activity to be advised by suitably qualified and competent ornithologist.	Not significant.
Geology and Hydrology	Construction			
	The surface drainage network would be designed to minimise potential changes to the volume and rate of surface water runoff, such that discharge does not exceed that of the pre-development scenario.	To minimise changes to the volume and rate of surface water runoff from the Site, and therefore increased downstream flood risk, due to increased impermeable space within the Site boundary.	Drainage Design required by condition.	Not significant.
	The assessment has identified the potential for contaminated soils and groundwater to exist associated with historical development. Site investigation to be undertaken to assess	To avoid or minimise impacts to the quality of surface waters or groundwater.	Intrusive investigation prior to construction required by condition.	Not significant.

Table 12.1: Mitigation Summary Table				
Topic	**Mitigation Proposed**	**Reason**	**Means of Implementation**	**Outcome/ Residual Effect**
	potential environmental risks to identified sensitive receptors. The main contractor would be required to develop specific Environmental Management Plans (EMPs) which would include the methodologies and management measures to be employed in the construction of the Proposed Development. It is anticipated that foul sewage from temporary welfare facilities would be to tank for off-site removal.		CEMP required by condition.	
	Any works taking place near watercourses will be undertaken in accordance with SEPA guidance and in line with the requirements of the Controlled Activities Regulations (CAR) to prevent or reduce adverse effects to the watercourse.	Avoid impacts on morphology and sediment supply in watercourses.	CEMP, incorporating a PPP required by condition.	Not significant.
Cultural Heritage	Construction			
	No likely significant effects have been identified, therefore no mitigation is required. However a programme of archaeological works to be undertaken prior to or during the construction of the Proposed Development is proposed as a good practice measure. The archaeological works may take the form of an evaluation or watching brief depending on the results of the GI works and the final areas required for ground breaking. Any soils removed during archaeological works would be scanned with a metal detector in order to identify any battlefield remains which may survive.	Avoid/ minimise potential to disturb, damage or destroy non-designated features or buried remains of cultural heritage interest during construction.	It is anticipated that a suitably worded planning condition will require the provision of a Written Scheme of Investigation (WSI) for the agreement of the Archaeological Advisor to ELC.	Not significant.
Transport	Construction			
	It is proposed to prepare and implement a comprehensive Construction Traffic Management Plan (CTMP).	Minimise potential to cause severance, driver delay, pedestrian delay, impacts on pedestrian amenity and accidents	It is anticipated that a suitably worded planning condition will require the provision of a CTMP.	Not significant.

Table 12.1: Mitigation Summary Table				
Topic	**Mitigation Proposed**	**Reason**	**Means of Implementation**	**Outcome/ Residual Effect**
	The CTMP will identify measures to reduce the number of construction vehicles as well as identifying measures to mitigate the impact of vehicles. The CTMP will identify the programme of works, the agreed routes to Site and details of a Site Liaison Officer who would have responsibilities for managing traffic and transport impacts and effects. The CTMP will also identify measures to reduce and manage construction staff travel by private car, particularly single occupancy trips. The CTMP would include the following measures as a minimum: • Immediately upon commencement, all deliveries, operatives and visitors to the Site would report to the security gate. This would be communicated to all early works contractors at their pre-start meeting; • The main contractor would develop a logistics plan highlighting the access point for the project, loading bay, pedestrian/ vehicular segregation, welfare, storage, security and material handling that would be enforced following full Site establishment; • Approved haul routes would be identified to the Site and protocols put in place to ensure that HGVs adhere to these routes; • All contractors would be provided with a Site induction pack containing information on delivery routes and any restrictions on routes; • Temporary construction Site signage would be erected along the identified construction traffic routes to warn people of construction activities and associated construction vehicles;	and safety impact on B6371 and B1348 corridors.		

Table 12.1: Mitigation Summary Table

Topic	Mitigation Proposed	Reason	Means of Implementation	Outcome/ Residual Effect
	• A construction traffic speed limit (for example, 20 mph) would be imposed through the sensitive area along the B1348 and on approach to the main site access point on the B6371; • The construction material 'lay down' areas would allow for a staggered delivery schedule throughout the day, avoiding peak and unsociable hours (i.e. before 06:00 and after 22:00); • An integral part of the progress meetings held with all trade contractors is the delivery schedule pro-forma. All contractors would be required to give details of proposed timing of material deliveries to the Site. At this stage, they would be given a specific area for delivery; • The CTMP and the control measures therein would be included within all trade contractor tender enquiries to ensure early understanding and acceptance/ compliance with the rules that would be enforced on this project; • Under no circumstances would HGVs be allowed to lay-up in surrounding roads. All personnel in the team would be in contact with each other and with Site management, who in turn would have mobile and telephone contact with the subcontractors; • Roads would be maintained in a clean and safe condition; and • A wheel washing/ wheel cleaning facility would be installed on-site during the construction period in order to reduce mud and debris being deposited onto the local road network.			

Table 12.1: Mitigation Summary Table

Topic	Mitigation Proposed	Reason	Means of Implementation	Outcome/ Residual Effect
Noise	Construction			
	Control construction noise levels based on final site design and likely works location, with potential measures including: • temporary solid screening around the HDD working areas; • Provision for noise monitoring at noise-sensitive locations for the duration of the HDD works, in consultation with ELC, with drilling interrupted if noise levels exceed relevant thresholds; • Noisier construction works (including piling and excavating but excluding HDD) to be restricted to daytime hours of 07:00 to 19:00 during weekdays or Saturday mornings (until 13:00 hours); • Adding signage for transient users of the Coastal Recreation Area; and • Good practice measures in line with BS5228-1 advice, including selection of quieter plant and maximising separation distances where possible.	To avoid likely significant effect during daytime works at NSR 12 (1A High Street) and NSR05 (The Antiquaries). To avoid likely significant effect during evening/ Saturday afternoon works at NSR07 (Appin Drive), NSR09 (Whin Park (south)), NSR12 (1A High Street) and NSR05 (The Antiquaries). To avoid likely significant effect during night, on Bank Holiday or Sundays during works at NSR02 (West Harbour Road), NSR06 (Atholl View), NSR10 (Avenue Road B6371), NSR11 (Cedar Drive), NSR05 (The Antiquaries), NSR07 (Appin Drive), NSR09 (Whin Park (south)) and NSR12 (1A High Street).	Planning Condition (Methods of working to be developed and agreed between main contractor and ELC).	Not significant.
Land Use, Socio-economics and Tourism	Construction			
	The CEMP will include a Public Access Management Plan to set out proposals for managing safe alternative routes for core paths impacted during the construction phase.	To minimise impacts on the recreational use of the local core path network.	It is anticipated that a suitably worded planning condition will require the provision of a Public Access Management Plan as part of the CEMP.	Not significant.
Operation				
Seascape, Landscape and Visual	Operation			
	Noting that this EIAR supports an application for PPP, it is noted that mitigation through design will be delivered through detailed siting and	To minimise effects on Landscape Fabric,	It is anticipated that suitably worded planning conditions will	Localised Significant effects (viewpoint 7 and 12 on mound

Table 12.1: Mitigation Summary Table				
Topic	**Mitigation Proposed**	**Reason**	**Means of Implementation**	**Outcome/ Residual Effect**
	design, subject to applications for matters specified in conditions.	Landscape Character, Landscape Designations, and Visual Receptors.	require the provision of further design detail.	north of Preston Cres only) as a result of the substation, given its scale and mass.
Ecology	Operation			
	Lights will be motion activated minimising period of illumination at night.	To minimise disturbance to bats caused by artificial lighting from onshore substation between dusk and dawn (bat activity period).	It is anticipated that a suitably worded planning condition will require the provision of final lighting design for the approval of ELC.	Not significant .
Ornithology	Operation			
	None proposed.	None required.	n/a	n/a
Geology and Hydrology	Operation			
	It is anticipated that detailed drainage design would be submitted to the planning authority in consultation with SEPA and Scottish Water (as required) for the agreement of details on SuDS surface water management and foul water treatment to discharge a condition of the planning consent.	To avoid/ minimise impacts from accidental spills or leakage of chemicals introduced to the Site, causing a release of pollutants to watercourses during operations or any maintenance activities.	Drainage Design required by condition.	Not significant.
	A detailed Drainage Design would be developed in consultation with relevant consultees to address foul drainage.	To avoid pollution as a result of unmanaged foul flows from welfare facilities.	Drainage Design required by condition.	Not significant.
Cultural Heritage	Operation			
	No likely significant effects have been identified, therefore no mitigation is required. It is noted that the detailed design of the Proposed Development will be subject to further planning application for the approval of matters specified in conditions. A condition requiring the size of the Proposed Development substation to take account of the extant Cockenzie substation (Site 138) and the consented Inch Cape substation (in terms of the height of structures)	To minimise potential effects upon the settings or character of designated assets such as Listed Buildings, Scheduled Monuments, Inventory Gardens and Designed Landscapes (GDL), Inventory Battlefields and Conservation Areas.	It is anticipated that a suitably worded planning condition will require the provision of final substation design for the approval of ELC.	Not significant.

Table 12.1: Mitigation Summary Table				
Topic	**Mitigation Proposed**	**Reason**	**Means of Implementation**	**Outcome/ Residual Effect**
	would ensure that impacts upon the Inventory Battle of Prestonpans and Cockenzie and Port Seton Conservation Area are minimised.			
Transport	Operation			
	None proposed.	None required.	n/a	n/a
Noise	Operation			
	Detailed design to incorporate measures to control noise levels from the proposed electrical and cooling plant based on final plant selections. This could include selection of quiet plant, noise control measures for the plant such as enclosures and attenuation, and solid screening particularly on the north-east site boundary.	To avoid/ minimise likely significant effects during daytime at NSR06 (Atholl View) and NSR09 (Whin Park (south)) and likely significant effect during the night at NSR04 (Hawthorn Terrace/ Whin Park), NSR05 (The Antiquaries), NSR06 (Athol View), NSR07 (Appin Drive), NSR09 (Whin Park (south)), NSR10 (Avenue Road B6371) and NSR12 (1A High Street).	Planning Condition (Detailed design to be approved by ELC).	Not significant.
Land Use, Socio-economics and Tourism	Operation			
	None Proposed.	None required.	n/a	Not significant.
Cumulative				
Seascape, Landscape and Visual	Cumulative			
	None proposed.	None required to address 'in-addition' cumulative effects.	n/a	No significant in-addition effects. Some localised significant 'in-combination' effects with introduction of Inch Cape substation.
Ecology	Cumulative			
	None.	n/a	n/a	None.

Table 12.1: Mitigation Summary Table				
Topic	**Mitigation Proposed**	**Reason**	**Means of Implementation**	**Outcome/ Residual Effect**
Ornithology	Cumulative			
	None predicted.	Standard practice construction environmental management.	As outlined in the Construction Environmental Management Plan.	None/ Not significant.
Geology and Hydrology	Cumulative			
	None.	n/a	n/a	None.
Cultural Heritage	Cumulative			
	None.	n/a	n/a	None.
Transport	Cumulative			
	Implementation of CTMP as described under construction transport effects.	Minimise potential to cause severe, driver delay, pedestrian delay, impacts on pedestrian amenity and accidents and safety impact on B6371 and B1348 corridors.	It is anticipated that a suitably worded planning condition will require the provision of a CTMP.	Not significant.
Noise	Cumulative			
	Inch Cape onshore transmission works – Construction			
	Same as for during the construction (above).	To minimise/ avoid likely significant effect during daytime at NSR05 (The Antiquaries) and likely significant effect during nigh at NSR01 (Seahorse Nursery, No.2 Edinburgh Road), NSR02 (West Harbour Road), NSR06 (Atholl View), NSR05 (The Antiquaries) and NSR07 (Appin Drive).	Planning Condition (Methods of working to be developed and agreed between main contractor and ELC).	Not significant.
	Seagreen Wind Farm offshore cable works - Construction			
	Same as for during the construction (above).	Likely significant effect during daytime at NSR05 (The Antiquaries) and NSR12 (1A High Street). Likely significant effect during the evening and Saturday afternoon and evening, NSR07 (Appin Drive), NSR09	Planning Condition (Methods of working to be developed and agreed between main contractor and ELC).	Not significant.

Table 12.1: Mitigation Summary Table				
Topic	**Mitigation Proposed**	**Reason**	**Means of Implementation**	**Outcome/ Residual Effect**
		(Whin Park (south)), NSR12 (1A High Street) and NSR05 (The antiquaries). Likely significant effect during the night and on Sunday or a Bank Holiday, NSR01 (Seahorse Nursery and No.2 Edinburgh Road), NSR02 (West Harbour Road), NSR06 (Atholl View), NSR10 (Avenue Road B6371) and NSR11 (Cedar Drive), NSR05 (The Antiquaries), NSR07 (Appin Drive), NSR09 (Whin Park (south)) and NSR12 (1A High Street).		
	Inch Cape onshore transmission works - Operation			
	Same as for operation (above).	To avoid/ minimise likely significant effect during the daytime at NSR06 (Atholl View) and NSR09 (Whin Park (south)) and likely significant effect during the night NSR05 (The Antiquaries), NSR04 (Hawthorn Terrace/ Whin Park), NSR06 (Atholl View) NSR07 (Appin Drive) and NSR09 (Whin Park (south)).	Planning Condition (Detailed design to be approved by ELC).	Not significant.
Land Use, Socio-economics and Tourism	Cumulative			
	None proposed.	None required – only significant beneficial effects identified in combination with the Seagreen Offshore Wind Farm Construction.	n/a	Significant (beneficial).