

# ***DALGETY BAY REMEDIATION WORKS***

***Environmental Impact  
Assessment***

***Volume 1 – Environmental  
Statement***

***February 2017***

***DIO Project No:  
Z9J7482Y13***

***Prepared for:  
Defence Infrastructure  
Organisation***

Revision Schedule					
<i>Rev</i>	<i>Date</i>	<i>Details</i>	<i>Prepared by</i>	<i>Checked by</i>	<i>Approved by</i>
01	December 2016	Environmental Statement	Redacted	Redacted	Redacted
02	February 2017	Environmental Statement	Redacted	Redacted	Redacted

Prepared by AECOM Infrastructure & Environment UK Ltd for the Ministry of Defence, Defence Infrastructure Organisation, under Contract Number DIOCB1/011 on, see date above.

AECOM  
2<sup>nd</sup> Floor, Apex 2  
97 Haymarket Terrace  
Edinburgh  
EH12 5HD

Redacted

## TABLE OF CONTENTS

<b>Schedule of Figures (ES Volume 2)</b>	<b>VII</b>
<b>Register of Appendices (ES Volume 3)</b>	<b>XI</b>
<b>List of Abbreviations</b>	<b>XII</b>
<b>1. Introduction</b>	<b>1-1</b>
1.1 Summary	1-1
1.2 Project Background	1-1
1.3 Need for Development	1-2
1.4 The Applicant	1-3
1.5 The Site	1-3
1.6 Land Ownership	1-5
1.7 Legislative Context and Requirement for EIA	1-5
1.8 Approach to Environmental Statement	1-7
1.9 Structure of Environmental Statement	1-8
1.10 Availability of the Environmental Statement	1-9
1.11 References	1-9
<b>2. Development Description</b>	<b>2-11</b>
2.1 Introduction	2-1
2.2 Background to Design Approach	2-1
2.3 Development Description	2-2
2.4 Consideration of Alternatives	2-5
2.5 Ground Investigation Works	2-7
2.6 Construction Compound	2-8
2.7 Phasing and Working Hours	2-8
2.8 Indicative Construction Materials	2-8
2.9 Site Access and Material Delivery	2-9
2.10 Waste Management	2-10
2.11 Post Development Monitoring	2-10
2.12 References	2-11
<b>3. Scoping and Consultation</b>	<b>3-1</b>

3.1	Introduction.....	3-1
3.2	Overview of Previous Engagement .....	3-1
3.3	South West Fife Area Committee and Community Council.....	3-2
3.4	Engagement with Dalgety Bay Sailing Club .....	3-3
3.5	EIA Scoping.....	3-3
3.6	Processing Agreement .....	3-4
3.7	Public Exhibitions .....	3-4
3.8	Ongoing Liaison .....	3-5
3.9	References .....	3-6
<b>4.</b>	<b>EIA Methodology .....</b>	<b>4-1</b>
4.1	Introduction.....	4-1
4.2	Overview of the EIA.....	4-1
4.3	Legislative Requirements .....	4-2
4.4	Scope of EIA .....	4-3
4.5	EIA Assessment Methodology .....	4-4
4.6	Types of Effect .....	4-7
4.7	Cumulative Effects .....	4-7
4.8	Assumptions and Limitations.....	4-7
4.9	References .....	4-8
<b>5.</b>	<b>Planning and Marine Policy.....</b>	<b>5-1</b>
5.1	Introduction.....	5-1
5.2	National Policy Context .....	5-1
5.3	Regional Policy Context .....	5-4
5.4	Local Policy Context.....	5-5
5.5	Conclusions.....	5-7
5.6	References .....	5-7
<b>6.</b>	<b>Landscape and Visual.....</b>	<b>6-1</b>
6.1	Introduction.....	6-1
6.2	Legislative and Planning Policy Context .....	6-1
6.3	Assessment Methodology .....	6-2

6.4	Landscape Baseline Conditions .....	6-3
6.5	Visual Baseline Conditions .....	6-9
6.6	Environmental Design and Management .....	6-14
6.7	Landscape Assessment .....	6-16
6.8	Assessment of Visual Amenity .....	6-19
6.9	Mitigation and Monitoring .....	6-25
6.10	Residual Effects .....	6-26
<b>7.</b>	<b>Water Environment .....</b>	<b>7-1</b>
7.1	Introduction.....	7-1
7.2	Legislative and Planning Policy Context .....	7-1
7.3	Assessment Methodology .....	7-4
7.4	Baseline Conditions.....	7-8
7.5	Summary of Receptor Sensitivities .....	7-14
7.6	Assessment.....	7-16
7.7	Mitigation and Monitoring .....	7-20
7.8	Residual Effects .....	7-23
7.9	References .....	7-23
<b>8.</b>	<b>Nature Conservation .....</b>	<b>8-1</b>
8.1	Introduction.....	8-1
8.2	Legislative and Planning Policy Context .....	8-1
8.3	Assessment Methodology .....	8-3
8.4	Baseline Conditions.....	8-7
8.5	Assessment.....	8-19
8.6	Mitigation and Monitoring .....	8-28
8.7	Residual Effects .....	8-29
8.8	References .....	8-29
<b>9.</b>	<b>Ornithology .....</b>	<b>9-1</b>
9.1	Introduction.....	9-1
9.2	Legislative Background .....	9-1
9.3	Assessment Methodology .....	9-3

9.4	Consultation responses.....	9-9
9.5	Baseline Conditions – Desk Study .....	9-9
9.6	Baseline Conditions – Survey Results .....	9-17
9.7	Assessment.....	9-27
9.8	Mitigation and Monitoring .....	9-50
9.9	Residual Effects .....	9-51
9.10	References .....	9-51
<b>10.</b>	<b>Traffic and Transport .....</b>	<b>10-1</b>
10.1	Introduction.....	10-1
10.2	Embedded Mitigation.....	10-1
10.3	Legislative and Planning Policy Context .....	10-1
10.4	Assessment Methodology .....	10-2
10.5	Baseline Conditions.....	10-6
10.6	Mitigation .....	10-14
10.7	Assessment of Residual Effects.....	10-15
10.8	References .....	10-16
<b>11.</b>	<b>Noise and Vibration.....</b>	<b>11-1</b>
11.1	Introduction.....	11-1
11.2	Legislative Background .....	11-1
11.3	Scope and Methodology.....	11-2
11.4	Baseline Conditions.....	11-9
11.5	Assessment.....	11-10
11.6	Mitigation .....	11-12
11.7	Residual Effects .....	11-13
<b>12.</b>	<b>Cumulative Assessment.....</b>	<b>12-1</b>
12.1	Introduction.....	12-1
12.2	Scope of Assessment.....	12-1
12.3	Approach and Assessment Methodology.....	12-2
12.4	Limitations .....	12-3
12.5	Summary of Cumulative Impacts .....	12-10

---

12.6	References .....	12-10
<b>13.</b>	<b>Summary of Effects and Mitigation .....</b>	<b>13-1</b>
13.1	Introduction.....	13-1
13.2	Primary Mitigation Measures (Mitigation by Design) .....	13-1
13.3	Summary of Conclusions .....	13-2
<b>14.</b>	<b>Schedule of Environmental Commitments .....</b>	<b>14-1</b>
14.1	Summary .....	14-1
14.2	Construction and Environmental Management Document (CEMD) .....	14-1
14.3	Waste Management .....	14-2
14.4	Relevant Policies and Guidance .....	14-3
14.5	Additional Sustainability Commitments .....	14-4

## SCHEDULE OF FIGURES

Figure Name and Number	Drawing Number
1.1 Location Plan	U/DB/EIA/001
1.2 Existing Site Plan	U/DB/EIA/002
1.3 Management Strategy Areas	U/DB/EIA/003
1.4 Consenting Boundaries	U/DB/EIA/004
1.5 Site Ownership Plan	U/DB/EIA/005
1.6 Proposed Site Plan	U/DB/EIA/006
2.1 Plan Indicating Works Area H – (Headland)	U/DB/EIA/007
2.2 Typical Revetment Arrangement For Area H (Headland)	U/DB/EIA/008
2.3 Plan Indicating Works In Area S – (Slipway)	U/DB/EIA/009
2.4 Typical Revetment Arrangement For Area S (Slipway)	U/DB/EIA/010
2.5 Plan Indicating Works Area BN & BS (Boat Park Bay)	U/DB/EIA/011
2.6 Typical Revetment Arrangement For Area BN & BS - (Boat Park Bay) Sheet 1 of 2	U/DB/EIA/012
2.7 Typical Revetment Arrangement For Area BN & BS- (Boat Park Bay) Sheet 2 of 2	U/DB/EIA/013
6.1 Landscape Character & Designations	U/DB/EIA/014
6.2 Visual Receptors	U/DB/EIA/015
6.3 Zone of Theoretical Visibility	U/DB/EIA/016
6.4 Viewpoint 1 – Dalgety Bay Sailing Club	U/DB/EIA/L1



Figure Name and Number	Drawing Number
6.5 Viewpoint 2 – East of Donibristle Bay	U/DB/EIA/L2
6.6 Viewpoint 3 – Fife Coastal Path Crow Hill Wood	U/DB/EIA/L3
6.7 Viewpoint 4 – Downing Point West of Donibristle bay	U/DB/EIA/L4
6.8 Viewpoint 5 – Braefoot Point East of Dalgety Bay	U/DB/EIA/L5
6.9 Viewpoint 6 – Core Path North of Dalgety Bay	U/DB/EIA/L6
7.1 Water environment receptors	U/DB/EIA/017
8.1 Designated Sites withn 2km of Management Area	U/DB/EIA018
8.2 Phase 1 Habitat Survey of Management Area Vicinity	U/DB/EIA/019
9.1 Designated Sites of Ornithological Interest Within 5km of Management Area	U/DB/EIA/020
9.2 CBC Breeding Bird Survey - Visit 1	U/DB/EIA/021
9.3 CBC Breeding Bird Survey - Visit 2	U/DB/EIA/022
9.4 CBC Breeding Bird Survey - Visit 3	U/DB/EIA/023
9.5 CBC Breeding Bird Survey - Visit 4	U/DB/EIA/024
9.6 Vantage Point Survey Locations	U/DB/EIA/025
9.7 Roosting Sites of SPA/Ramsar Species April to September 2015	U/DB/EIA/026
9.8 Foraging Sites of SPA/Ramsar Species April to September 2015	U/DB/EIA/027

Figure Name and Number	Drawing Number
9.9 Other Behaviour of SPA/Ramsar Species April to September 2015	U/DB/EIA/028
9.10 Distribution of Observed SPA/Ramsar Species April to September 2015: Auks and Other Waterbirds Not Shown Elsewhere	U/DB/EIA/029
9.11 Distribution of Observed SPA Species April to September 2015: Ducks (Sheet 1)	U/DB/EIA/030
9.11 Distribution of Observed SPA Species April to September 2015: Ducks (Sheet 2)	U/DB/EIA/031
9.12 Distribution of Observed SPA Species April to September 2015: Gulls	U/DB/EIA/032
9.13 Distribution of Observed SPA Species April to September 2015: Terns	U/DB/EIA/033
9.14 Distribution of Observed SPA Species April to September 2015: Waders (Sheet 1)	U/DB/EIA/034
9.14 Distribution of Observed SPA Species April to September 2015: Waders (Sheet 2)	U/DB/EIA/035
9.15 Noise Modelling for Ornithology Assessment; Scenario 1 Mitigated	U/DB/EIA/035/N1
9.16 Noise Modelling for Ornithology Assessment; Scenario 2 Mitigated	U/DB/EIA/035/N2
9.17 Noise Modelling for Ornithology Assessment; Scenario 3 Mitigated	U/DB/EIA/035/N3
10.1 Survey Locations Weeks 1 and 2	U/DB/EIA/036
10.2 Survey Locations Weeks 3 and 4	U/DB/EIA/037
10.3 Active Quarry Locations	U/DB/EIA/038
10.4 Preferred Routes	U/DB/EIA/039

Figure Name and Number	Drawing Number
10.5 Route Option - Goathill Quarry to Site	U/DB/EIA/040
10.6 Route Option - Goathill Quarry to Burntisland Harbour	U/DB/EIA/041
10.7 Route Option - Concrete Supply to Site	U/DB/EIA/042
10.8 Route Option - Cruicks Quarry to Site	U/DB/EIA/043
10.9 Traffic Accidents In The Area	U/DB/EIA/044
11.1 Construction Sound Levels Scenario 1	U/DB/EIA/045
11.2 Mitigated Construction Sound Levels Scenario 1	U/DB/EIA/046
11.3 Construction Sound Levels Scenario 2	U/DB/EIA/047
11.4 Mitigated Construction Sound Levels Scenario 2	U/DB/EIA/048
11.5 Construction Sound Levels Scenario 3	U/DB/EIA/049
11.6 Mitigated Construction Sound Levels Scenario 3	U/DB/EIA/050
11.7 Receptors and Monitoring Locations	U/DB/EIA/051
12.1 Potential & Committed Development Within 3km	U/DB/EIA/052
12.2 Potential & Committed Development Beyond 3km	U/DB/EIA/053
12.3 Potential & Committed Marine Development	U/DB/EIA/054

## REGISTER OF APPENDICES

Appendix Reference	Description
2.1	Public Health England Consultation Response
3.1	EIA Scoping Matrix
5.1	Planning Policies
6.1	Landscape Assessment Methodology
7.1	Fife Council Flooding Consultation
8.1	AMEC Intertidal Phase 1 Survey
8.2	River Forth Fisheries Trust Response
9.1	AECOM Baseline Ornithology Report
9.2	AMEC Baseline Ornithology Report
9.3	AMEC Desk Study Ornithology Report
10.1	Assessment of HGV Movements
11.1	Noise and Vibration Terminology
11.2	Noise Model Input Data
11.3	Noise Monitoring Location Photos
11.4	Noise Monitoring Data
11.5	Fife Council Noise Consultation

## LIST OF ABBREVIATIONS

ALARA	As low as reasonably achievable
ATC	Automatic Traffic Counters
ADT	Average Daily Traffic
AOD	Above Ordinance Datum
AWI	Ancient Woodland Inventory
BS	British Standard
BTO	British Trust for Ornithology
BPM	Best Practicable Means
BSBI	Botanical Society of the British Isles
CoPA	Control of Pollution Act
CSO	Combined Sewer Overflow
CEMD	Construction Environmental Management Document
CEMD	Construction and Environmental Management Document
CIEEM	Chartered Institute of Ecology and Environmental Management
CMS	Construction Method Statement
COMARE	Committee on Medical Aspects of Radiation in the Environment
CRTN	Calculation of Road Traffic Noise
DBSC	Dalgety Bay Sailing Club
DETR	Department of Environment Transport and the Regions
DfT	Department for Transport
DMRB	Design Manual for Road and Bridges
DIO	Defence Infrastructure Organisation
EcIA	Ecological Impact Assessment
ECow	Ecological Clerk of Works
EIA	Environmental Impact Assessment
EPA	Environmental Protection Act
EPS	European Protected Species
ES	Environmental Statement
GDL	Garden and Designed Landscapes
GLVIA	Guidelines for Landscape and Visual Impact Assessment
GWDTE	Groundwater Dependent Terrestrial Ecosystem
Gy	Gray
Ha	Hectare

HES	Historic Environment Scotland
HRA	Habitats Regulations Appraisal
HGV	Heavy Goods Vehicle
IEA	Institute of Environmental Assessment
IEMA	Institute of Environmental Management and Assessment
IHT	Institution of Highways and Transportation
kBq	Kilobecquerels
LBAP	Local Biodiversity Action Plan
LCA	Landscape Character Areas
LCU	Landscape Character Unit
LCTs	Landscape Character Types
LDP	Local Development Plan
LNCS	Local Nature Conservation Site
LNRR	Local Nature Reserve
LLA	Local Landscape Area
LVIA	Landscape and Visual Impact Assessment
MHWS	Mean High Water Spring
MSv	Millisieverts
MLWS	Mean Low Water Spring
MNNS	Marine Non-Native Species
MoA	Memorandum of Agreement
MOD	Ministry of Defence
MSA	Management Strategy Areas
NCN	National Cycle Network
NESA	Network Evaluation from Survey and Assignment
NNS	Non-Native Species
NVC	National Vegetation Classification
NPF3	National Planning Framework 3
NRMM	Non-road mobile machinery
NRTF	National Road Traffic Forecast
OFFSAB pSPA	Outer Firth of Forth & St Andrews Bay Complex pSPA
PAC	Pre-Application Consultation
PAN	Planning Advice Note
PHE	Public Health England
PLDP	Proposed Local Development Plan

PMF	Priority Marine Feature
pSPA	Proposed SPA
RAF	Royal Air Force
RBMP	River Basin Management Planning
RSPB	Royal Society for the Protection of Birds
RCAHMS	Royal Commission on the Ancient and Historical Monuments
RYA	Royal Yachting Association
RPA	Radiation Protection Advisor
SA	Sustainability Appraisal
SAC	Special Area of Conservation
SBL	Scottish Biodiversity List
SDP	Strategic Development Plan
SEPA	Scottish Environment Protection Agency
SESPlan	South East Scotland Strategic Development Plan
SINC	Site of Importance to Nature Conservation
SMP	Shoreline Management Plan
SNH	Scottish Natural Heritage
SPA	Special Protection Area
SPLs	Significant Pollutant Linkages
SPP	Scottish Planning Policy
SPG	Supplementary Planning Guidance
SSSI	Site of Special Scientific Interest
SUDS	Sustainable Urban Drainage Systems
SW	Scottish Water
TA	Transport Assessment
TAG	Transport Assessment Guidance
TN	Target Notes
TMP	Traffic Management Plan
TPO	Tree Preservation Order
UK BAP	UK Biodiversity Action Plan
WFD	Water Framework Directive
WPZ	Water Protection Zones
WeBS	Wetland Bird Survey
ZTV	Zone of Theoretical Visibility

## 1. INTRODUCTION

### 1.1 Summary

- 1.1.1 Defence Infrastructure Organisation (DIO) on behalf of the Secretary of State for Defence (**'the Applicant'**) is proposing to carry out a series of physical works on specific areas of the foreshore at Dalgety Bay in Fife, in order to remediate known contamination of radium-226.
- 1.1.2 The physical works required to meet the effective long-term mitigation of risks from radium contamination within the foreshore (herein referred to as **'the Development'**) can be summarised as follows:
  - Install geotextile membrane beneath existing coastal rock armour and replace or reinforce rock armour to provide cover system to mitigate against the introduction of landward radium contamination into the foreshore.
  - Removal of higher activity radium material from targeted foreshore areas;
  - Limited re-profiling of foreshore and placement of geotextile membrane and rock armour cover system to isolate remaining radium contamination; and,
  - Removal of existing jetty and slipways at Dalgety Bay Sailing Club (DBSC) to allow screening for radioactive particles in materials beneath and replacement with a new jetty and slipway structure.
- 1.1.3 This Environmental Statement (ES) reports the results of the Environmental Impact Assessment (EIA) process carried out for the Development and accompanies planning and marine licence applications for the construction and operation of the proposed works. The purpose of the EIA is to identify and assess the likely significant effects resulting from the construction and operation of the Development and ensure that, where possible, appropriate mitigation has been incorporated into the project design.
- 1.1.4 ES Volume 2 - Figures 1.1 'Location Plan' and 1.2 'Existing Site Plan' demonstrate the geographical context and extent of the area where the Development will take place (**'the Site'**).
- 1.1.5 ES Volume 2 - Figure 1.6, 'Proposed Site Plan' provides an overview of the Development upon completion.

### 1.2 Project Background

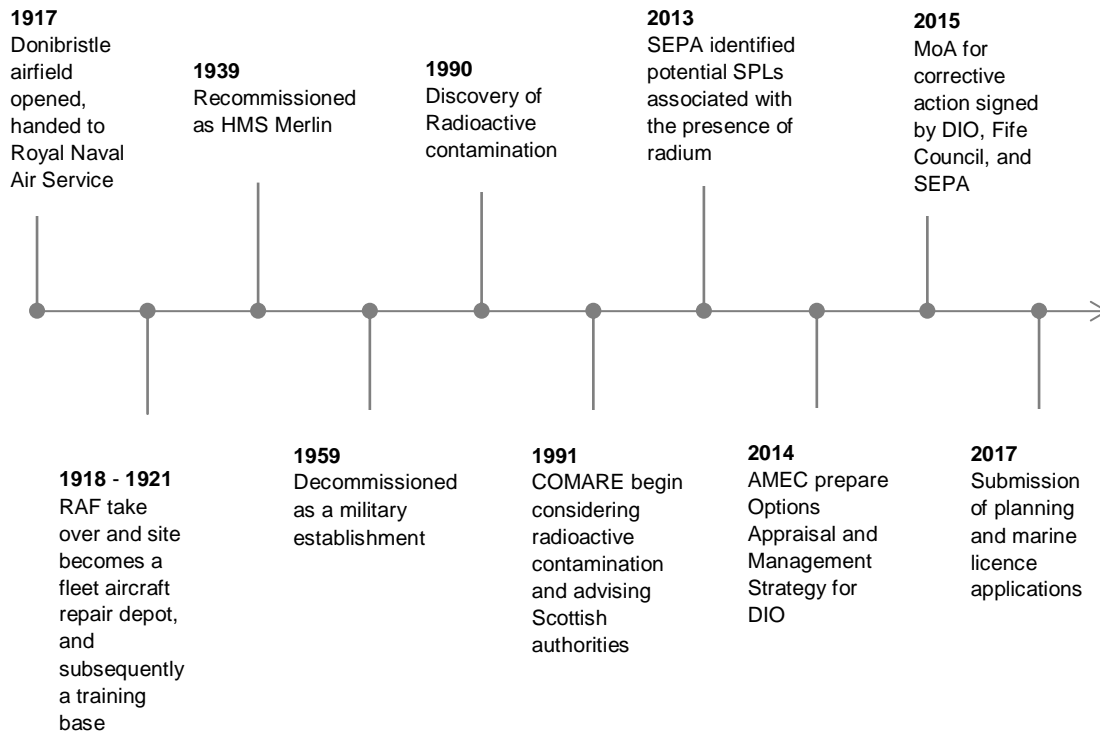
- 1.2.1 During the First World War, the area surrounding the Site was utilised by the Royal Naval Air Service as an airfield (Donibristle) which subsequently became a fleet aircraft repair depot. The area was then used by the Royal Air Force (RAF) as a shore training base until 1939 when it was re-commissioned as HMS Merlin, a Royal Navy shore establishment which included a major aircraft repair yard. The facility was eventually decommissioned as a military establishment in 1959.
- 1.2.2 Following the discovery of radioactive contamination on the beach at Dalgety Bay during a routine baseline monitoring campaign by Babcock Engineering Services for Rosyth Naval Base in June 1990, a limited survey was carried out which confirmed the presence of discrete sources of radium-226.
- 1.2.3 The Committee on Medical Aspects of Radiation in the Environment (COMARE) has been considering radioactive contamination in the Dalgety Bay area since 1991 and has been involved in advising Scottish authorities since then. As outlined in COMARE's 15<sup>th</sup> Report on Radium Contamination in the Area Around Dalgety Bay (2014) "*Radium-226 is a metallic radionuclide that emits alpha and gamma radiations and has a physical half-life of 1,600 years...Radium-226 occurs naturally as part of the radioactive decay chain of uranium-238, and it can be extracted from uranium-bearing ores and purified by chemical means*".
- 1.2.4 In the early 20th century, one of the major industrial uses of radium was in the production of luminescent paint, primarily for the use on the application of display dials on items such as



watches and clocks. The material was also used for aircraft instruments to make them visible in night flying.

- 1.2.5 Potentially, the radium-226 identified in the Dalgety Bay foreshore results from military instruments containing luminescent paint which, in line with recognised practice at the time, were incinerated with the resulting material buried on site.

## Dalgety Bay Remediation Timeline



## 1.3 Need for Development

- 1.3.1 In 2013, the Scottish Environment Protection Agency (SEPA) identified potential significant pollutant linkages (SPLs) associated with the presence of radium on specific areas of the Dalgety Bay foreshore. As a result, DIO has been working with Fife Council, SEPA and a number of other stakeholders to develop a strategy to remediate the area in order to reduce or control the health and environmental risks associated with the pollutant linkages identified.
- 1.3.2 In order to identify and assess remediation options, an Outline Management Options Appraisal ('the **Options Appraisal**') was prepared by AMEC for DIO and issued in January 2014. This identified four broad outline strategy options for managing the radium. The Dalgety Bay Management Strategy ('the **Management Strategy**') was subsequently prepared by AMEC for DIO and issued in July 2014. The Management Strategy recommended a preferred option for remediation which has been taken forward by the AECOM Design Team. The option offers an effective long-term management strategy for the mitigation of risks from radium within the Dalgety Bay foreshore that is both practicable and sustainable.
- 1.3.3 A Memorandum of Agreement (MoA) was signed in April 2015 by DIO, Fife Council and SEPA which constitutes "a *framework for cooperation and collaboration*" (but not a legally binding agreement) in implementing and maintaining the measures contained in the Management Strategy.
- 1.3.4 The physical implementation of the Management Strategy necessitates both planning consent and a marine licence. Further to positive EIA Screening Opinions from Fife Council (under the Town and Country Planning (EIA) (Scotland) Regulations (2011)) ('the **Planning EIA Regulations**') and Marine Scotland (under the Marine Works (EIA) Regulations (2007)) ('the

**Marine EIA Regulations'**) respectively, it was agreed with each Competent Authority that one EIA should be undertaken, covering both regulatory regimes.

- 1.3.5 The design of the Development and the related construction methodology has therefore been developed alongside the progression of the EIA ensuring that the consideration of environmental effects has directly informed the design process from the outset.
- 1.3.6 It should also be noted that a Habitats Regulations Appraisal (HRA) under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) will be required to be undertaken by Fife Council as Competent Authority, due to its proximity to internationally designated nature conservation sites. This ES provides the relevant background data to inform Fife Council's assessment. In addition, AECOM has conducted a preliminary HRA Assessment for Fife Council's information and this has been provided separately.
- 1.3.7 For information, the Options Appraisal and Management Strategy are available to view online at the following locations:

Options Appraisal: <https://www.sepa.org.uk/media/61708/dio-outline-management-options-appraisal-final-report.pdf>

Management Strategy: <https://www.gov.uk/government/publications/dalgety-bay-management-strategy-report>

## 1.4 The Applicant

- 1.4.1 AECOM is submitting the planning and marine licence applications on behalf of the Secretary of State for Defence, who in turn is represented by DIO.

## 1.5 The Site

- 1.5.1 This Section of the ES establishes and describes the area to which this ES and associated planning and marine licence applications relate.
- 1.5.2 Dalgety Bay is located within Fife Council region, on the north shore of the Firth of Forth on the east coast of Scotland. Volume 2 - Figure 1.1 of the ES, 'Location Plan' shows the location of Dalgety Bay in the context of the wider region. According to Fife Council's Dunfermline and West Fife Local Plan (adopted 16<sup>th</sup> November 2012), Dalgety Bay is home to approximately 9,883 people and "*benefits from extensive areas of woodland or open space, adding to its attractive coastal setting*".
- 1.5.3 The site to which this ES and the related planning and marine licence applications relate (**'the Site'**) is identified in Volume 2 - Figure 1.2 of the ES, 'Existing Site Plan'.
- 1.5.4 The immediate landward adjacency encompasses land owned by Dalgety Bay Sailing Club (DBSC) Ltd., which comprises a number of existing buildings and structures including a two-storey brick and wood building used as a club house, a single storey breeze block boat store and a rescue-boat house at the high tide level.
- 1.5.5 The DBSC grounds has a single track vehicle access from the closest residential street (The Wynd) which will be used for construction access to the Site, member car parking and an area used currently as a boat park. The



Image 1-1 Dalgety Bay Sailing Club Clubhouse

majority of the adjacent landward area is surfaced in grassed soil with a tarmac/gravel road and car park.

- 1.5.6 The Ross Plantation, primarily broadleaf woodland, is located to the north-west of the DBSC grounds. Much of the Ross Plantation and trees around and beyond the Club House are protected by a Tree Preservation Order (TPO).
- 1.5.7 The closest residential receptors to the Site are located on The Wynd, an adjacent residential street which forms part of a wider residential area comprising varied housing types.
- 1.5.8 The Site was originally derived in the Management Strategy as “Areas where SEPA has either identified potential SPLs or are undertaking further review, together with the area subject [to] previous work undertaken in accordance with the Dalgety Bay Inspection and Investigation Plan (DIO, 2012). In addition consideration has been given to the foreshore geography/topography, soil type, tidal activity and, most importantly, the presence and distribution of radium”.
- 1.5.9 The Site has been divided into five distinct Management Strategy Areas (MSAs) which all require varying approaches to remediation. The location and extent of the MSA’s are demonstrated in ES Volume 2 - Figure 1.3, ‘Management Strategy Areas’.
- 1.5.10 Table 1.1 below describes the five MSA’s in more detail, as outlined in the Management Strategy.

Table 1.1 – Management Strategy Areas

Identification Code	Description	Area (m2)
Headland (H)	A moderately sloping gravel beach, typically extending from 0-15 metres (m) in width at Mean Low Water Neap (MLWN) and 20-25m exposed at Mean Low water Spring (MLWS). Isolated rock outcrops. The foreshore is backed by a 4-5m high steeply sloping headland protected by armour stone over most of its height.	3643
Slipway (S)	There are two existing concrete slipways a beach level and raised stone jetty set within a moderately sloping gravelly/sandy beach. There are some rock outcrops and a low (1-2m) high slope at the back of the beach extending up to the DBSC. The beach extends 25-30m wide at MLWN with some mud and rocks beyond down to MLWS.	3090
Boat Park Bay South (BS)	The upper sand and gravel beach is typically 10-15m wide with sand, mud and rock below. The foreshore extends to some 80m-110m wide at MLWN. Above the beach there is some steeply sloping rock armouring of approximately 1m in height.	4989
Boat Park Bay North (BN)	The upper sand and gravel beach is typically 10-15m wide with sand, mud and rock below, extending some 140m-170m in width down to MLWN. Above the beach there is some steeply sloping rock armouring of approximately 1m in	10, 923

Identification Code	Description	Area (m2)
	height.	
Boat Park Bay North Zone 1 (BN-Z)	Sub-area BN-Z comprises the unprotected (i.e. no rock armouring) part of Area BN, north of the reclaimed boat park. The foreshore comprises varying beach materials interrupted by substantial rock outcrops.	181

## 1.6 Land Ownership

- 1.6.1 ES Volume 2 - Figure 1.5, 'Site Ownership Plan' shows the extent of land ownership within the Site, which consists of the following parties:
- Dalgety Bay Sailing Club (DBSC) Ltd.;
  - Moray Estates Development Company Ltd;
  - Barratt Developments PLC; and,
  - The Crown Estate.

## 1.7 Legislative Context and Requirement for EIA

- 1.7.1 Volume 1 - Chapter 4 of the ES provides a detailed overview of the legislative requirement for EIA, considering both terrestrial land-use planning and marine consenting regimes. The following section provides a brief overview of the consenting regimes which will govern the implementation of the Development and the subsequent requirement for environmental assessment.
- 1.7.2 For reference, ES Volume 2 - Figure 1.4, 'Consenting Boundaries' shows the extent of work requiring planning consent, and that which falls within the marine licensing consenting regime.

### Land-Use Planning and EIA

- 1.7.3 All elements of the Development which are located landward of the MLWS fall within the confines of the statutory powers defined under the Town and Country Planning (Scotland) Act 1997 (as amended) and as such will require planning consent. As detailed within ES Volume 2 - Figure 1.4, this includes all elements of work with the exception of a small extent of MSAs H (Headland) and S (Slipway).
- 1.7.4 As the Site exceeds two Hectares (Ha), a 'major' planning application will be required as defined by regulation 2(1) and under provision 9 (b) 'Major Developments' of the Town and Country Planning (Hierarchy of Developments) (Scotland) Regulations 2009.
- 1.7.5 The requirement for EIA for the landward elements of the Development is defined by the Planning EIA Regulations which transpose the EIA Directive<sup>1</sup> on the assessment of the effects of certain public and private projects on the environment into the Scottish Planning System.
- 1.7.6 Development that falls within a relevant description in Schedule 1 of the EIA Regulations always requires EIA, while development of a type listed in Schedule 2 requires EIA only if: a) it meets any relevant criteria and exceeds any relevant threshold listed in the second column of the table in Schedule 2; or b) is located wholly or in part in a 'sensitive area' as defined in regulation 2(1). For all 'Schedule 2' development, the planning authority must make its own formal determination of whether or not EIA is required (referred to as a 'screening opinion').

<sup>1</sup> Council Directive No. 85/337/EEC, as amended by 97/11/EC, 2003/35/EC and 2009/31/EC and codified by 2011/92/EU. Directive 2011/92/EU has been amended in 2014 by [DIRECTIVE 2014/52/EU](#) (for detailed information please refer to [Review of the EIA Directive](#)).

- 1.7.7 The Development falls under Section 10 (m) of Schedule 2 of the EIA Regulations and as such AECOM requested a screening opinion from Fife Council (as Planning Authority and Competent Authority) on behalf of DIO on 11<sup>th</sup> March 2016. The Council responded on 14<sup>th</sup> April 2016 stating that *“taking into account the characteristics of the development, the environmental sensitivity of its location and surrounds, the potential impact on ecological and other environmental/natural heritage issues, and other materially relevant environmental related criteria, an EIA application would be required”*.
- 1.7.8 In light of the above, a major application for full planning permission, accompanied by this ES is submitted to Fife Council as Planning Authority for all elements of the Development above the MLWS.

## Marine Licence and EIA

- 1.7.9 Under Section 20(1) of the Marine (Scotland) Act 2010 (from 0 -12nm) and Section 65(1) of the Marine and Coastal Access Act 2009 (from 12 - 200nm), a marine licence from Scottish Ministers is required if a person or organisation intends to carry out certain acts in the Scottish marine area. These acts can include:
- The deposit of a substance or object in the sea or on or under the seabed;
  - The construction, alteration or improvement of works in the sea or on or under the seabed;
  - The removal of a substance or object from the seabed;
  - Dredging (including plough, agitation, side-casting and water injection); and/or,
  - The incineration of a substance or object.
- 1.7.10 Those elements of the Development located below the MHWS which fall within the criteria described above will therefore require a marine licence under the Marine (Scotland) Act 2010. As detailed within ES Volume 2 - Figure 1.4, ‘Consenting Boundaries’ this includes the majority of management areas H (Headland), S (Slipway), BS (Boat Park South) and BN (Boat Park North) with the exception of the landward extents. Note that works carried out within area BN-Z will not require a marine licence.
- 1.7.11 The requirement for EIA for the seaward elements of the Development is defined by the Marine EIA Regulations. These Regulations transpose the same EIA Directive discussed in 1.8.5 above and as the Development falls within Annex II of the Directive it also requires to be screened for EIA under these Regulations.
- 1.7.12 AECOM requested a screening opinion from Marine Scotland (as Competent Authority) on behalf of DIO on 11<sup>th</sup> March 2016. Marine Scotland responded on 30<sup>th</sup> March 2016 stating that they *“concur with the conclusions of the [screening] report in that EIA is required”*.
- 1.7.13 In addition to an application for planning consent, a marine licence application, accompanied by an EIA as reported in this ES is submitted to Marine Scotland as Competent Authority for all elements of the Proposed Development below the MHWS.

## Other Supporting Information

- 1.7.14 In addition to this ES, other documents are submitted to the Competent Authorities as part of the consenting process. Table 1.2 summarises the supporting documentation which has accompanied each application.

Table 1.2 - Other Supporting Documentation

Document	Description of Contents
Coastal Process Report (February 2017)	While a Coastal Processes Assessment was previously envisaged to form part of the EIA, as the project progressed it was considered necessary to



Document	Description of Contents
	develop this as a standalone document which has informed the EIA.
Planning Statement (February 2017)	This statement provides an explanation of the principles behind (and justification for) the Development and how it fits with the national, regional and local planning policies.
Design and Access Statement (February 2017)	This report explains the design principles and concepts that have been applied to particular aspects of the proposal including the amount, layout, scale, landscaping and appearance of the development.
Pre-Application Consultation (PAC) Report (February 2017)	This document summarises the methods of engagement and the outcomes following the feedback from the pre-application consultation activities that have been undertaken by the Applicant. It should be noted, that a single report has been produced to satisfy the requirements of both planning and marine legislation.

## 1.8 Approach to Environmental Statement

- 1.8.1 The ES is the main output of the EIA process; it presents information on the likely environmental implications of the Development and proposed measures to mitigate any significant effects. Volume 1 - Chapter 4 of the ES provides a detailed overview of the approach to the EIA process, demonstrating compliance with the relevant legislation.
- 1.8.2 The detailed scoping process carried out as part of the EIA process is discussed further in Volume 1 - Chapter 3 of this ES. To summarise however, the following environmental issues were identified, in consultation with key stakeholders, as requiring detailed assessment:
- Landscape and Visual;
  - Hydrology;
  - Nature Conservation;
  - Ornithology;
  - Traffic and Transport;
  - Noise and Vibration; and,
  - Coastal Processes.
- 1.8.3 The ES has addressed each of these topics individually within this document, with the exception of Coastal Processes. As this project developed, it was considered necessary to carry out the Coastal Processes assessment as a standalone report to inform each of the EIA chapters. This has therefore been submitted separately as part of the planning and marine licence application packages.
- 1.8.4 The methodology for the EIA assessment draws primarily on the guidance contained within "A Handbook on Environmental Impact Assessment" (SNH, 4<sup>th</sup> edition, 2013) and the Guidelines for Environmental Impact Assessment (Institute of Environmental Management and Assessment, 2004 & 2006).
- 1.8.5 The approach is broadly the same for all specialist topic areas with some variation in the descriptions and categorisation of assessment criteria. Where an alternative approach has been employed in the technical assessment, this will be clearly defined in the associated ES Chapter. Overall, each technical chapter will cover the following:
- The existing situation and future baseline conditions if they are subject to change;

- The impact of construction activity;
  - The impact of operational effects at relevant timescales;
  - The effects of the scheme, both beneficial and adverse, including direct and indirect effects;
  - Measures used to mitigate adverse impacts, following a hierarchy of Avoid, Prevent, Reduce and Offset;
  - Assessment of residual effects (effects after mitigation); and,
  - The identification of any requirements for continued monitoring.
- 1.8.6 AECOM is also committed to the Institute of Environmental Management and Assessment (IEMA) EIA Quality Mark. The IEMA EIA Quality Mark is based around a set of EIA Commitments, which organisations registered to the scheme agree to comply with. IEMA operates the EIA Quality Mark and undertakes an independent review of an organisation's compliance with its EIA commitments both during the application process and once registered through an annual review process. As such EIA Quality Mark provides registrants with a benchmark for their EIA activities and allows them to demonstrate their commitment to effective practice.

## 1.9 Structure of Environmental Statement

- 1.9.1 The EIA process has been managed entirely by AECOM on behalf of the Applicant and this ES presents the results of the assessment of environmental impacts undertaken by a number of specialist consultants.
- 1.9.2 The remainder of this ES is set out as described in Table 1.3 below:

Table 1.3 – Content of Environmental Statement

Document	Description of Contents
<b>Volume 1</b>	<b>Environmental Statement (Chapter 1 – 14)</b>
Chapter 2	Development Description
Chapter 3	Scoping and Consultation
Chapter 4	EIA methodology and Guidance
Chapter 5	Planning Policy Review
Chapter 6	Landscape and Visual
Chapter 7	Water Environment
Chapter 8	Nature Conservation
Chapter 9	Ornithology
Chapter 10	Traffic and Transport
Chapter 11	Noise and Vibration
Chapter 12	Cumulative Assessment
Chapter 13	Summary of Effects and Mitigation
Chapter 14	Schedule of Environmental Commitments
<b>Volume 2</b>	<b>Supporting Figures</b>
<b>Volume 3</b>	<b>Technical Appendices</b>
<b>Volume 4</b>	<b>Non-technical Summary</b>

## 1.10 Availability of the Environmental Statement

- 1.10.1 This ES and associated supporting documents will be available for download from the Fife Council planning portal website upon registration (<http://planning.fife.gov.uk/online/>). Details of the previous screening (ref: 16/01079/SCR) and scoping (ref: 16/02372/SCO) consultations can also be viewed through this facility.
- 1.10.2 Hard copies of the ES are also available for viewing at Fife Council Planning Authority offices at the following address:
- Fife Council, Development and Buildings, Development Management, Kingdom House, Kingdom Avenue, Glenrothes, KY7 5LY.
- 1.10.3 Any representations regarding the Development should be made directly to Fife Council and Marine Scotland in one of the following ways:
- Online at the above website ( Fife Council only);
  - By email [development.central@fife.gov.uk](mailto:development.central@fife.gov.uk) (Fife Council) and [ms.majorprojects@gov.scot](mailto:ms.majorprojects@gov.scot) (Marine Scotland)
- By post to the following addresses:
- Fife Council, Development and Buildings, Development Management, Kingdom House, Kingdom Avenue, Glenrothes, KY7 5LY and,
  - Marine Scotland, Marine Laboratory, 375 Victoria Road, Aberdeen, AB11 9DB.

## 1.11 References

- AMEC (January 2014) Dalgety Bay Outline Management Options Appraisal, Final Report.
- AMEC (July 2014) Dalgety Bay Management Strategy.
- COMARE (2014) 15th Report on Radium contamination in the area around Dalgety Bay.
- DIO, Fife Council and SEPA (2015) Dalgety Bay Management Strategy Implementation Group Memorandum of Agreement.
- European Parliament, (1985). Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment.
- European Parliament (2003) Directive 2003/35/EC of the European Parliament and of the Council providing for public participation in respect of the drawing up of certain plans and programmes relating to the environment and amending with regard to public participation and access to justice Council Directives 85/337/EEC and 96/61/EC.
- European Parliament (2009) Directive 2009/31/EC of the European Parliament and of the council of 23 April 2009 on the geological storage of carbon dioxide and amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulations (EC) No 1013/2006.
- European Parliament (2011) Council Directive 97/11/EC of 3 March 1997 amending Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment.
- European Parliament, (2011). Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment.
- European Parliament, (2014). Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment.
- Institute of Environmental Management and Assessment (IEMA), (2004). Guidelines for Environmental Impact Assessment.
- MoD (2015) 'Section 2 (Appendix 2E) of the MoD Sustainability and Environmental Appraisal Tools Handbook (Version 7.0)
- Scottish Government (1997) The Town and Country Planning Act (as amended).



Scottish Government (2009) The Town and Country Planning (Hierarchy of Developments) (Scotland) Regulations.

Scottish Government (2010) The Marine (Scotland) Act (as amended).

Scottish Government, (2011a). Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 (as amended).

Scottish Government, (2011b). Planning Circular 3 2011: The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011.

Scottish Government, (2013). Planning Advice Note 1/2013: Environmental Impact Assessment. Edinburgh: Scottish Government.

UK Government (1994) Conservation (Natural Habitats, &c.) Regulations (as amended).

UK Government (2007). The Marine Works (EIA) Regulations (as amended).

Scottish Natural Heritage (SNH), (2013). A Handbook on Environmental Impact Assessment: 4th Edition. [Electronic], Available: <http://www.snh.gov.uk/docs/A1198363.pdf> [Accessed throughout October 2016].

## 2. DEVELOPMENT DESCRIPTION

### 2.1 Introduction

- 2.1.1 This Chapter of the Environmental Statement (ES) provides information on the project background and design development that has been undertaken, the construction and layout of the Development as proposed and the alternatives considered as part of the Management Strategy optioneering process.

### 2.2 Background to Design Approach

- 2.2.1 As discussed in ES Volume 1 - Chapter 1, the Development has been designed to implement the recommendations of the Management Strategy by securing landward radium contamination and as a result, mitigating future mechanisms for radium repopulation over the foreshore.
- 2.2.2 The overall objective of the Management Strategy was to *“identify and develop a recommendation for an effective long-term management strategy for the mitigation of risks from radium within the foreshore that is both practicable and sustainable”* (p.2).
- 2.2.3 In line with this, the primary objective of the Development is to address the health protection criteria established by Public Health England (PHE) in their response (see ES Volume 3 - Appendix 2.1) to the Management Strategy consultation, which is summarised below:
- Criterion 1: That all efforts should be made to ensure that objects that could give rise to a committed effective dose of 100 millisieverts (mSv) to an individual, regardless of objects size, or an external dose of 1 Gray (Gy) over time (h)<sup>-1</sup>, averaged over an area of 1 centimetre (cm)<sup>2</sup> skin at a depth of 70 microns, are either removed or isolated so that there is no credible current or future mechanism for exposure; and,
  - Criterion 2: That radium contaminated objects remaining after application of Criterion 1 should be either removed or isolated so that the current or future probability of an individual receiving a 1mSv committed effective dose is less than 10<sup>-6</sup> per year. In addressing this criterion, optimisation<sup>1</sup> should be carried out so that increasing weight is given to management options that remove or isolate objects of increasingly high activity.
- 2.2.4 The Management Strategy considered a number of options for achieving the level of protection outlined above and these are discussed further in Section 2.4 below.
- 2.2.5 It is concluded through the Management Strategy that the removal of higher activity materials to give the highest confidence for the removal of radium material greater than 40kBq (in line with Best Practicable Means (BPM)) will minimise the potential for contamination becoming accessible in the future. It is considered that this approach, in combination with the installation of a cover system consisting of a geotextile membrane and protective rock armour, to prevent inadvertent contact with the residual lower activity radium materials, will ensure that both Criteria 1 and 2 above are satisfied.
- 2.2.6 The proposed works, established as the preferred option through the Management Strategy and agreed with SEPA over the course of the design development, therefore represent the Development to which this ES refers and can be summarised as follows:
- Install geotextile membrane beneath existing coastal armour and replace or reinforce rock armour to provide cover system to mitigate against the introduction of landward radium contamination into the foreshore;
  - Removal of higher activity radium material from targeted foreshore areas;

<sup>1</sup> *“the principle of optimisation requires reduction of the public health risks as low as reasonably achievable (ALARA), taking all relevant factors into account, including wider health risks, social and economic considerations”*. (PHE).

- Limited re-profiling of foreshore and placement of geotextile membrane and armour cover system to isolate remaining radium contamination; and,
  - Removal of existing jetty and slipways at Dalgety Bay Sailing Club (DBSC) to allow screening for radioactive particles in materials beneath and replacement with a new jetty and slipway structure.
- 2.2.7 For the purposes of this ES, the geotextile membrane and associated rock armouring will be termed the '**Cover System**'. It should be noted that the rock armour installation is purely to protect and secure the geotextile membrane and ensure the Cover System is suitable to mitigate against the introduction of landward radium contamination.
- 2.2.8 As previously discussed, the Development has been divided into five Management Strategy Areas (MSAs) (see ES Volume 2 - Figure 1.3 'Management Strategy Areas'), namely; the Headland (Area H), the Slipway (Area S), Boat Park South (Area BS), Boat Park North (Area BN) and a landward sub area (Zone 1) of Boat Park North (Area BN-Z).
- 2.2.9 The locations of and various works required within each MSA are discussed further below, along with an indicative construction methodology. ES Volume 2 - Figure 1.6, 'Proposed Site Plan', provides an overview of the Development upon completion.

## 2.3 Development Description

### Area H – Headland: Proposed Development

- 2.3.1 Area H - Headland is located between the existing harbour wall and slipways. The strategy for the Headland Area is to install a geotextile membrane across the foreshore down to the mean low water spring (MLWS), including the reinforcement and replacement of existing rock armour to provide an appropriate Cover System. The proposed Cover System will extend seaward from existing ground level, as is the



*Image 2-1 Headland: Existing Rock Armour*

- case currently, tapering to the MLWS approximately 35 metres (at the furthest point) from the existing coastline. At the western edge, the Cover System will tie in with existing rock outcrops and at the eastern extent it will be retained against the new slipway.
- 2.3.2 Upon completion, the rock armour will be maintained as appropriate by Fife Council in line with the recommendations of the Management Strategy.
- 2.3.3 ES Volume 2 - Figure 2.1 'Plan Indicating Works in Area H' and the associated typical revetments (Figure 2.2) provide an indication of the nature and extent of proposed works in this area.

### Area H – Headland: Construction Methodology

- 2.3.4 As demonstrated in ES Volume 2 - Figure 2.1 it is envisaged that the grassed area to the front of the DBSC clubhouse would be established as a working platform and storage area, allowing oversized armour stone from the existing revetment to be set aside for re-use in the new revetment, where appropriate. New stone will also supplement the existing material. The

rock armour will be removed in strips to minimise the duration the unprotected embankment is exposed to erosion, therefore minimising the risk of release of point sources. The grassed area which will form the working platform will require a temporary cover system (geotextile and stone) to mitigate any potential cross contamination. This will be reinstated to grass upon completion of work.

- 2.3.5 It is likely that the works would progress along the length of the coast in strips corresponding to the width of the geotextile membrane. The geotextile membrane would be secured in trenches excavated at the crest of the revetment and at the toe in the foreshore. It would be anchored by being folded back on itself around stones placed in the toe trench and at a concrete beam at the crest. The geotextile membrane would be placed starting from the top of the slope down the beach to the toe. Work on the foreshore would be progressed between high tides. The stockpiled protection armour would then be placed on a bedding layer over the geotextile membrane, progressing up the beach profile. Each panel will be completed sequentially with an overlap of geotextile membrane. The thickness of armour to be placed across the beach would be in the order of 1 to 1.5 metres (m).
- 2.3.6 Use of tracked excavators and four wheel drive dumper trucks are anticipated to move materials from the stockpile areas on the foreshore to the working area. Formation of temporary access ramps on to the shore will be required to assist with construction.
- 2.3.7 While no formalised foreshore turnover will be carried out in this location, any higher activity radium contaminated material identified as a result of scanning during excavation will be characterised, segregated and removed off site at the end of each working day. Non-contaminated arisings will be re-used on site minimising the material required to be removed off site.

## Area S - Slipway: Proposed Development

- 2.3.8 Area S – Slipway is located adjacent to DBSC clubhouse. The strategy for the Slipway Area is to remove the two existing slipways and jetty structure then excavate the foreshore in a series of cells in order to process the material and remove the higher activity radium material to meet the requirements of the Management Strategy. A replacement concrete slipway and jetty structure (**'the Slipway'**) will then be installed with a geotextile membrane beneath.



*Image 2-2 Slipway: Existing Arrangement*

- 2.3.9 The proposed slipway has been designed in consultation with DBSC and conforms to Royal Yachting Association (RYA) Guidance on Slipway Design.
- 2.3.10 The Slipway is a single structure comprising two distinct concrete slipway areas separated by a concrete jetty. The western portion of the slipway is approximately 56m in length and 10m in width and includes a 1:5 slope at the landward extent, grading to a 1:10 slope as it approaches the sea and tapers to the MLWS. A retaining wall will be installed at the top of the western extent of the slipway to maintain the Headland rock armour.



- 2.3.11 The eastern portion of the slipway also consists of a 1:10 slope and measures approximately 56m in length. The width of the eastern portion of the slipway ranges from approximately 40m at the landward extent to 35m at the seaward extent.
- 2.3.12 The jetty structure which separates each slipway platform is 4m in width, 56m in length and 2.2m in height from the adjacent slipways. The structure is horizontal from the landward extent, before dropping to a 1:10 slope, then a 1:5 slope as it approaches the sea.
- 2.3.13 A Cover System of geotextile membrane and associated rock armour will also be installed at the eastern extent of the Slipway area, extending approximately 35 metres from the landward extent into the foreshore. Upon completion, the rock armour will be maintained as appropriate by Fife Council in line with the recommendations of the Management Strategy.
- 2.3.14 ES Volume 2 – Figure 2.3 ‘Plan Indicating Works in Area S’ and the associated typical revetments (Figure 2.4) provide an indication of the nature and extent of proposed works.

#### Area S - Slipway: Construction Methodology

- 2.3.15 It is anticipated that the existing slipways and jetty would be removed in two phases with a temporary jetty installed to allow the DBSC Ltd. to continue to operate whilst the new structure is constructed.
- 2.3.16 The proposed Slipway would be constructed with machinery operating from the foreshore and working between tides. It will be formed in sections from pre-cast concrete slabs with the geotextile membrane placed beneath, negating the requirement for foundation piling.
- 2.3.17 A concrete retaining wall will be installed to allow the phasing of the works. It is envisaged that foundation blocks for the Slipway will be installed working from the toe, in a landward direction. The Slipway will be constructed with large concrete blocks in a coursed arrangement. Void spaces will be infilled with granular material and the structure will be capped with a concrete slab.
- 2.3.18 Prior to the Slipway being installed, the foreshore would be turned over to the full depth of known contamination as informed by the supplementary ground investigation discussed in Section 2.5 below. This will require the division of the foreshore into cells and material within these cells surveyed in 100mm layers. Any higher activity radium material encountered will be removed and taken off site at the end of each working day in order to achieve the overall aims of the Management Strategy.
- 2.3.19 The Cover System in the eastern section of the Slipway would be installed using the same process as described for the Headland Area discussed above.

#### Areas BS and BN (Boat Park Bay South and Boat Park Bay North): Proposed Development

- 2.3.20 Areas BS and BN are located in the Boatyard Area. The strategy for the Boat Yard Area is to install a geotextile membrane, reinforced with rock armour to ensure a sufficient cover system for encapsulation, across the upper sandy part of the foreshore.
- 2.3.21 In the majority, the proposed Cover System will extend seaward from existing ground level, as is the case currently. The exception is to the northern extent, where due to the change in ground levels, the concrete headwall will rise around 1m from ground level.
- 2.3.22 The existing post and wire fence to the northern section of the Boat Park will be removed prior to construction and replaced once works are complete.
- 2.3.23 Throughout this section, the width of rock armour will vary between 5m and 20m, following the contours of the coastline. At the southern edge, the rock armour will abut the eastern section of the Slipway. Upon completion, the rock armour will be maintained as appropriate by Fife Council in line with the recommendations of the Management Strategy.

- 2.3.24 ES Volume 2 - Figure 2.5 'Plan Indicating Works in Areas BN and BS' and the associated typical revetments (Figures 2.6 and 2.7) provide an indication of the nature and extent of proposed works.

## Areas BS and BN (Boat Park Bay South and Boat Park Bay North): Construction Methodology



Image 2-3 Boat Park Bay: Existing Rock Armour

- 2.3.25 The Cover System would be installed as described for the Headland Area, with the addition that the foreshore will be split into cells and formally turned over to the depth of known contamination as described for the Slipway area.
- 2.3.26 In agreement with the DBSC, boats currently stored within the boat park will be transported to other parts of DBSC land to suit the phasing of the work.

## Area BNZ (Landward Strip at Boat Park Bay North): Proposed Development

- 2.3.27 Area BNZ is located in the northern section of Boat Park Bay North and consists of a section of land behind the newly proposed rock armour measuring approximately 5m wide by 35m long. Materials from this area will be excavated and higher activity radium material will be characterised, segregated and removed off site at the end of each working day. The area will then be backfilled with clean material.
- 2.3.28 ES Volume 2 - Figure 2.5 provide an indication of the nature and extent of proposed works.

## Area BNZ (Landward Strip at Boat Park Bay North): Construction Methodology

- 2.3.29 A protective bund or barrier will require to be installed during excavation to prevent seawater ingress and the subsequent risk of contaminant dispersal. This is discussed further in ES Volume 1 - Chapter 7, 'Water Environment'.

## 2.4 Consideration of Alternatives

- 2.4.1 Where alternative approaches to development have been considered, paragraph 4 of Part II of Schedule 4 of the EIA Regulations requires the applicant to include in the ES *"an outline of the main alternatives studied by the applicant or appellant and an indication of the main reasons for the choice made, taking into account the environmental effects"*. This recommendation is also established in Schedule 3, Part 6 of the Marine EIA Regulations.
- 2.4.2 In order to identify and assess options for managing the potential significant pollution linkages on specific areas of the Dalgety Bay foreshore associated with the presence of radium contamination, the Options Appraisal identified four broad outline strategy options for remediation, as detailed below:
- Exclusion of receptors;
  - Cover system/encapsulation;
  - Excavation and disposal; and,
  - An optimised approach comprising a number of remedial techniques.
- 2.4.3 The Management Strategy, in accordance with guidance outlined in the Environment Agency document 'Contaminated Land Research Report 11 (CLR 11) - Model Procedures for the

Management of Land Contamination' (2004) and in partnership with key stakeholders such as SEPA, sought to develop the Options Appraisal into a preferred solution for remediation. As part of this, the four techniques discussed above were assessed against a number of criteria, in a staged manner, following good practice guidance as laid out in the SAFEGROUNDS publication 'Guide to the Comparison of Contaminated Land Management Options' (CIRIA, 2009).

2.4.4 As part of the Management Strategy, numerous options which fell broadly into the management techniques listed in Section 2.4.2 above were identified for each of the 5 MSA's. These options were then filtered through a further screening assessment process outlined below:

- **Stage 1:** Defining possible management strategy options.
- **Stage 2:** Undertaking screening of the possible management strategy options identified against construction viability attributes (e.g. practicality, durability etc.) and removing those deemed to be unsatisfactory. ('Tier 1 Screening')
- **Stage 3:** Undertaking screening of remaining options against environmental and social attributes and removing those deemed to be unsatisfactory. (Tier 2 Screening').
- **Stage 4:** Screening of remaining management strategy options against capital and maintenance costs to derive a short-list for each area.
- **Stage 5:** Defining the optimum management strategy by weighing the short-listed options against each and utilising the overarching implementation criteria of functionality, confidence of achieving health protection criteria, costs and maintenance range.

2.4.5 An example of one of the most significant alternatives which was considered for Area H – Headland was the installation of a 'marine barrier' (groyne or off-shore solution) in combination with rock armour reinforcement to reduce the impact from waves onto the foreshore. However, this was discounted through the process due to a combination of uncertainty regarding functionality, construction and cost.

2.4.6 The Stage 3 (Tier 2) screening process was the most pertinent in the context of potential environmental considerations. Annex C of the Management Strategy 'Tier 2: Attribute Table 2 and Tier 2 Attribute Scoring Assessments' demonstrates the scoring assessment and comparative optioneering which was carried out to develop a preferred option.

2.4.7 As established in Table 4.8 (p.34) of the Management Strategy, each of the options were assessed against a number of environmental and social criteria. Table 2.1 below outlines these in more detail.

Table 2.1 – Management Strategy Environmental and Social Impact - Attribute Definition

Attribute	Definition
Works Impact	The likely impact to amenity receptors as a direct result of employing a single option or combination. Amenity receptors include local residents and users of the landward area of the site (walking, sailing, bird watching etc.)
Environmental Effects	The likely impact to biodiversity as a result of employing an option or combination.
Processes and Authorisations	The relative complexity of implementing an option, with respect to required processes and authorisations.

Attribute	Definition
Stakeholder Support	The relative degree of scheme acceptance from stakeholders including local residents and local site users (landward and foreshore), land owners and other non-regulatory bodies.
Sustainability	The relative environmental, social and economic benefit (or otherwise) of undertaking a single option, or combination.

Table 2.2 below identifies the scoring of the preferred option taken forward in each of the MSA's against the above criteria, relative to the other options identified. The results reflect the fact that environmental and social considerations were considered from the outset and given significant weighting with respect to the optioneering process.

**Table 2.2 – Overview of Management Strategy Assessment of Environmental and Social Impacts**

MSA	Preferred Option Score (/20)	Ranking Compared to Other Options
Headland	17	1 <sup>st</sup> of 8.
Slipway	14	1 <sup>st</sup> of 7
Boat Park South	15	2 <sup>nd</sup> of 6
Boat Park North	15	2 <sup>nd</sup> of 5
Boat Park North (Zone 1)	14	2 <sup>nd</sup> of 5

- 2.4.8 In light of the above, it can be concluded that a rigorous assessment of alternatives which included consideration of environmental effects was carried out through the Options Appraisal and Management Strategy. As a result, the Management Strategy derived the most effective, practicable, and proportionate means of ensuring the health protection criteria recommended by PHE are met and the risk associated with radium within the foreshore at the Site is managed in the longer term.
- 2.4.9 Further information on the design evolution of the Development is also detailed in the Design and Access Statement (February 2017) and Pre-Application Consultation (PAC) Report (February 2017) which have been submitted in support of the planning application.

## 2.5 Ground Investigation Works

- 2.5.1 As discussed in Chapter 10 of the EIA Scoping Report (July 2016), a significant level of information is already available with respect to ground conditions at the Site. The most significant of these is AMEC's 'Dalgety Bay Land Quality Assessment – Final Factual Investigation Report' (25 April 2013) which informed the Management Strategy.
- 2.5.2 However, all previous ground investigations have focussed on delineating the extent of radiological particles, with little or no cognisance to geological and hydrogeological conditions. Nor has there been any previous consideration of non-radiological contamination.



- 2.5.3 As such, additional ground investigations are programmed to be carried out in early 2017. The primary purpose of the ground investigation works is to assess the engineering properties within the underlying soils to inform future construction works. However, a number of sub-objectives have also been identified, including an assessment of non-radiological contamination on the Site and the identification of the full depth of known radium contamination across areas of the Site where the Management Strategy requires foreshore turnover.
- 2.5.4 Results are expected to be available in Spring 2017 and will inform the proposed Construction and Environmental Management Document (CEMD) which will be developed prior to construction.
- 2.5.5 For the avoidance of doubt, higher activity radium material encountered during the ground investigation works will be removed off site at the end of each working day and disposed of under an appropriate licence. Further information on waste management processes is detailed below under Section 2.10.

## 2.6 Construction Compound

- 2.6.1 It is envisaged that the primary administrative compound, containing; cabins, welfare facilities and storage space for plant, machinery and construction materials will be established within the DBSC grounds on the southern section of the Ross Plantation (see ES Volume 2 - Figure 1.6, 'Proposed Site Plan'). This will be a secure facility enclosed by a 1.8 metre high temporary fence. None of the existing adjacent trees will be affected.
- 2.6.2 Any radioactive contaminants identified during construction works will be securely packaged and stored within the compound until the end of the working day, when they will be removed off site.
- 2.6.3 As described in Section 2.9 below, it is proposed that the rock armour stone and large pre-cast concrete slabs for the Slipway will be delivered by barge and stockpiled on the foreshore area, negating the requirement for this to be stored within the compound.
- 2.6.4 All temporary working areas and compounds will be reinstated to existing upon completion of work.

## 2.7 Phasing and Working Hours

- 2.7.1 It is envisaged that the works will be carried out over two consecutive six-month summer periods (approximately April to September), primarily to mitigate potential impacts on wintering birds in the adjacent Special Protection Area (SPA).
- 2.7.2 The intention at this stage is that the Slipway will be constructed during the first summer period, with the Headland and Boat Park Cover System construction following in the second period, although this will ultimately be defined by the Contractor. During the works, consultation will be undertaken with DBSC with respect to detailed construction programming, in order to ensure that the recreational use of the facility is maintained as far as possible throughout the works.
- 2.7.3 Tidal influences will affect the phasing of works, however it is expected that working periods would be between 8am until 6pm on weekdays. This would be further established and controlled by Fife Council and Marine Scotland through planning / marine licence conditions.
- 2.7.4 At this stage, there is no additional lighting requirements proposed as part of the Development and fencing and safety barriers will be installed as appropriate.

## 2.8 Indicative Construction Materials

- 2.8.1 The construction of the Cover System and Slipway will require delivery of large 'primary' rock armour stones, smaller 'secondary' rock armour stones, granular bedding materials, geotextile membrane and concrete. Quantities of materials are estimated as follows:
  - Primary Rock Armour stones (1000 millimetre (mm) diameter) of 11,000m<sup>3</sup> (approx. 22,000 tonnes (t));

- Secondary Rock Armour stones (500mm diameter) of 3,300m<sup>3</sup> (approx. 6,600t);
- Granular bedding material (25mm to 50mm diameter) of 5,000m<sup>3</sup> (approx. 10,000t);
- Concrete to form the head beam slipway and jetty of 3,000m<sup>3</sup>; and,
- Geotextile membrane of 13,000m<sup>2</sup>.

## 2.9 Site Access and Material Delivery

- 2.9.1 As part of the EIA process, the worst case scenario of all material being supplied to the Site by heavy goods vehicle (HGV) was initially assessed, resulting in approximately 2,650 two-way vehicle movements over the construction period (approximately 22 movements per day assuming a 5-day week). However, the associated impacts on the local road network and residential properties have necessitated the requirement to implement mitigation to reduce the number of HGV movements.
- 2.9.2 As such, it is envisaged that the bulk of the materials will be delivered to the Site by sea, in a suitable vessel such as the 'Forth Guardsman', a barge of approximately 48m long by 14m wide.
- 2.9.3 It is estimated that the transport by sea of stone material quantities would require the barge to make approximately 19 (1,500t) deliveries of primary and secondary rock armour, plus 7 deliveries to transport the bedding material and an additional 5 to transport the concrete. Therefore a total of approximately 31 barge loads would be required to carry these materials over the two, six month construction periods. This would reduce the number of HGV movements to approximately 30 over the same period of time resulting in a negligible amount of movements per day.
- 2.9.4 It is envisaged that the barge would be towed by tug to the Site and timed to arrive at high tide to allow positioning adjacent to a designated stockpile areas. The barge will be held in position until the tide level drops so that it is beached on the foreshore. Excavators working on the deck of the barge and on the shore would unload the rock into stockpiles. Excavators and dumper trucks will then distribute the materials to the various work areas as required. No materials will be offloaded directly into the water.
- 2.9.5 Concrete, where possible, will be precast off site and brought to the site by barge in batches to suit phasing of the Slipway construction.
- 2.9.6 The delivery of these materials will be ongoing throughout the construction and the composition of each delivery will depend on the construction sequence.
- 2.9.7 It is not known at this stage where the material will be transported from, as this will be a matter for the successful Contractor to determine. As a result, no assessment of traffic movements to/from a suitable harbour to load the barge has been carried out. It is also assumed that these facilities will have their own licencing thresholds which will determine vehicle movements. As such, the Contractor will be required to demonstrate to both the Local Authority and SEPA that their approach to transporting materials to the Site will not result in more significant environmental effects than have been considered within this ES.
- 2.9.8 Road access to the Site would be via the existing DBSC entrance located at the eastern end of The Wynd, an adjacent residential street which is primarily fronted by residential properties



*Image 2-4: Site Access on to The Wynd*

with driveway accesses. A destination in itself, The Wynd also serves as access to a number of other surrounding residential streets such as The Spinneys and Glamis Place. It is subject to a 20mph speed limit. ES Volume 2 - Figure 10.4 demonstrates the proposed vehicle access routes based on the assumption that materials will be sourced locally.

- 2.9.9 For information only, ES Volume 3 - Appendix 10.1 presents the original assessment of all materials being brought to the Site by HGV movements. This is with a view to providing a demonstration of the iterative design approach employed through the EIA and justification for the strategy of delivering the majority of materials by sea.

## 2.10 Waste Management

- 2.10.1 The management of waste is an integral part of the Development and as such, good practice and mitigation measures outlined in Volume 1 - Chapter 13 of this ES 'Schedule of Environmental Commitments'. A general overview of the approach to waste management during construction is provided below.

### Management of Radioactive Wastes

- 2.10.2 The various waste streams generated during the construction phase will be segregated to ensure appropriate characterisation is undertaken and thereby appropriately reduce volumes of materials for off-site disposal.
- 2.10.3 A final disposal route for radioactive waste (radium) will be established in consultation with SEPA prior to the main works commencing and material movement will be controlled under an existing SEPA authorisation held by the Ministry of Defence (MoD) which reflects the requirements of the Radioactive Substances Act 1993 (as amended).
- 2.10.4 The legislation applicable to the transport of radioactive material, including low level and intermediate level waste, is the Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (as amended). To ensure compliance with the legislation, a Radiation Protection Advisor (RPA) will be nominated to assess movements of radioactive material and specify movement categorisation and container types to be used.
- 2.10.5 At the end of each working day any higher activity radium material encountered will be removed off-site in order to achieve the overall aims of the Management Strategy.

### Management of Non-Radioactive Wastes

- 2.10.6 Beyond the removal of higher activity radium, it is not envisaged that significant volumes of material require to be removed from the site. The primary aim will be to re-use any non-contaminated excavated material for earth works and landscaping, respecting the principles of the waste hierarchy as outlined in the Waste Framework Directive (WFD) (2008/98/EC) and reflected in Scotland's Zero Waste Plan (2010) and Scottish Planning Policy (2014).
- 2.10.7 Any non-radium contaminated materials such as asbestos or excess construction material will be stored in covered stockpiles and/or skips and disposed of appropriately under the requirements of the Waste Management Licensing (Scotland) Regulations 2011 and the Waste (Scotland) Regulations 2012 and in full consultation with SEPA, Fife Council and Marine Scotland.

## 2.11 Post Development Monitoring

- 2.11.1 As outlined in the Memorandum of Agreement (MoA) which was signed in April 2015 by DIO, Fife Council, and SEPA; SEPA will be responsible for undertaking a 24 month 'Validation Monitoring Period' to ensure the finalised Development meets the requirement of delivering the Management Strategy. Beyond this period SEPA will remain responsible for post completion monitoring in line with their regulatory role, for the purpose of public health reassurance.

## 2.12 References

- AMEC (April 2013) 'Dalgety Bay Land Quality Assessment – Final Factual Investigation Report'
- AMEC (January 2014) Dalgety Bay Outline Management Options Appraisal, Final report.
- AMEC (July 2014) Dalgety Bay Management Strategy.
- CIRIA SAFEGROUNDS (2009) Guide to the Comparison of Contaminated Land Management Options.
- Environment Agency (2004) Contaminated Land Research Report 11 (CLR 11) – Model Procedures for the Management of Land Contamination'.
- European Parliament (2008) Directive (2008/98/EC) Waste Framework Directive (WFD).
- Royal Yachting Association (RYA) Guidance on Slipway Design.
- Scottish Government (2010) Zero Waste Plan.
- Scottish Government (2011) Waste Management Licensing (Scotland) Regulations 2011 (as amended).
- Scottish Government (2012) Waste (Scotland) Regulations 2012.
- Scottish Government (2014) Scottish Planning Policy.
- UK Government (1993) Radioactive Substances Act (as amended).
- UK Government (2009) Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations (as amended).

## 3. SCOPING AND CONSULTATION

### 3.1 Introduction

- 3.1.1 Consultation is an important part of the development process for major development proposals in Scotland. The statutory pre-application process is outlined under primary legislation; namely, the Town and Country Planning (Scotland) Act 1997 and the Marine (Scotland) Act 2010.
- 3.1.2 In line with this, as the Development has progressed consultation has been undertaken with a range of interested parties including statutory and non-statutory consultees, stakeholders and the local community.
- 3.1.3 This Chapter of the Environmental Statement (ES) provides a summary of the Environmental Impact Assessment (EIA) scoping responses received, focusing on the responses that have influenced the design evolution of the Development and addressing any issues raised. It also summarises the wider pre-application consultation carried out by the Applicant.
- 3.1.4 For reference, the Dalgety Bay Remediation Works EIA Scoping Report (July 2016) (**‘the Scoping Report’**) carried out by AECOM and the subsequent response from Fife Council on behalf of themselves and Marine Scotland on 2<sup>nd</sup> September 2016 (**‘the Scoping Opinion’**) are available on the Fife Council planning portal by searching under reference 16/02372/SCO: <http://planning.fife.gov.uk/online/search.do?action=advanced>
- 3.1.5 Furthermore, a detailed description of the wider pre-application consultation activities undertaken, including the results of consultation with the local community, is contained within a separate Pre-Application Consultation (PAC) Report (February 2017) which has been submitted in support of the planning and marine licence applications.

### 3.2 Overview of Previous Engagement

- 3.2.1 Partnership working and stakeholder engagement has been considered fundamental to addressing the health and environmental risks associated with the pollutant linkages which have been identified in the Dalgety Bay foreshore.
- 3.2.2 For example, the Management Strategy states that *“the timely detailed development and implementation of the Management Strategy is dependent upon a number of key enablers which necessitates a strong collaborative approach”* (page iii). Furthermore, the SEPA Dalgety Bay Stakeholder Engagement Strategy (February 2014) specifies a number of stakeholders who should be engaged throughout the remediation process.
- 3.2.3 Since 2005, a number of forum groups have been established to ensure the solution to remediation measures at Dalgety Bay has been progressed in full partnership with key stakeholders and decision makers. These are summarised below, along with confirmation of their current status:
  - **The Dalgety Bay Forum Group:** Established as part of the Management Strategy process to provide a vehicle for communication between the various public agencies responsible for dealing with the radioactive contamination at Dalgety Bay and its health effects. Once the Management Strategy was approved and published (July 2014), this group was dissolved. The forum comprised:
    - Fife Council (Officers & Elected Members);
    - NHS Fife;
    - Dalgety Bay Sailing Club (DBSC) Ltd.;
    - Dalgety Bay and Hillend Community Council;
    - The Scottish Environment Protection Agency (SEPA);
    - Scottish Government (Officials & MSPs);
    - Food Standards Agency (FSA) (now Food Standards Scotland);



- Public Health England (PHE);
- Defence Infrastructure Organisation (DIO), as part of the Ministry of Defence (MoD); and,
- Moray Estates.
- **The Dalgety Bay Implementation Group:** Established as part of the Management Strategy process, the forum is chaired by SEPA and comprises the following stakeholders:
  - Fife Council;
  - DIO;
  - Moray Estates; and,
  - Affected Landowners (including the DBSC Ltd.).

Regular meetings were dissolved upon completion and publication of the Management Strategy; however the forum still meets on an ad-hoc basis as specific matters surrounding the remediation strategy and wider project arise.

- **The Dalgety Bay Permitting Group:** This group is chaired by SEPA and was established to ensure the efficient implementation of the Management Strategy in terms of the complexities of the consenting process. This purpose of the group has been largely superseded by the inception of the formal planning and marine licence application process, however the forum can still be convened where required. The group comprises the following key stakeholders:
  - Scottish Natural Heritage (SNH);
  - FSA;
  - Fife Council;
  - Marine Scotland; and,
  - The Crown Estate.

### 3.3 South West Fife Area Committee and Community Council

- 3.3.1 The South West Fife Area Committee is one of seven area committees covering the full extent of Fife, established to “reinforce the Council’s commitment to localised decision making in addressing the differing needs of our communities”. ([www.fifedirect.org.uk](http://www.fifedirect.org.uk)).
- 3.3.2 According to the Council website, the role of the committees is to:
  - Determine matters within their terms of reference which directly affect their area;
  - Scrutinise service delivery and performance locally; and,
  - Monitor the impact of council and other public services on the community.
- 3.3.3 The Applicant (through DIO) has attended the South West Area Committee monthly meetings on a bi-monthly basis since April 2016 in order to update the Committee with the progression of the implementation of the remediation strategy. This has often been in partnership with representatives from SEPA.
- 3.3.4 Minutes of the Committee meeting are available on the Fife Council website.
- 3.3.5 It is envisaged that engagement with the South West Fife Area Committee and attendance at monthly meetings will continue through the construction process until completion of the Development.
- 3.3.6 In addition, a representative from DIO has attended the local Community Council (Dalgety Bay and Hillend) monthly meetings on a bi-monthly basis since March 2016 to ensure the wider community have been kept informed of the project progression.

## 3.4 Engagement with Dalgety Bay Sailing Club

- 3.4.1 The AECOM Design Team met with representatives from Dalgety Bay Sailing Club (DBSC) Ltd. on 13<sup>th</sup> September 2016 to discuss the design and implementation of the proposed Slipway.
- 3.4.2 Outline design drawings, derived from a sketch arrangement previously provided to AECOM by DBSC were presented and the proposed design approach was discussed with the Sailing Club representatives. A brief site walkover was also carried out and suitable options for the proposed construction compound were identified and assessed.
- 3.4.3 Following the meeting, DBSC provided further sketches showing the end of the Slipway amended to slope steeply down to meet the existing seabed. This arrangement was subsequently adopted and design drawings were refined for the purposes of submitting the planning and marine licence consents.
- 3.4.4 At this stage, it is therefore considered that DBSC's operational requirements for the Slipway have been met. However, further design meetings will be required with the DBSC representatives at the construction design stage.

## 3.5 EIA Scoping

- 3.5.1 As detailed in paragraph 101 of Planning Circular 3/2011 'Guidance on The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011', *"Before making a planning application, a developer may ask the planning authority for their formal opinion on the information to be supplied in the ES (a 'Scoping Opinion'). This provision allows the developer to be clear about what the planning authority considers the main effects of the development are likely to be and, therefore, the topics on which the ES should focus"*. This can also be considered relevant for EIA's carried out under the marine licensing regime.
- 3.5.2 The purpose of EIA scoping is therefore to provide information on the likely environmental implications of the scheme and determine the scope and extent of issues to be addressed.
- 3.5.3 Given that this ES has been completed to cover the requirements of both terrestrial and marine development, it was considered essential to carry out a robust scoping process to ensure the ES is focused on the key environmental issues. A draft Scoping Report was distributed to the following regulatory authorities on the 31<sup>st</sup> May 2016 in order to gain informal feedback on the proposed approach and methodology:
  - SEPA;
  - SNH;
  - Marine Scotland; and,
  - The Planning Authority (Fife Council).
- 3.5.4 On the 7<sup>th</sup> June 2016, a Scoping Workshop was held with the above stakeholders to discuss the draft Scoping Report and to ensure that the approach to the ES was sufficient. At this stage, there was general agreement with the scope and approach to the ES, with the exception of the 'Water Environment' topic, which having previously been excluded, was scoped in to the project upon SEPA's request.
- 3.5.5 Subsequently, the finalised Scoping Report was submitted to Fife Council on 8<sup>th</sup> July 2016 under the provisions of Part 4 (13) of the Planning EIA Regulations and Part 3 (13) of the Marine EIA Regulations. The objectives of the Scoping Report was to:
  - Describe the available relevant baseline environmental information within and surrounding the Development Site;
  - Allow wider stakeholder bodies to inform the EIA process;
  - Identify the environmental issues and potential impacts which would need to be addressed as a result of implementing the Proposed Development;
  - Outline proposed approaches/methodology for assessing such potential impacts as part of a future EIA;

- Determine the need for further assessment; and,
  - Determine if statutory authorities are in agreement with the extent of environmental assessment required and had any further information relevant to the assessment. .
- 3.5.6 In advance of the submission it had been agreed that Fife Council would collate one Scoping Opinion on behalf of both themselves and Marine Scotland as joint Competent Authorities. This was issued on 2<sup>nd</sup> September 2016 with Fife Council stating that *“the methodology and scope of the proposed Environmental Statement for the proposed remediation works is broadly acceptable in terms of the headings and summaries provided within your Scoping Report”*.
- 3.5.7 Extensive consultation was carried out by Fife Council as part of the scoping process and a number of additional issues and opportunities were highlighted in the Scoping Opinion.
- 3.5.8 The Scoping Matrix in ES Volume 3 - Appendix 3.1 summarises the outcomes of the EIA scoping consultation and, where applicable, how these responses have been addressed in this ES.

## 3.6 Processing Agreement

- 3.6.1 A Processing Agreement is a project management tool used to support the efficient handling of planning applications. Processing Agreements can be used to set out the key processes involved in determining an application, identify what information is required, and from whom, and set the timescales for the delivery of various stages of the process.
- 3.6.2 Processing Agreements can deliver a number of benefits including:
- Greater transparency in decision-making for everyone involved in the process;
  - Greater predictability and certainty over the timing of key stages;
  - Faster decision-making;
  - Clearer lines of communication between authority and applicant; and,
  - More effective and earlier engagement of key stakeholders
- 3.6.3 The Scottish Government expects planning authorities to use Processing Agreements for all major applications.
- 3.6.4 A Processing Agreement for the Development was first submitted to Fife Council Planning Authority **Redacted** on 9<sup>th</sup> September 2016, using the Scottish Government’s preferred template. Since then, the Agreement has been continually refined and updated by both parties to ensure the Applicant and planning authority were fully informed of Development timescales, information requirements and key stakeholders.
- 3.6.5 It is considered that this process has allowed both parties to fully understand the required time, information and resource implications of the Development, ensuring the efficient management of the pre-application process.

## 3.7 Public Exhibitions

- 3.7.1 The aim of the public exhibitions held on 21<sup>st</sup> November 2016 and 23<sup>rd</sup> November 2016 at Dalgety Bay Parish Church, was to provide an opportunity for all stakeholders to view the proposals for the Development and more importantly, give feedback and suggestions in respect of the proposed design and implementation. The timing of the exhibitions (15:00 – 21:00) was considered carefully in order to encourage wider attendance and provide members of the public with a choice of times, designed to suit different needs and circumstances.
- 3.7.2 Furthermore, the exhibitions were carried out at a suitable stage in the design progression which allowed stakeholders a sufficient opportunity to understand the Development sufficiently to inform the design and raise any concerns or opportunities.
- 3.7.3 The exhibitions were advertised in the Dunfermline Press on 7<sup>th</sup> October 2016 and persons wishing to provide comments on the Development were asked to do so in writing to AECOM



through a dedicated email address ([dalgetybaycomments.uki@aeecom.com](mailto:dalgetybaycomments.uki@aeecom.com)) or by post to AECOM's Edinburgh (Haymarket) office no later than 9th December 2016.

- 3.7.4 In addition to the advertisement, a number of key stakeholders were contacted directly to raise awareness of the events. These are summarised in the Pre-Application Consultation (PAC) Report (February 2017) which accompanies the planning application.
- 3.7.5 Furthermore, the exhibitions were advertised at the following locations:
- **Dobbies Garden Centre**, Western Approach Rd, Dalgety Bay KY11 9XP;
  - **ASDA Stores**, Fulmar Way, Dalgety Bay, KY11 9JX;
  - **Tesco Stores**, Regents Way Dalgety Bay, Dunfermline KY11 9UY;
  - **Dalgety Bay Library**, Regents Way, Dunfermline KY11 9UY;
  - **Dalgety Bay Parish Church**, Regents Way, Dalgety Bay KY11 9UY; and,
  - **Dalgety Bay Sports and Leisure Centre**, Harbour Drive, Dalgety Bay, KY11 9NA.
- 3.7.6 Information boards, maps and photomontages of the Development from various viewpoints were on display at the public exhibition. Comment sheets were also provided to invite feedback from attendees.
- 3.7.7 In general, it is considered that the exhibitions were well attended with 27 attendees on Day 1 and a further 24 attendees on Day 2. Attendees included local residents, Community Council representatives, Councillors, representatives from Fife Council (Environmental Health and Harbours), and members of DBSC.
- 3.7.8 A number of key themes arose through stakeholder discussions and these are summarised below:
- Visual impacts upon completion;
  - Construction effects including traffic and noise;
  - Effects on the operation of DBSC;
  - Programme / timescale of the Development; and,
  - The location of the proposed construction compound.
- 3.7.9 The majority of attendees appeared broadly supportive of the Development and its overall objective for remediation. Features of the Development and its evolution were explained and supported by a comprehensive suite of illustrative drawings, photomontages and information posters on display in the venue on both exhibition days. It was made clear to all attendees that all proposals may be subject to change or be amended prior to submission of the planning and marine licence applications.
- 3.7.10 It was also made clear in the supporting information that comments provided at this stage would not be considered as formal representations to the applications for planning and marine licence consent and that there would be further opportunity to make comments on the Development after submission of both the planning and marine licence applications.
- 3.7.11 Table 3.2 of the PAC Report provides a summary of the written feedback received as a result of the exhibitions, and details how these have been considered and addressed by the Applicant.

## 3.8 Ongoing Liaison

- 3.8.1 In addition to the pre-application consultation discussed above, it is envisaged that a level of stakeholder engagement will be undertaken during the construction phase to ensure that the public and other stakeholders will be fully informed of the progression of the Development. This will include the surrounding community, SEPA, SNH and the Planning Authority, and also marine stakeholders such as Marine Scotland, the Maritime and Coastguard Agency, the Northern Lighthouse Board and Forth Ports (who may have input relating to navigational considerations for commercial and recreational craft).

## 3.9 References

AECOM (2016) The Dalgety Bay Remediation Works EIA Scoping Report.

AMEC (2014) Dalgety Bay Management Strategy.

Fife Council (2016) Scoping Opinion.

Fife Council website (accessed numerous times throughout October and November 2016), [www.fifedirect.org.uk](http://www.fifedirect.org.uk).

Scottish Government (1997) The Town and Country Planning (Scotland) Act 1997 (as amended).

Scottish Government (2010) Marine (Scotland) Act (as amended).

Scottish Government, (2011a) Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 (as amended).

Scottish Government, (2011b). Planning Circular 3 2011: The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011.

SEPA (2014) Dalgety Bay Stakeholder Engagement Strategy.

UK Government (2007). The Marine Works (EIA) Regulations (as amended).

## 4. EIA METHODOLOGY

### 4.1 Introduction

- 4.1.1 This Chapter of the Environmental Statement (ES) sets out the overall approach that has been followed in undertaking the Environmental Impact Assessment (EIA) for the Development. It outlines how this ES addresses the requirements of relevant legislation and associated good practice. It also describes the definition of significance within the EIA and the method of assessing environmental impacts and effects.
- 4.1.2 EIAs have been required for certain major developments in the UK since the implementation of the European Council Directive on Environmental Assessment (EC Directive 85/337/EEC) ('the Directive') in 1988. Directive 85/337/EEC was subsequently amended by Directives 97/11/EC, 2003/35/EC and 2009/31/EC. In 2011, the 2011/92/EU (Public Participation) Directive consolidated all of the changes that came before it. Directive 2011/92/EU was subsequently amended by Directive 2014/52/EU, which came in to force in May 2014. Member States have until the 16th May 2017 to transpose the new 2014 Directive into domestic legislation. The Scottish Government have recently consulted on the proposals for implementing the Directive (9th August 2016 – 31st October 2016).
- 4.1.3 The EIA Directive is implemented in Scotland by a range of statutory instruments. Of relevance to the Development and to this ES are the following:
- The Town and Country Planning (EIA) (Scotland) Regulations 2011, as amended by the (The Town and Country Planning (Miscellaneous Amendments) (Scotland) Regulations 2015. Herein referred to as '**the Planning EIA Regulations**'.
  - The Marine Works (EIA) Regulations 2007, as amended by the Marine Works (EIA) (Amendment) Regulations 2011. Herein referred to as '**the Marine EIA Regulations**'.
- 4.1.4 Under the Planning EIA Regulations, all elements of Development landward of the Mean Low Water Spring (MLWS) constitute 'Schedule 2 development' under Regulation 10(m) '*Coastal work to combat erosion and maritime works capable of altering the coast through the construction, for example, of dykes, moles, jetties and other sea defence works, excluding the maintenance and reconstruction of such works*'.
- 4.1.5 EIA is not mandatory for 'Schedule 2' developments but may be required depending on the potential for significant environmental effects to occur as a result of factors such as the size, nature or location of the development. In view of the nature and size of the Development and the proximity of sensitive receptors, an EIA has been undertaken and this ES prepared to present the findings. This approach was confirmed by both Fife Council (14<sup>th</sup> April 2016) and Marine Scotland (30<sup>th</sup> March 2016) in their screening responses.
- 4.1.6 Regulation 10 (m) refers directly to Annex II of the Directive and therefore also serves as the qualifying criteria for marine licensable activities. This ES therefore addresses the requirements of both regulatory regimes.

### 4.2 Overview of the EIA

- 4.2.1 The purpose of the EIA is to identify and assess the likely significant environmental effects of the Development. The EIA has been undertaken in accordance with current best practice guidance together with applicable legislation for the EIA process. In particular, the EIA has been prepared with due consideration of the documentation referenced in Section 4.9 below.
- 4.2.2 Additional guidance on the assessment procedures is provided within industry good practice guidance relevant to each technical discipline and these documents are identified within the relevant technical chapters of this ES.
- 4.2.3 One of the key aims of this EIA has been to integrate environmental considerations into the design process from the outset. An iterative approach has been taken to developing the design by incorporating early consideration of environmental constraints, potential effects and

opportunities for mitigation. By embedding EIA within the design process, the likely significant adverse environmental impacts of the Development were identified as the design progressed and mitigation measures to avoid, reduce or offset adverse environmental effects or maximise environmental benefits have therefore been incorporated into the Development's design. As an example, after initially assessing the impacts of materials being delivered to the Site by HGV, the resultant effects were considered unacceptable and as such, barge deliveries have been proposed.

4.2.4 Further information on the design evolution of the Development can be found in ES Volume 1 - Chapter 2 'Development Description' and in the Design and Access Statement (February 2017) which has been submitted in support of the planning application.

4.2.5 The main steps which have been followed in undertaking this EIA are as follows:

- Baseline surveys were undertaken to identify and describe the existing conditions or environmental character of the area potentially affected by the Development;
- Relevant natural and man-made processes that may change the character of the Development Site were identified as part of the baseline surveys;
- Consideration was given to the possible interactions between the Development and both existing and future site conditions. These interactions or effects were assessed using stated criteria based on accepted guidance, professional judgement by recognised specialists and good practice;
- The possible environmental effects, both direct and indirect, were predicted and used to inform the site design process;
- Recommendations were made to avoid, minimise or mitigate adverse effects and, where possible, enhance positive effects;
- In cases where no practical mitigation measure has been identified, the ES has highlighted remaining or 'residual' impacts and classified these in accordance with a standard set of significant criteria; and,
- The results of the EIA for the final design are reported within this ES.

## 4.3 Legislative Requirements

### Land-Use Planning

4.3.1 Part 1 Schedule 4 of the Planning EIA Regulations establishes the information to be included in an ES, such that it is reasonable to assess environmental effects. Part 2 of Schedule 4, details the information absolutely required. These requirements are summarised in Table 4.1 below, along with a description of where this information has been included in this ES.

Table 4.1 – Summary of Information Requirements (Planning)

Information Required	Location in ES
A description of the development, including in particular:	
(a) The physical characteristics of the development and the land-use requirements during construction and operation	Volume 1 - Chapter 2
(b) The main characteristics of the production processes	Volume 1 - Chapter 2

Information Required	Location in ES
(c) An estimate, by type and quantity of expected residues and emissions resulting from the operation of the proposed development.	Volume 1 - Chapter 13
An outline of the main alternatives studied by the applicant and an indication of the main reasons for the choice made.	Volume 1 - Chapter 2
A description of the aspects of the environment likely to be significantly affected by the development.	Volume 1 - Chapters 6-11
A description of the likely significant effects of the development on the environment, which should cover direct and indirect effects, secondary, cumulative, short, medium, and long term, permanent and temporary, positive and negative.	Volume 1 - Chapters 6-11
The description by the applicant of the forecasting methods used to assess the effects on the environment	Volume 1 - Chapter 4
A description of the measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment	Volume 1 - Chapters 6-11 and 13
A Non-Technical Summary of the above information	Volume 4
An indication of any difficulties encountered by the applicant in compiling the required information	Volume 1 - Chapters 6-11

## Marine Licensing

- 4.3.2 Schedule 3 of the Marine EIA Regulations establishes the information required to be included in an ES relating to marine licensable activities. Additional requirements, not explicitly addressed by section 4.3.1 above are outlined in Table 4.2 below, along with a description of where this information has been included in this ES.

Table 4.1 – Summary of Information Requirements (Marine)

Information Required	Location in ES
The quantity, nature and source of any items or materials to be deposited in the sea in the course of the project.	Volume 1 - Chapter 2
The working methods to be used in the course of the project	Volume 1 - Chapter 2

## 4.4 Scope of EIA

4.4.1 The detailed scoping process carried out as part of the EIA is discussed further in Volume 1 – Chapter 3 of this ES. To summarise however, the following environmental issues were identified as requiring detailed assessment:

- Landscape and Visual;
- Hydrology;
- Nature Conservation;
- Ornithology;
- Traffic and Transport; and,
- Coastal Processes.

4.4.2 The ES has addressed each of these topics individually within this document, with the exception of Coastal Processes. As this project developed, it was considered necessary to carry out the Coastal Processes assessment as a standalone report to inform each of the EIA chapters. This has therefore been submitted separately as part of the planning and marine licence application packages.

## 4.5 EIA Assessment Methodology

4.5.1 The following section describes the general approach to the assessment of effects. This draws on the guidance contained within “A Handbook on Environmental Impact Assessment” (SNH, 4<sup>th</sup> edition, 2013) and the Guidelines for Environmental Impact Assessment (Institute of Environmental Management and Assessment, 2004 & 2006).

4.5.2 The approach is broadly the same for all specialist topic areas with some variation in the descriptions and categorisation of assessment criteria. Where an alternative approach has been employed in the technical assessment, this will be clearly defined in the associated ES Chapter. Overall, each technical chapter covers the following:

- The existing situation and future baseline conditions if they are subject to change;
- The impact of construction activity;
- The impact of operational effects at relevant timescales;
- The effects of the scheme, both beneficial and adverse, including direct and indirect effects;
- Measures used to mitigate adverse impacts, following a hierarchy of Avoid, Prevent, Reduce and Offset;
- Assessment of residual effects (effects after mitigation); and,
- The identification of any requirements for continued monitoring.

4.5.3 The assessment of significance is generally informed by the sensitivity of the existing or baseline environmental conditions or character (or the sensitivity of an individual receptor), and the magnitude of the impact, or change to the existing conditions or baseline character which occur as a result of the Development. Generally, the assessment will use the existing situation as the baseline, except where there are likely to be changes up to the completion of work. Other changes and possible trends that might be expected to exist, should the proposal not be implemented, will also be incorporated in the assessment, if deemed appropriate.

### Sensitivity or Importance of Receptors

4.5.4 The sensitivity of the baseline conditions is assessed according to the relative importance of existing environmental features on or near to the Development Site, or by the sensitivity of receptors which would potentially be affected by the Development. Criteria for the determination of sensitivity or of importance or value of receptors are established based on approved guidance, legislation, statutory designation and/or professional judgment.

- 4.5.5 Table 4.3 provides general definitions of the sensitivity criteria used within the EIA. Where necessary, within the specialist chapters of the ES specific sensitivity criteria are defined with reference to that particular discipline.

Table 4.3 – Sensitivity Criteria

Sensitivity	Definition
<b>High</b>	The receptor has little or no ability to absorb change without fundamentally altering its present character, and/or is of very high environmental value or of international importance.
<b>Medium</b>	The receptor has moderate capacity to absorb change without significantly altering its present character, and/or has some environmental value or is of regional importance.
<b>Low</b>	The receptor is tolerant of change without detriment to its character, and/or is low environmental value or local importance.
<b>Very Low</b>	The receptor is resistant to change and is of little environmental value.

### Magnitude of Impacts

- 4.5.6 The magnitude of potential impacts on environmental baseline conditions is identified through consideration of the Development, taking into account of the scale or degree of change from the existing situation as a result of the effect; the duration and reversibility of the effects, as well as consideration of relevant legislative or policy standards or guidelines.
- 4.5.7 Table 4.4 provides general definitions of the impact magnitude criteria used in the EIA. Where necessary within the specialist chapters of the ES, impact magnitude criteria are defined with reference to that particular discipline.

Table 4.4 – Magnitude Criteria

Magnitude	Definition
<b>High</b>	Total loss or major alteration to key elements/features of the baseline conditions such that post development character/composition of baseline condition will be fundamentally changed.
<b>Medium</b>	Loss or alteration to one or more key elements/features of the baseline conditions such that post development character/composition of the baseline condition will be materially changed.
<b>Low</b>	Minor shift away from baseline conditions. Changes arising from the alteration will be detectable but not material; the underlying character /composition of the baseline condition will be similar to the pre-development situation.
<b>Very Low</b>	Very little change from baseline conditions. Change is barely distinguishable, approximating to a “no change” situation.



## Classification of Effects

- 4.5.8 The approach to the assessment of significance is outlined in Table 4.5. A combination of the magnitude of the impact and the sensitivity of the receiving environment (receptor) guides the significance of effect. It should be noted that this general approach is a framework only and professional judgement is also applied to the assessment of significance.

Table 4.5 - Classification of Effects

Sensitivity or Value of Resource/Receptor	Magnitude of Impact			
	High	Medium	Low	Very Low
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Very Low	Minor	Negligible	Negligible	Negligible

- 4.5.9 For the purposes of this EIA, effects predicted to be 'Minor' or 'Negligible' are generally considered to be 'Not Significant'. Effects assessed as either 'Moderate' or 'Major' (shaded blue in Table 4.5 above) are generally considered to be 'Significant'. To provide context, a general definition of the classification of effects is provided below:

- **Major:** These effects may represent key factors in the decision making process. Potentially associated with sites and features of national importance or likely to be important considerations at a regional or district scale. Major effects may relate to resources or features which are unique and which, if lost, cannot be replaced or relocated.
- **Moderate:** These effects, if adverse, are likely to be important at a local scale and on their own could have a material influence on decision making.
- **Minor:** These effects may be raised as local issues and may be of relevance in the detailed design of the project, but are unlikely to be critical in the decision making process.
- **Negligible:** Effects which are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error, these effects are unlikely to influence decision making, irrespective of other effects.

- 4.5.10 The significance of the effects arising from the Development will be reported using a seven-point scale as follows:

- Major Adverse;
- Moderate Adverse;
- Minor Adverse;
- Negligible ;
- Minor Beneficial;
- Moderate Beneficial; and,
- Major Beneficial.

- 4.5.11 'Potential effects' are defined as any effects that may occur as a result of the Development, prior to consideration of mitigation measures. The significance of 'residual effects' takes into



account mitigation, i.e. it is an assessment of the effect that would remain following the implementation of committed mitigation measures.

- 4.5.12 Some variation from this general approach is required for specific environmental concerns but this is summarised in the individual ES topic sections.

## 4.6 Types of Effect

- 4.6.1 Potential effects have been separated into two types based on the different phases of development which will occur, taking account of potential secondary and cumulative as well as direct and indirect effects, as explained below.

### Construction Effects

- 4.6.2 Construction effects are temporary, short-term effects that occur during the construction phase only. This will include effects resulting from construction of the Development as well as any effects resulting from other construction works such as temporary compounds.

### Operational Effects

- 4.6.3 Operational effects are those long-term effects that would occur as a result of the Development.

### Indirect or Secondary Effects

- 4.6.4 For the purposes of the EIA, the potential effects of the Development are considered in terms of effects on each discrete environmental topic area. However, the inter-relationship between topic areas such as water quality and ecology means effects cannot always be considered in isolation since changes affecting one factor may often have secondary implications for other areas.
- 4.6.5 For example, if one effect is to alter water quality, flora and fauna may be affected as a secondary effect. Under some circumstances, it is possible for the secondary or indirect effects to be more significant than the changes that triggered them. Where there is the potential for secondary or indirect effects this is highlighted and assessed in the ES.

## 4.7 Cumulative Effects

- 4.7.1 Schedule 4 of the Planning EIA Regulations and Schedule 3 of the Marine EIA Regulations requires the cumulative effects of any proposed development to be taken into account as part of the EIA process. Cumulative effects are those that occur when a number of individual predicted environmental impacts from the Proposed Development collectively cause a greater effect on any one receptor than would be experienced in isolation. Planning Advice Note 1/2013: 'Environmental Impact Assessment' states in paragraph 4.32 that when considering the potential impact of a particular proposal on the environment, planning authorities will wish to take account of:
- Impact Interactions: The reactions between the impacts of just one project or between the impacts of other projects in the area.
  - Additive Impacts: Impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project.
- 4.7.2 Likely cumulative and in-combination effects on specific resources or receptors are described in Volume 1 – Chapter 12 of the ES.

## 4.8 Assumptions and Limitations

- 4.8.1 The EIA process aims to assist good decision-making based on information about the potential environmental effects of the Development; however, there will inevitably be some

uncertainty as to the exact scale and nature of the environmental effects. This uncertainty arises for various reasons, for instance due to the limitations of the prediction process itself.

4.8.2 Assumptions specific to certain environmental aspects are discussed in the relevant technical chapters of the ES. As detailed below however, a number of general assumptions have been made during preparation of the ES:

- The land uses adjacent to the site remain as they are at the time of the ES submission; Information provided by third parties, including publicly available information and previous studies remain accurate at the time of publication.
- Baseline conditions have been assumed to be accurate at the time of the physical surveys but, due to the dynamic nature of the environment, conditions may change during the site preparation, construction and operational phases; and,
- The assessment of cumulative impacts has been reliant on the availability of information on the development schemes identified in November 2016, as informed by both Marine Scotland and Fife Council.

## 4.9 References

European Parliament, (1985). Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment.

European Parliament (2011) Council Directive 97/11/EC of 3 March 1997 amending Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment.

European Parliament (2003) Directive 2003/35/EC of the European Parliament and of the Council providing for public participation in respect of the drawing up of certain plans and programmes relating to the environment and amending with regard to public participation and access to justice Council Directives 85/337/EEC and 96/61/EC.

European Parliament (2009) Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide and amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulations (EC) No 1013/2006.

European Parliament, (2011). Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment.

European Parliament, (2014). Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment.

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

MoD (2015) 'Section 2 (Appendix 2E) of the MoD Sustainability and Environmental Appraisal Tools Handbook (Version 7.0)

Scottish Government, (2011a). Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 (as amended).

Scottish Government, (2011b). Planning Circular 3 2011: The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011. Edinburgh: Scottish Government.

Scottish Government, (2013). Planning Advice Note 1/2013: Environmental Impact Assessment. Edinburgh: Scottish Government.

Scottish Natural Heritage (SNH), (2013). A Handbook on Environmental Impact Assessment: 4th Edition. [Electronic], Available: <http://www.snh.gov.uk/docs/A1198363.pdf> [Accessed throughout October 2016].

UK Government (2007). The Marine Works (EIA) Regulations (as amended).

## 5. PLANNING AND MARINE POLICY

### 5.1 Introduction

- 5.1.1 This Chapter of the ES summarises national, regional and local policy guidance and advice that are relevant to the EIA process. Consideration has been given to land use planning policies that are relevant to the terrestrial element of the Development and marine policies which have been considered to ensure that works within the marine environment are in accordance with the principles of the Marine (Scotland) Act 2010 (as amended).
- 5.1.2 The Development Plan for Dalgety Bay consists of the South East Scotland Strategic Development Plan (SESPan) (2013) and the Dunfermline & West Fife Local Plan (adopted 2012). It is important to note that this chapter does not include an assessment of the Development's accordance with development plan policy or other relevant material considerations. The Planning Statement (February 2017) submitted in support of the planning application provides an overall assessment of the Development against the Development Plan and other material considerations (in accordance with Section 25(1) of the Town and Country Planning (Scotland) Act 1997 (as amended)).
- 5.1.3 Notwithstanding this, in order to ensure the ES and subsequent recommendations are commensurate with national, regional and local strategic policy direction, land-use and marine planning policy and guidance has been considered in the topic-specific sections of the ES. Where relevant, policy objectives have been used to inform the significance of potential impacts on environmental receptors.

### 5.2 National Policy Context

#### National Planning Framework 3 (2014)

- 5.2.1 National Planning Framework 3 (NPF 3), published in June 2014, provides a statutory framework for Scotland's long term spatial development. NPF 3 sets out the Scottish Government's spatial development priorities for the next 20 to 30 years and represents a clear vision of what is expected of the planning system.
- 5.2.2 NPF 3 identifies four primary outcomes for the long term spatial development of Scotland and within each outlines current status and the vision for the future. The outcomes are as follows:
- A successful sustainable place;
  - A low carbon place;
  - A natural resilient place; and,
  - A connected place.
- 5.2.3 In the context of the Development, NPF 3 places significant emphasis in Scotland's coastline as having an *"exceptional, internationally recognised environment"* and that they now have an *"unprecedented opportunity to secure growth from renewable energy generation as well as other key economic sectors including tourism and food and drink"* (para 1.7).
- 5.2.4 Given this focus on protecting and enhancing Scotland's coast, it is considered that the outcomes identified within NPF 3 form an important context in the assessment of the Development.

#### Scottish Planning Policy (2014)

- 5.2.5 Scottish Planning Policy (SPP) is the statement of the Scottish Government's Policy on nationally important land use matters. SPP includes a number of 'Principal Policies' and more targeted 'Subject Policies' that influence policy at regional and local level across Scotland. In line with the outcomes identified in NPF 3, subject policies include: a Successful, Sustainable Place; a Low Carbon Place; a Natural, Resilient Place; and, a Connected Place.

- 5.2.6 SPP dictates that the planning system in Scotland should protect, enhance and promote access to environmental resources whilst providing suitable protection for species, habitats, and landscape character.
- 5.2.7 In the context of the principle of the Development, paragraph 194 states that “*The planning system should promote protection and improvement of the water environment...in a sustainable and co-ordinated way*” and “*seek to protect soils from damage such as erosion or compaction*”.
- 5.2.8 Where relevant, SPP ‘Subject Policies’ will be addressed in the topic specific environmental chapters of the ES (Volume 1, Chapters 6 to 11).

## Planning Advice Notes (PANs)

- 5.2.9 PANs set out detailed advice from the Scottish Government in relation to a number of planning and environmental related issues. Those PANs relevant to the Development are summarised in Table 5.1 below:

Table 5.1 - Planning Advice Notes

Title	Description
PAN 33 Contaminated Land (revised 2000)	Provision of advice on; the implications of the new contaminated land regime for the planning system; the development of contaminated land; the approach to contaminated land in development plans; the determination of planning applications when the site is or may be contaminated; and, where further information and advice can be found.
PAN 69 Planning and Building Standards Advice on Flooding (2004)	Provision of good practice advice on planning and building standards in areas where there is a risk of flooding
PAN 75 Planning for Transport (2005)	The objective of PAN 75 is to integrate development plans and transport strategies to optimise opportunities for sustainable development and create successful transport outcomes.
PAN 51 Planning, Environmental Protection and Regulation (Revised 2006)	Details the role of the planning system in relation to the environmental protection regimes.
PAN 65 Planning and Open Space (2008)	Provides advice on the role of the planning system in protecting and enhancing existing open spaces and providing high quality new spaces.
PAN 3/2010 Community Engagement (2010)	This document provides advice on how to engage with local communities through the planning process.
PAN 1/2011 Planning and Noise (2011)	This PAN provides advice on the role of the planning system in helping to prevent and/ or mitigate any potential adverse effects of noise. It promotes the principles of good acoustic design and promotes a sensitive approach to the location of new development.

Title	Description
PAN 1/2013 Environmental Impact Assessment 2013)	Provides information on the legislative background, details regarding the EIA process, and how ES's are evaluated by relevant bodies into an implemented planning decision.

## UK Marine Policy Statement (2011)

- 5.2.10 The UK Marine Policy Statement (**'the Marine Policy Statement'**) is the framework for preparing Marine Plans and taking decisions affecting the marine environment in the United Kingdom. The Marine Policy Statement was adopted by all of the devolved administrations of the UK, and is seen as an important step in achieving the vision of *"clean, healthy, safe, productive and biologically diverse oceans and seas"* (p.3).
- 5.2.11 The overarching objectives which drive the Marine Policy Statement and the production of marine plans are to:
- Promote sustainable economic development;
  - Enable the UK's move towards a low-carbon economy, in order to mitigate the causes of climate change and ocean acidification and adapt to their effects;
  - Ensure a sustainable marine environment which promotes healthy, functioning marine ecosystems and protects marine habitats, species and our heritage assets; and,
  - Contribute to the societal benefits of the marine area, including the sustainable use of marine resources to address local social and economic issues.
- 5.2.12 The Marine Policy Statement outlines how it will achieve these objectives by forming a new plan-led marine planning system which will integrate and work parallel to existing terrestrial planning systems.
- 5.2.13 The high-level approach to marine planning is established and general principles for decision making that will contribute to achieving the objectives are outlined. The Marine Policy Statement also sets out the framework for environmental, social and economic considerations that need to be taken into account in marine planning, covering topics including marine protected areas, ports and shipping, defence and national security, and tourism and recreation.

## Scotland's National Marine Plan (2015)

- 5.2.14 Scotland's National Marine Plan (**'the National Marine Plan'**) exists under the requirements of both the Marine (Scotland) Act 2010 (which governs Scotland's inshore waters) and by the Marine and Coastal Access Act 2009 (which governs Scotland's offshore waters).
- 5.2.15 As described above, the UK Marine Policy Statement outlines the need, content, and high level policy framework for all marine plans produced by the UK devolved administrations. Scotland's National Marine Plan responds to this by establishing a strategic framework to ensure the sustainable development of the country's marine resources.
- 5.2.16 The National Marine Plan contains both general and topic specific policies, those policies that are of relevance to the Development include:
- Policy GEN 3 Social benefit;
  - Policy GEN 7 Landscape/seascape;
  - Policy GEN 8 Coastal process and flooding;
  - Policy GEN 9 Natural heritage;
  - Policy GEN 12 Water quality and resource;
  - Policy GEN 18 Engagement;
  - Policy GEN 21: Cumulative Impacts; and,

- Policies REC & TOURISM 2, 4, and 5.

## 5.3 Regional Policy Context

### South East Scotland Strategic Development Plan (SESplan) (2013)

- 5.3.1 SESPlan (**'the Strategic Plan'**) is produced by the SESplan Strategic Development Planning Authority (SDPA), a body comprising six member authorities: City of Edinburgh, East Lothian, Fife (the southern portion of this area), Midlothian, Scottish Borders and West Lothian Councils. As required by the Planning etc. (Scotland) Act 2006, the Strategic Plan must take the form of a visionary document that provides a framework for local authorities in developing planning policy. The Strategic Plan in this regard has a tiered relationship with Local Development Plans (LDPs) that are produced to cover the local authority areas within the SESplan area. The Strategic Plan sets out a long term, 20 year vision for the development of the area.
- 5.3.2 The Strategic Plan focuses on specific development aspirations and themes in the south-east of Scotland such as 'Economic Growth', 'Housing', 'Infrastructure', and 'Energy'.
- 5.3.3 Policy 1B – 'The Spatial Strategy: Development Principles' identifies key aspirations that must be considered by Local Development Plans (LDPs) and therefore any future development coming forward in the region.
- 5.3.4 The policy is outlined below and has been considered relevant to the proposed remediation works at Dalgety Bay:

*"Local Development Plans will:*

- *Ensure that there are no significant adverse impacts on the integrity of international, national and local designations and classifications, in particular National Scenic Areas, Special Protection Areas, Special Areas of Conservation, Sites of Special Scientific Interest and Areas of Great Landscape Value and any other Phase 1 Habitats or European Protected Species;*
- *Ensure that there are no significant adverse impacts on the integrity of international and national built or cultural heritage sites in particular World Heritage Sites, Scheduled Ancient Monuments, Listed Buildings, Royal Parks and Sites listed in the Inventory of Gardens and Designed Landscapes;*
- *Have regard to the need to improve the quality of life in local communities by conserving and enhancing the natural and built environment to create more healthy and attractive places to live;*
- *Contribute to the response to climate change, through mitigation and adaptation; and,*
- *Have regard to the need for high quality design, energy efficiency and the use of sustainable building materials".*

### South East Scotland Proposed Strategic Development Plan (SESplan) (2016)

- 5.3.5 Given the relative maturity of the SESplan Proposed SDP, it is considered a material consideration to the Development and as such, the principles contained within it, should be considered in the EIA assessment to some extent. Similar to the current adopted SDP, the document focuses on a series of themes and aspirational opportunities for the strategic region which are to be implemented through a Spatial Strategy. The Proposed SDP's Spatial Strategy identifies 'Key Areas of Change' in Fife, however there is no specific reference to Dalgety Bay either here or elsewhere in the plan.
- 5.3.6 Most significant, in the context of the Development, the Proposed SDP outlines that new development, and new LDPs must take into account 'Placemaking Principles':
- "Development should take account of the Placemaking Principles... Local Development Plans will include development frameworks, masterplans and design briefs that are aligned with*



*relevant community plans and have been developed jointly with local people. Local Development Plans will be guided by the Placemaking Principles detailed in Table 3.1 and ensure that all international, national and locally designated areas are afforded the appropriate level of protection” (p.12).*

## 5.4 Local Policy Context

### Dunfermline & West Fife Local Plan (2012)

- 5.4.1 The Dunfermline and West Fife Local Plan (**‘the Local Plan’**) is one of three local plans that cover the Fife local authority area, it provides direction with regard to the future development of the Dunfermline and West Fife geographical area. The Local Plan covers a ten year period from 2012 to 2022. The three local plans are due to be replaced by the proposed FIFEplan Local Development Plan (LDP), which is due to be adopted in early 2017.
- 5.4.2 The Local Plan provides a context for the *“regeneration of local communities and for the promotion of a successful economy, guiding development to the most appropriate location while protecting the natural and built environment.”* (Fife Council Website, 2016).
- 5.4.3 The Site falls within the ‘Dalgety Bay’ settlement envelope established within the Local Plan. The purpose of the settlement envelope is to define the extent of a town or village against that which is identified as ‘countryside’. Identified settlement envelope areas also are subject to the all of the Core Local Plan Policies, with the exception of those specifically applicable to development within the countryside.
- 5.4.4 In terms of specific designations, as demonstrated in ES Volume 2 – Figure 6.1, ‘Landscape Character and Designations’ part of the site is located within an area designated as Protected Open Space therefore Policy C4 ‘Open Space and Urban Park’ and Policy C5 ‘Public Open Space’ apply directly and are discussed further below.
- 5.4.5 The policies outlined in ES Volume 3 - Appendix 5.1 are of also of relevance to the Development and have been considered throughout this assessment.

### FIFEplan Proposed Plan (2014)

- 5.4.6 A new Local Development Plan (LDP), covering the entire Fife area is due to be adopted in early 2017 and a Proposed Plan was published for consultation in October 2014. It is intended that the plan will be active over a ten year period, which will commence upon formal adoption.
- 5.4.7 The new LDP will replace the three existing local plans for Fife. Through an overarching strategy, a series of policies, and the identification of a number of proposals FIFEplan aims to guide development throughout the area.
- 5.4.8 Again, given the relative maturity of the LDP it should be considered as material to the decision-making process. In particular, the following policies have been considered relevant:
  - Policy 1: Development Principles.
  - Policy 10: Amenity.
  - Policy 12: Flooding and the Water Environment.
  - Policy 13: Natural Environment and Access.
- 5.4.9 Regarding policy direction, FIFEplan attempts to streamline policies and provide more of a focus on the spatial element of the plan; this in turn has resulted in a smaller number of policies. This however means that some policies have a wider topical remit, and often overlap with one another. Overall the policy direction is broadly similar between the proposed and adopted plans, with changes in wording and topical arrangement the primary difference. Policy 1 provides a notable restructure and acts as a gateway policy in assessing the suitability of all development proposals. The 14 additional policies in FIFEplan act to support Policy 1.



- 5.4.10 The Proposed FIFEplan LDP map also identifies an area of Dalgety Bay as being located in the 'Green Network Policy Area' ('Dalgety Bay Coast'), which the entire Site falls within. Part of the Site is also identified as being within the 'Existing Green Network Asset'.

## Making Fife's Places (2015)

- 5.4.11 This supplementary planning guidance has been approved by the Council and as such, is a material consideration in the determination of planning applications.
- 5.4.12 Making Fife's Places replaced the following documents:
- Green infrastructure Supplementary Planning Guidance (SPG);
  - Fife Masterplans Handbook;
  - Creating a better Fife – Fife Urban Design Guide;
  - Fife Sustainability Checklist;
  - Public Art SPG; and,
  - FC Transportation Development Guidelines (Supplementary Designing Streets Guidance).
- 5.4.13 The guidance explains the expectations of Fife Council in relation to the design of proposed development, and contains the following information which should be considered within the EIA assessment:
- Appendix A: Site Appraisal Information: Natural Heritage & Biodiversity;
  - Appendix B, Site Appraisal Information – Landscape; and,
  - Appendix D: Site Appraisal Information: Trees.

## Fife Shoreline Management Plan 2 (2011)

- 5.4.14 The Fife Shoreline Management Plan (SMP) provides an assessment of the risks associated with shoreline evolution, coastal flooding and erosion and presents a framework for policy to address risks to people and the developed, historic and natural environment for a sustainable future. The plan provide a large scale assessment of the coastal flooding and erosion risks and provide guidance and advice to operating authorities and private landowners on the management of their defences.
- 5.4.15 Dalgety Bay is covered under Policy Unit 13 'St. David's Bay to Braefoot Point' of the SMP and advises as follows:
- "The coastal frontage here comprises shingle with some areas of intertidal mudflat. The Policy Unit is dominated by the coastal town of Dalgety Bay. The modern town, which was built in 1962, takes its name from the main bay it adjoins in the eastern extent, but the town stretches over numerous coves and bays including Donibristle Bay and St David's Bay. The coastal defences comprise various rock and masonry revetments between natural rocky headlands. Hopeward Point forms the statutory limit of the Coast Protection Act 1949".*
- 5.4.16 The overall policy is to 'hold the line' for currently defended sections as there *"is little coastal erosion or flooding that is of concern to the properties and historic buildings of Dalgety or further along the coast to the east. Though this is likely because of the existing defences throughout this Policy Unit. Holding the line for existing defences would prevent the heavily built up areas from being inundated. The natural protection within the bay will maintain the undefended sections. Flooding is predicted within the centre of the Policy Unit where there are currently no defences. This has minimal impact upon residences and is proposed to be allowed to flood allowing for some gain in inter-tidal habitat within this area. Dalgety Bay has a history of uncovering small radioactive particles. SEPA regularly monitor the area and are in discussions with the MOD in removal of further buried small radioactive particles to minimise any risk to the local community. SEPA are also in the process of developing a long term*

*remediation plan for the area, provision of which will be incorporated into the adopted policy for the Policy Unit”.*

## Fife Community Plan (2011-2020)

- 5.4.17 The aim of community planning in the area is to bring together Fife’s public and voluntary organisations to work together with and empower Fife’s communities, in order to strengthen the future and improve the quality of life in the region.
- 5.4.18 The Community Plan highlights risk and opportunities for Fife, and sets out a ten year vision for the area: *“Our vision is to strengthen Fife’s future to make Fife a great place to live, work, visit and invest”.*
- 5.4.19 The Fife Community Planning Partnership board is made up of the following:
- Fife Council;
  - NHS Fife;
  - Police Scotland;
  - Scottish Fire & Rescue Service;
  - Fife Voluntary Action;
  - Scottish Enterprise;
  - Skills Development Scotland;
  - Fife College;
  - St Andrews University;
  - South East Scotland Transport Partnership (SEStran); and,
  - Scottish Government.
- 5.4.20 Fife Partnership aim to achieve their ten year vision through working towards the following outcomes:
- Reducing inequalities;
  - Increasing employment; and,
  - Tackling climate change.

## 5.5 Conclusions

- 5.5.1 While the remediation of the foreshore at Dalgety Bay is not specifically addressed through the planning and marine policy framework which guides future development in the area, it is apparent that the Development itself is in line with national objectives to protect and enhance Scotland’s coastlines and sustainably manage marine resources.
- 5.5.2 As previously discussed a Planning Statement (February 2017), which accompanies the planning application to which this ES relates, assesses the Development against the policies that are summarised in this Chapter.
- 5.5.3 Furthermore, in order to ensure the ES and subsequent recommendations are commensurate with the above national, regional and local strategic policy direction, policies have been considered in the topic-specific sections of the ES. Where relevant, policy objectives have been used to inform the significance of potential impacts on environmental receptors.

## 5.6 References

Fife Council (2011). Fife Shoreline Management Plan 2 [Online] Accessed on 24th November 2016 at: [http://publications.1fife.org.uk/uploadfiles/publications/c64\\_SMP2\\_V5.pdf](http://publications.1fife.org.uk/uploadfiles/publications/c64_SMP2_V5.pdf)

Fife Council (2012). Dunfermline & West Fife Local Plan [Online] Accessed on 24th November 2016 at:

[http://fifeconsult.objective.co.uk/portal/local\\_view\\_fusion/dunfermline\\_\\_west\\_fife\\_local\\_plan/wfIp?pointId=3379983](http://fifeconsult.objective.co.uk/portal/local_view_fusion/dunfermline__west_fife_local_plan/wfIp?pointId=3379983)

Fife Council (2013). Fife's Community Plan 2011-2020. [Online] Accessed on 24th November 2016 at:

[http://publications.1fife.org.uk/uploadfiles/publications/c64\\_c64\\_CommunityPlan2011-2020rev201307Aug.pdf](http://publications.1fife.org.uk/uploadfiles/publications/c64_c64_CommunityPlan2011-2020rev201307Aug.pdf)

Fife Council (2015). FIFEplan Proposed Plan (2015 Pre-examination edit) [Online] Accessed on 24th November 2016 at:

[http://publications.1fife.org.uk/uploadfiles/publications/c64\\_LDPPre-ExamEditReduced2.pdf](http://publications.1fife.org.uk/uploadfiles/publications/c64_LDPPre-ExamEditReduced2.pdf)

Fife Council (2015). Making Fife's Places [Online] Accessed on 24th November 2016 at:

[http://www.fifedirect.org.uk/uploadfiles/publications/c64\\_MakingFifesPlacesPlanningPolicyGuidance.pdf](http://www.fifedirect.org.uk/uploadfiles/publications/c64_MakingFifesPlacesPlanningPolicyGuidance.pdf)

HM Government (2011). UK Marine Policy Statement [Online] Accessed on 24th November 2016 at:

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/69322/pb3654-marine-policy-statement-110316.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69322/pb3654-marine-policy-statement-110316.pdf)

Scottish Executive (Revised 2000). Planning Advice Note (PAN) 33: Contaminated Land. [Online] Accessed on 24th November 2016 at:

<http://www.gov.scot/Publications/2000/10/pan33>

Scottish Executive (2004) Planning Advice Note (PAN) 69: Planning and Building Standards Advice on Flood Risk. [Online] Accessed:

<http://www.gov.scot/Publications/2004/08/19805/41594>

Scottish Executive (2005). Planning Advice Note (PAN) 75: Planning for Transport. [Online] Accessed on 24th November 2016 at: <http://www.gov.scot/Resource/Doc/57346/0016795.pdf>

Scottish Executive (Revised 2006). Planning Advice Note (PAN) Planning, Environmental Protection and Regulation [Online] Accessed on 24th November 2016 at:

<http://www.gov.scot/Resource/Doc/152228/0040973.pdf>

Scottish Government (2008). Planning Advice Note (PAN) 65: Planning and Open Space. [Online] Accessed on 24th November 2016 at:

<http://www.gov.scot/Resource/Doc/225179/0060935.pdf>

Scottish Government (2010). Planning Advice Note (PAN) 3/2010: Community Engagement. [Online] Accessed on 24th November 2016 at:

<http://www.gov.scot/Resource/Doc/322754/0103851.pdf>

Scottish Government (2011). Planning Advice Note (PAN) 1/2011: Planning and Noise. [Online] Accessed on 24th November 2016 at:

<http://www.gov.scot/Resource/Doc/343210/0114180.pdf>

Scottish Government (2013). Planning Advice Note (PAN) 1/2013: Environmental Impact Assessment. [Online] Accessed on 24th November 2016 at:

<http://www.gov.scot/Resource/0043/00432581.pdf>

Scottish Government (2014). Scotland's Third National Planning Framework [Online] Accessed on 24th November 2016 at:

<http://www.gov.scot/Resource/0045/00453683.pdf>

Scottish Government (2014). Scottish Planning Policy [Online] Accessed on 24th November 2016 at:

<http://www.gov.scot/Resource/0045/00453827.pdf>

Scottish Government (2015). Scotland's National Marine Plan [Online] Accessed on 24th November 2016 at:

<http://www.gov.scot/Resource/0047/00475466.pdf>

Scottish Government (2015). Online Planning Advice on Flood Risk. [Online] Accessed on 24th November 2016 at:

<http://www.gov.scot/Resource/0047/00479774.pdf>

SESplan SDPA (2013). South East Scotland Strategic Development Plan (SESplan) [Online] Accessed on 24th November 2016 at:

<http://www.sesplan.gov.uk/assets/SESplan%20Strategic%20Development%20Plan%20Approved%2027%20June%202013.pdf>

SESplan SDPA (2016). South East Scotland Proposed Strategic Development Plan (SESplan) [Online] Accessed on 24th November 2016 at:

<http://www.sesplan.gov.uk/assets/Proposed%20Strategic%20Development%20Plan%2023%2009.pdf>

## 6. LANDSCAPE AND VISUAL

### 6.1 Introduction

- 6.1.1 This Chapter of the ES provides a Landscape and Visual Impact Assessment (LVIA) of the likely effects on landscape and visual amenity arising from the Development. It identifies and assesses the likely significant effects that the Development may have on the landscape character and visual resource of the area.
- 6.1.2 The following assessments describe and evaluate the landscape resource and visual amenity of the Study Area, report on the proposed change and makes informed predictions of the likely effects. The assessment process also involves consideration of opportunities to mitigate potential negative landscape and visual effects.

### 6.2 Legislative and Planning Policy Context

- 6.2.1 The landscape and visual assessments have been undertaken with reference to national, regional and local planning policy and guidance.

#### National Policy

- 6.2.2 National policy and guidance referred to includes:
  - Scotland's Third National Planning Framework (NPF3) (2014);
  - Scottish Planning Policy (SPP) (2014);
  - Planning for Natural Heritage: Planning Advice Note (PAN) 60 (2008); and,
  - Scotland's National Marine Plan (2015) with particular attention to General Policy 7 which states that decisions should be made to "*ensure that development and use of the marine environment take seascape, landscape and visual impacts into account.*"

#### Regional Policy

- 6.2.3 The South East Scotland Strategic Development Plan (SESPPlan) (2013) focuses on specific development aspirations and themes in the south-east of Scotland and provides a framework for local authorities in planning policy terms. The following policy is relevant to landscape and visual matters:
  - **Policy 1B:** The Spatial Strategy: Development Principles identifies key aspirations that must be considered by Local Development Plans (LDPs) in the region:  
*"Local Development Plans will:*  
*"Ensure that there are no significant adverse impacts on the integrity of international, national and local designations and classifications, in particular National Scenic Areas, Special Protection Areas, Special Areas of Conservation, Sites of Special Scientific Interest and Areas of Great Landscape Value and any other Phase 1 Habitats or European Protected Species"; and,*  
*"Ensure that there are no significant adverse impacts on the integrity of international and national built or cultural heritage sites in particular World Heritage Sites, Scheduled Ancient Monuments, Listed Buildings, Royal Parks and Sites listed in the Inventory of Gardens and Designed Landscapes".*

#### Local Policy

- 6.2.4 The following policies from the Dunfermline & West Fife Local Plan (2012) ('**the Local Plan**') relate to landscape and visual matters:
  - **Policy E3:** Development Quality – Environmental Impact: "*New development must make a positive contribution to the quality of its immediate environment both in terms of its environmental impact and the quality of place it will create... New development*

*is required to...demonstrate a commitment to landscape protection and improvement...*

- **Policy E4:** Development Quality – Design: *“New development must make a positive contribution to its immediate environment in terms of the quality of the development... New development is required to...Demonstrate well thought out design... and...Make the best of site attribute”*
- **Policy E11:** Historic Gardens and Designed Landscapes: *“Development affecting Historic Gardens and Designed Landscapes shall protect, preserve and enhance such places and shall not impact adversely upon their character, upon important views to, from or within them, or upon the site or setting of component features which contribute to their value”.*
- **Policy E19:** Local Landscape Areas: *“Development proposed within a Local Landscape Area or outwith the boundary but which may impact upon the designated area will only be permitted where it has no significant adverse effect on the identified landscape qualities of the area and/or its overall landscape integrity and setting...”*
- **Policy C4:** Open Space and Urban Park: *“Existing or proposed open spaces... will be protected from development”.* This policy is concerned with, amongst other things, the amenity of existing recreational open space.

## FIFEplan Proposed Local Development Plan (2014)

- 6.2.5 A new Local Development Plan (LDP), covering the entire Fife area is due to be adopted in early 2017 and a Proposed Plan was published for consultation in October 2014. It is intended that the plan will be active over a ten year period, which will commence upon formal adoption.
- 6.2.6 The following policies are relevant to landscape and visual matters:
- **Policy 1:** Development Principles: To be supported, development proposals must *“Safeguard the character and qualities of the landscape”.*
  - **Policy 10:** Amenity: *Development will only be supported if it does not have significant detrimental impact on amenity in relation to... Construction impacts... the visual impact of the development on the surrounding area”.*
  - **Policy 13:** Natural Environment and Access: *“Development proposals will only be supported where they protect or enhance...Landscape character and views...Where adverse impacts on existing assets are unavoidable, we will only support proposals where these impacts will be satisfactorily mitigated...Development proposals must provide an assessment of the potential impact on... trees and landscape and include proposals for the enhancement of natural heritage and access assets, as detailed in Making Fife”.*
  - **Policy 14:** Built and Historic Environment: *Proposals will not be supported where it is considered they will harm or damage... Historic Gardens and Designed Landscapes”.*

## 6.3 Assessment Methodology

- 6.3.1 A detailed breakdown of the full assessment methodology employed for considering landscape and visual impacts is provided in ES Volume 3 – Appendix 6.1. For brevity however, a summary of the approach is provided below.
- 6.3.2 The landscape and visual effects of the Development have been assessed at the following stages:
- During the construction period anticipated to occur over a maximum period of two consecutive six-month summer periods (approximately April to September); and
  - During the operational life of the Development (post construction).



- 6.3.3 Effects arising from the process and activities associated with decommissioning have not been considered in detail as no formal decommissioning activities are proposed and they would be of a similar nature to construction issues.
- 6.3.4 The assessment has established the baseline landscape and visual conditions of the Study Area as demonstrated in ES Volume 2 - Figures 6.1 to 6.3. Following assessment of the baseline landscape and visual context of the Development the LVIA has assessed the:
- Sensitivity of both landscape and visual receptors derived by a combination of susceptibility and value;
  - Magnitude of effect derived from scale/extent, duration and reversibility, whether adverse or beneficial; and,
  - Significance of the effects based on a comparison of sensitivity of receptor and magnitude of effect.

## 6.4 Landscape Baseline Conditions

- 6.4.1 This section presents an overview of the landscape context of the Study Area and provides information about landscape designations and character, and their current condition. It also sets out the landscape receptors included within the assessment.

### Landscape Designations

- 6.4.2 Landscape designations relevant to this assessment are outlined below and are illustrated in ES Volume 2 - Figure 6.1.

#### National Landscape Designations

- 6.4.3 There are no national landscape designations that cover the Site, or wider Study Area.

#### Regional Landscape Designations

- 6.4.4 The Site does not fall within any regional landscape designation. The closest regional landscape designation is the Cullaloe Hills and Coast Local Landscape Area (LLA), shown in ES Volume 2 - Figure 6.1.
- 6.4.5 The adopted Local Plan Policy E19: Local Landscape Areas provides the policy context for LLAs, as described above.
- 6.4.6 Fife Council commissioned a review of local landscape designations to assist the preparation of local plans in line with Scottish Natural Heritage (SNH) Guidance (2006) 'Guidance on Local Landscape Designations'. The 2009 'Fife Local Landscape Designation Review' (**the 2009 Review**) informed the identification and policy direction of LLAs in the adopted Local Plan.
- 6.4.7 No detailed citation exists for the Cullaloe Hills and Coast LLA. However, the 2009 Review provided an updated assessment of the landscape character of the LLA and accompanying 'Statement of Importance' describing location, boundaries and reasons for designation/features of interest. Those relevant to the Study Area include:
- Rounded interlocking hills and lower rolling farmland;
  - Low coastal hills and typical of the Fife coast and provide a distinct setting for settlements fringing the Firth of Forth;
  - Steep wooded braes are a characteristic landscape feature of Fife;
  - Along the coastal edge the steep semi-natural deciduous wooded slopes of the coastal braes have high scenic value, and this woodland and the diverse shoreline provide a strong sense of naturalness;
  - The hills and coastal braes play an important role in providing connectivity between areas of countryside which lie between settlements, including Dalgety Bay; and,



- Views are particularly important along the coastal edge where the coastal settlements are interspersed by the coastal hills and often steep wooded braes. The Cullaloe Hills are highly visible across the Firth from Edinburgh.

6.4.8 As a regional designation, the Cullaloe Hills and Coast LLA is considered to have medium value in the context of this assessment.

### Gardens and Designed Landscapes (GDLs)

6.4.9 GDLs are listed in the Inventory of Gardens and Designed Landscapes, compiled, maintained and updated by Historic Environment Scotland. There are two GDLs within the Study Area:

- Fordell Castle, situated approximately 1.2km to the north of the site; and,
- St. Colme situated approximately 0.35km to the east of the site.

6.4.10 Fordell Castle is situated to the north of Dalgety Bay, north of the A921. A site assessment has confirmed that a combination of topography and intervening built form and vegetation would preclude intervisibility with this GDL. Fordell Castle GDL has therefore been scoped out of further assessment.

6.4.11 St. Colme GDL covers an extensive area to the east of the Study Area, from the settlement edge of Dalgety Bay, along the coastal hills to the south of the A921 as far as Aberdour. St. Colme House is set on elevated ground, but within dense woodland overlooking Barnhill Bay and would have no intervisibility with the Site.

6.4.12 The extensive parkland to the west of St. Colme House comprises former 18<sup>th</sup> Century formal parks with significant blocks of woodland planting and medium to large scale rectilinear fields; a remnant avenue of planting on the western approach to St Colme House (Beech Avenue) the most obvious indicator of its former use.

6.4.13 As nationally important landscapes, GDLs are considered to have High value.

### Landscape Character Overview

6.4.14 The landscape character is defined at the regional level.

6.4.15 The David Tyldesley and Associates (1999) 'Fife Landscape Character Assessment (FLCA)', Scottish Natural Heritage Review No. 113 covers the Study Area. This 1999 assessment was updated in 2009 as part of the aforementioned Fife Local Landscape Designation Review, which also took into account changes to the landscape since the 1999 assessment

6.4.16 The 2009 Fife Local Landscape Designation Review (LLDR) forms the most up-to-date source of information about landscape character for the majority of the Study Area. However, the 2009 LLDR does not consider the intertidal landscape character referenced in the FLCA and as such reference will be made to the earlier study where appropriate.

6.4.17 Urban areas are not classified by the 1999 FLCA or the subsequent 2009 LLDR.

6.4.18 The nature and location of the proposal on the shoreline would be dissociated with the townscape character of adjacent urban area as a result of screening provided by substantial intervening vegetation and, to a lesser degree, topography. As a result, an assessment of townscape character has not been conducted.

6.4.19 The Landscape Character Types and Units (LCTs/LCUs) identified in Table 6.1 fall within the 1.5km Study Area.

Table 6.1 – Landscape Character Baseline

LCT/LCU Reference	Intervisibility (Yes/No)	Further assessment required (Yes/No)
<b>2009 Fife Local Landscape Designation Review</b>		
CH74: Aberdour Hills	Yes	Yes
LH37: West Dunfermline	No	No
UV29: Cullaloe Hills	No	No
<b>1999 Fife Landscape Character Assessment</b>		
C.17: Other Intertidal Shores	Yes	Yes
C.19 Firth of Forth and Tay	Yes	Yes

6.4.20 Those LCTs ‘scoped in’ to the assessment are discussed in detail below.

#### **LCU CH74: Aberdour Hills**

6.4.21 This Landscape Character Unit (LCU) forms part of the broad Coastal Hills Landscape Character Type (LCT). It covers the open countryside between the settlements of Dalgety Bay and Aberdour.

6.4.22 The landscape characteristics of LCU CH74 are described as follows:

- Simple rolling coastal hills located on coastal edge above the steeper coastal braes;
- Arable and pasture farmland with tree groups and lines;
- There is some influence from the urban edge of Burntisland and Aberdour;
- The coastal gas [sic] terminal complex is screened by landform and woodland; and,
- The landscape character unit is crossed by the Fife Coastal Path, A921 and railway line.

6.4.23 The accompanying Landscape Character Criteria table is also reflected in Table 6.1 below.

Table 6.2 – Aberdour Hills: Landscape Character Criteria

Criteria	Rank	Description
<b>Landscape Character Criteria</b>		
Typicality	Medium	The rolling coastal hills are found regularly along Fife coastline and contribute to sense of place within Fife.
Rarity or uniqueness	High	The simple rolling coastal hills are associated with the coastal braes close to the water’s edge below.

Criteria	Rank	Description
<b>Landscape Character Criteria</b>		
Condition or quality	Medium	The fields are typically well tended fields, although the encroaching settlement, and oil terminal and reduce the quality of LCU.
Variation in quality	No	n/a
<b>Landscape Quality Criteria</b>		
Scenic Qualities	Medium	LCU itself is relatively simple, balanced, organised and tended farming landscape.
Enjoyment	Medium	The area includes the Fife coastal path, other walking opportunities and a golf course.
Cultural qualities	Medium	There are several features including remains of church and dovecot and policy influences associated with St Colme House and Aberdour Castle and House HGDL.
Naturalness	Medium	Pressures from built developments and industry disturb naturalness of the landscape.
Setting	Medium	Provides setting to adjacent small settlements.
Views	Medium	Pleasing seaward views. Landward views are restricted by the rising land.
Connectivity	High	The LCU provides a green wedge between Aberdour and Burntisland.

6.4.24 The boundary of this LCU is largely contiguous to the boundary of the Cullaloe Hills and Coast LLA and St Colme GDL, which in the context of this assessment have medium and high value respectively.

6.4.25 Within the Study Area this LCU contains the Cullaloe Hills and Coast LLA and St. Colme GDL. While the LCU is reflective of a number of the characteristics noted in published assessments, it is also considered to be influenced by several detracting modern elements. Overall this character unit is considered to have medium value.

## LCT: C.17: Other Intertidal Shores

6.4.26 The 2009 LLDR does not consider the character of the intertidal and maritime environment referenced in the 1999 FLCA. As such, the 1999 study has been used as the basis of an assessment of the intertidal and shoreline character where more recent information is absent.

6.4.27 This LCT covers an almost continuous area around the coast of Fife, including Dalgety Bay itself.

6.4.28 The LCT comprises the intertidal mudflats, sands, shingles and rock between mean, high and low watermarks of ordinary spring tides.

6.4.29 The landscape characteristics of LCT C.17 are described as follows:

- A natural landscape dominated by the sea and the tidal cycle;
- At low tide the low lying, dull brown or brown-grey sheets of the mudflats with the meandering outwash channels;
- The rougher texture, more colourful shingle bays and rocky shores with their deep striations;
- The lighter colour and smooth, even slope to the sea of the sandy beaches with their groyne and other structures;
- The landform, colours, textures and patterns of sand/mud and water of the estuaries;
- The large-scale, flat, open or exposed, uniform or simple landscapes with smooth textures, sinuous lines and muted colours;
- The solitude dominated by natural noises and the naturalness of the areas, with sometimes huge flocks of birds or perhaps just occasional waders or gulls flying or scurrying across mud or shingle;
- The ever changing line of the water's edge and the sound and movement of the waves;
- The generally natural landscape occasionally punctuated by small moored craft, artefacts of navigation and small harbours;
- The wide range of landscape experiences depending on the weather conditions and the local permutations of mud, sand, shingle and rock, estuary or harbour;
- Typically, it is a large-scale, open (and in high winds very exposed), simple, flat, harmonious, natural, landscape with sinuous lines, random patterns, varied textures and colours and slow movement, and dominated by the sight, sound and smell of the sea; and,
- Views are invariably extensive in the seaward direction and to landward are generally towards the cliffs, braes, coastal hills or coastal terraces.

6.4.30 The accompanying 'Pressures for Change in the Landscape' (p.96) notes:

*"There is little evidence of change in the intertidal zone except where algae or eel grass appear to be expanding and some gradual changes in the line of outwash channels and beach levels are just perceptible. The greatest threat of change must be further land claim, especially of mudflats, but the international ecological importance of these is likely to deter further extensive encroachment. Otherwise, infrastructural works e.g. pipelines and coast protection works may be the only expected changes".*

6.4.31 Within the Study Area this landscape is not covered by any landscape designation. While it is reflective of a number of the characteristics noted of this LCT, modern development such as existing coastal protection works, elements associated with DBSC including slipways and

jetties, and nearby urban areas also influence the landscape character locally. On balance, LCT C.17 is considered to have medium value.

## LCT: C.19: Firths of Forth and Tay

- 6.4.32 The 2009 LLDR does not consider the character of the wider maritime character referenced in the 1999 FLCA and as such the earlier study has been used as the basis of an assessment of the intertidal and shoreline character.
- 6.4.33 This LCT covers the expanse of the Firth of Forth to the south of the Study Area.
- 6.4.34 The landscape characteristics of LCT C.19 are described as follows:
- A very large-scale, flat, horizontal and natural landscape dominated by the weather conditions and the colour of the sea and the sky and the movement of waves;
  - The many small off-shore islands;
  - The navigation and shipping artefacts on the water;
  - The frequent but very slow movements of vessels of a variety of types;
  - A maritime landscape where the character is always influenced by the sea and can be particularly affected by the weather conditions and views of the sky and the sea;
  - The effects of lights reflecting on the Firths at night;
  - The Tay Road and Railway Bridges, and the Kincardine, Forth Rail and Forth Road Bridges; and,
  - Often a calm, bright, colourful and smooth, exposed landscape with extensive views. A natural landscape dominated by the sea and the tidal cycle.
- 6.4.35 Despite being a maritime LCT, the published assessment considers that one of the important ways in which it is experienced is from the shore. Such experiences include a wide range of both natural and man-made influences.
- 6.4.36 In the accompanying 'Pressures for Change in the Landscape' (p.99), the LCT description notes that these maritime landscapes are unlikely to experience major changes that would alter their character, while noting that only 'significant' land reclaiming would result in such change.
- 6.4.37 Within the Study Area this LCT is not covered by any landscape designation. This is a broad and varied landscape type influenced by a variety of natural and built features. Overall, the value of this character type is considered to be medium.

## **Physical Character of the Site**

- 6.4.38 The Site is shown in ES Volume 2 - Figures 6.1 to 6.3. It lies at the location of the existing DBSC jetty and slipway area and includes parts of the inland coastline and the shoreline area to the east and west of the headland.
- 6.4.39 The existing onshore coast sits at approximately 9 metres above ordnance datum (AOD) near DBSC, dropping steeply to the bay which is naturally low lying at sea level.
- 6.4.40 Existing rock armour slopes wrap around the shoreline to the east and west of DBSC. Two concrete slipways extend into Dalgety Bay from the landing area.
- 6.4.41 The intertidal zone is a largely natural area defined by natural processes, although influenced locally by the engineered structures described above. The intertidal shores at this location exhibit a rougher texture with rocky shores and deep striations, which gradually smooth out with distance into the Firth of Forth.
- 6.4.42 The Site is not covered by any landscape designation. Existing coastal engineering structures, the settlement of Dalgety Bay and DBSC detract from the landscape character at this location; making it distinct from the more natural coastline to the east of Dalgety Bay.

## Summary of Landscape Character Information

- 6.4.43 It is not expected that a regional assessment of landscape character would address the Site location specifically. As a result, the LCT characteristics described above tend to be broad-brush and found widely across Fife.
- 6.4.44 AECOM Landscape Architects visited the site on 16<sup>th</sup> August 2016 in good conditions with generally good visibility. The following additional observations were made in respect of the character of the site, and wider Study Area:
- The coastal edge from Donibristle Bay to DBSC towards Ross Plantation includes existing rock armour defences, which tend to be more prominent around headlands and promontories;
  - The disused harbour at Donibristle Bay and DBSC are engineered features along the coastline which contrast with the more natural coastal edge to the east of St. Bridget's Kirk (remains); and,
  - Open views across the intertidal mudflats and shores include the large expanse of the Firth of Forth and varied coastline of Fife to the north and Lothian to the south, and include commercial shipping berths, large scale built infrastructure and urban areas.

## 6.5 Visual Baseline Conditions

- 6.5.1 This section describes views to and from the site, their distribution, character and value.
- 6.5.2 AECOM conducted an assessment of the views available to and from the Site by walking and driving (as appropriate) paths, publically accessible areas and roads. Before doing so, a broad area of search was defined using a GIS-based computer program which predicts the Zone of Theoretical Visibility (ZTV) of the site based on bare-earth landform only, described below.

### Zone of Theoretical Visibility

- 6.5.3 The ZTV is shown on ES Volume 2 - Figure 6.3. As described in Appendix 6.1, the ZTV does not account for built form, engineered structures, incidental vegetation (such as hedges, hedgerow trees, shelter belts etc.). It therefore represents the 'worst-case' scenario in terms of visibility. In other words, there will be many locations shown as being within the ZTV from where the Development would not, in actuality, be visible.
- 6.5.4 The ZTV is based on the maximum height for the Development as described in ES Volume 1 - Chapter 2.
- 6.5.5 The ZTV demonstrates that rising topography to the north, east and west of Dalgety Bay restricts distant visibility. As would be expected for any development on a coastal location there is extensive, unobstructed theoretical visibility across the Firth of Forth to the south.
- 6.5.6 While the ZTV is a useful exercise in understanding the theoretical visibility of the Development, it is necessary to consider the actual intervisibility between the Site and the surrounding landscape context, as described subsequently.

### Analysis of the ZTV

- 6.5.7 The site area occupies the low-lying shoreline adjacent to, and extending to the north and south of DBSC.
- 6.5.8 As with many coastal areas, and as noted by published landscape character descriptions (Sections 6.4.14-6.4.37), views tend to have a seaward focus. However, there are open headlands and promontories from which one is able to look back, inland, to appreciate views of the coastline.
- 6.5.9 Views from the Firth of Forth within the Study Area looking inland take in the steep wooded braes to the east of the Bay, urban area of Dalgety Bay, Braefoot Oil Terminal and distant views to Burntisland and North Queensferry including the road and rail bridges that span the Firth of Forth.
- 6.5.10 The inland topography of Dalgety Bay rises steeply from approximately 9m AOD along the shoreline to a localised ridgeline at approximately 50m AOD from Steeple Clump to the west,

following Hillend Industrial Estate to the north and Tattie Knoll to the north-east, before encircling the bay at Braefoot Plantation to the east. The 30m contour below this ridgeline broadly marks the extent of visibility looking inland when viewed from ground level at the Site.

- 6.5.11 To the north and west of the Study Area, built form surrounding Dalgety Bay rises steeply as a result of underlying topography; the resulting effect is that rows of intervening built form will tend to screen views from urban areas behind and further inland.
- 6.5.12 The screening effect of built form is emphasised by planting within the curtilage of properties. Blocks of woodland around the coastline to the west of Dalgety Bay at Ross Plantation, Crow Hill wood to the north of the Bay, and Braefoot Plantation to the east of the Bay also serve to filter and fragment views of the Site.
- 6.5.13 Shoreline areas to the south-east (defined as Open Space and therefore relating to Policy C4 of the adopted Local Plan) tend to be well vegetated, which restrict views along the line of the coast from the urban edge and Core Path network.
- 6.5.14 Within open countryside to the north-east of the Study Area there are views across Dalgety Bay to the Firth of Forth and beyond. However, a combination of high hedgerows and plantation woodland tends to limit views to isolated, open locations e.g. field gates.

### Representative Viewpoints

- 6.5.15 The 6 representative viewpoint locations which form the basis of the assessment of visual amenity were agreed with Fife Council on 4<sup>th</sup> October 2016. The viewpoint locations are shown on ES Volume 2 - Figure 6.2 and listed in Table 6.3 below.

Table 6.3 - Representative Viewpoint Locations

Viewpoint Number	Description	Approximate Grid Reference	Distance from site boundary and direction of view
1	Dalgety Bay Sailing Club	316477 683087	0m. East
2	East of Donibristle Bay	316205 682832	270m. North east
3	Fife Coastal Path, Crow Hill Wood east of 'Sealstrand'	316479 683693	320m. South west
4	'Downing Point' west of Donibristle Bay	315961 682457	715m. North east
5	'Braefoot Point', east of Dalgety Bay	317690 683105	1.13km. West
6	Core Path (Fife Council ref.724), north of Dalgety Bay	317781 683821	1.36km. South west

- 6.5.16 GLVIA3 notes that the selection of viewpoints is used to represent views from a range of different types of visual receptor, as larger numbers of viewpoints cannot all be included individually and as the notable effects for some receptors are unlikely to differ between the viewpoints selected.



## Viewpoint 1: Dalgety Bay Sailing Club

- 6.5.17 This close range view is located within the Site boundary, and is representative of users of DBSC and adjacent open space.
- 6.5.18 Panoramic views ( $\geq 180$  degrees) are available from the viewpoint. There are open and long distance vistas across the Firth of Forth which would tend to be the focus of receptors at this location.
- 6.5.19 The foreground of the view comprises the shoreline and intertidal zone, three concrete slipways, a garage and boat park associated with DBSC and coastal defence rock armour. The intertidal flats and rocky outcrops of the bay occupy the view's mid-ground. A well-wooded ridge line rises from the eastern shore of the bay and forms the background of the view.
- 6.5.20 Aside from built form in the foreground, two clusters of residential dwellings nestled within woodland are seen to the left of the view. The western half of the bay, including its steep wooded ridgeline is largely absent from built development. More distant detracting features include two radio masts located on a far ridge.
- 6.5.21 On account of being a pleasing view with few detracting elements, the value of the view is considered to be medium.

## Viewpoint 2: East of Donibristle Bay

- 6.5.22 This close to medium range viewpoint is located on a minor headland and is representative of views from publicly accessible open space.
- 6.5.23 Panoramic views ( $\geq 180$  degrees) are available from this viewpoint. There are open and long distance views available across the Firth of Forth which would tend to be the focus of receptors at this location.
- 6.5.24 The sweeping coastline extends from the foreground to background of the view. The landward mid-ground is occupied by residential properties on The Wynd, partially filtered by vegetation within adjacent open space. The clubhouse of DBSC and boat masts can be seen in the centre of the view, along with disused harbour. Existing rock armour and rocky outcrops add texture to the coastline. The far side of Dalgety Bay, comprising agricultural fields and mature woodland rises steeply from sea level, forms the backdrop to the bay. The island of Inchcolm is seen to the right of the view.
- 6.5.25 Detracting features include distant views of the Braefoot Oil Terminal and two radio masts on a far ridgeline.
- 6.5.26 The value of the view is considered to be medium.

## Viewpoint 3: Fife Coastal Path, Crow Hill Wood east of 'Sealstrand'

- 6.5.27 This viewpoint is located on the Fife Coastal Path, south of residential properties on Moray Way South, approximately 320m from the Site.
- 6.5.28 The view is representative of residential properties and recreational receptors on the Fife Coastal Path.
- 6.5.29 The foreground of the view comprises the extensive intertidal zone which at low tide (as shown) extends far out into the Firth of Forth. The Ross Plantation restricts distant views to the west, focussing the view across the Firth of Forth that occupies the mid-to-background of the view, and as far as the north Lothian coast some 6km to the south.
- 6.5.30 The DBSC Boat Park, associated buildings and existing rock armour are man-made features that could be considered to detract from the view. Urban areas and built form on the Lothian coast are perceptible as small background features within the view.
- 6.5.31 On account of being a pleasing view with few detracting elements, the value of the view is considered to be medium.

## Viewpoint 4: 'Downing Point' west of Donibristle Bay

- 6.5.32 Viewpoint 4 is a medium range view located at Downing Point, a narrow rocky headland that extends approximately 140m into the Firth of Forth. This view is representative of users of open space and illustrates the nature of views inland from recreational watercraft.
- 6.5.33 Panoramic views ( $\geq 180$  degrees) are available from this location. Receptors at this location have a sense of being 'within' the maritime environment of the Firth of Forth. Views inland are part of the experience seen 'in the round'; however, it is the sweeping long distance views available across the Firth of Forth that would tend to be the focus of receptors at this location.
- 6.5.34 Residential development at Donibristle Gardens is visible on the nearby coastline. Further along the coast intervening vegetation limits the visibility of built form, including DBSC. In the background the wooded braes to the east of Dalgety Bay rise steeply to agricultural fields. Higher ground at Dunearn Hill (221m AOD) is visible some 7km from the viewpoint.
- 6.5.35 The developed features present on the coastline to the west of Dalgety Bay and Donibristle Bay detract from the more natural coastline visible in the mid to background of the view. The Braefoot Oil Terminal is a detracting feature in the background of the view.
- 6.5.36 On account of being a pleasing view with relatively few detracting elements, the value of the view is considered to be medium.

## Viewpoint 5: 'Braefoot Point', east of Dalgety Bay

- 6.5.37 Viewpoint 5 is located at Braefoot Point, approximately 1.13km west of the Site. Braefoot Point marks the end of an informal recreational route through the Braefoot Plantation.
- 6.5.38 The view is representative of recreational receptors, and used to illustrate the nature of distant views from recreational watercraft. This is part of an open and panoramic ( $\geq 180$  degrees) view across the Firth of Forth. The focus of the view is towards the Forth Bridge and Queensferry Crossing (under construction), and distant Lothian coast to the south.
- 6.5.39 The fore-to-midground is occupied by the broad expanse of the Firth of Forth and rocky outcrops on the near shoreline. The western shore of Dalgety Bay, which is more developed than the east, includes sections of rock armour, DBSC, associated slipway and boat masts, as well as the wider urban area partially screened by intervening woodland. Letham Hill Wood provides an elevated and wooded backdrop to the urban area. The Forth Bridge, Forth Road Bridge and Queensferry Crossing are prominent features in the background of the view.
- 6.5.40 Being a pleasing view, albeit containing some detracting elements, the value of the view is considered to be medium.

## Viewpoint 6: Core Path (Fife Council ref.724), north of Dalgety Bay

- 6.5.41 Viewpoint 6 is located on Core Path R724, approximately 1.36km from the Site, and is representative of recreational users of the Core Path.
- 6.5.42 This elevated, long distance view is taken through a field gate, which is typical of the limited opportunities for views from this section of the Core Path. The Forth Bridge and Queensferry Bridge (currently under construction) form the focus within the view as the eye follows the shoreline of the more developed western coastline of Dalgety Bay.
- 6.5.43 The foreground comprises steeply sloping agricultural fields bounded by hedgerows and woodland. The Firth of Forth occupies much of the mid-to-background of the view. The urban edge, coastline and wooded braes of Dalgety Bay enclose distant views to the west. The background of the view is formed by the distant Lothian coast, including tanker berths and urban areas.
- 6.5.44 On account of being a pleasing view containing some detracting elements, the value of the view is considered to be medium.

## Identification of Receptors

### Residential Receptors

- 6.5.45 The principal settlement within the Study Area is Dalgety Bay and conjoined settlement of Hillend to the north-west.

- 6.5.46 As described above, a combination of topography and vegetation limits the availability of views from much of the settlement.
- 6.5.47 Properties on the coastline immediately to the north and west of the Site, and those to the north and south of Moray Way South road have potential to gain views of the Site. Properties immediately adjacent to the Site, to the east of The Wynd, have views from rear elevations into the interior of the site. Views from some properties are partially restricted by intervening vegetation along their boundaries and within the Site itself. Other views are more open and overlook the working boat yard / storage area.
- 6.5.48 A small group of properties to the west of DBSC, to the north of The Wynd, are located close to the shoreline, separated from the Site by open space planted with hedgerows and mature trees. These properties are low lying, with partially filtered views looking out over the Firth of Forth. However there is the potential for isolated, filtered or oblique views of the Site.
- 6.5.49 Properties to the north and south of Moray Way South road would have medium range views of the Site. Properties on the shoreline would have unobstructed views; whereas those further inland will have views partially restricted by vegetation and/or built form in front of them.
- 6.5.50 Views from residential dwellings are considered to have medium value.
- 6.5.51 Viewpoint 3 has been selected to represent views from the small number of residential receptors with direct and unobstructed views of the Site.

### Fife Coastal Path

- 6.5.52 The Fife Coastal Path is a long distance path and regionally important route. The path covers a 188km route which stretching from the Firth of Forth in the south, to the Firth of Tay in the north. Along its length the route passes through a variety of urban, industrial and rural landscapes along the long coastline, resulting in a variety of experiences and views.
- 6.5.53 At its closest point the Fife Coastal Path passes approximately 100m to the west of the Site. The route within the Study Area is illustrated on ES Volume 2 - Figure 6.2.
- 6.5.54 There is the potential for mid-to-long range views of the Site from coastal sections of the path. Views from elevated areas are limited as a result of screening by intervening vegetation, but there are isolated stretches and point locations from which views across Dalgety Bay and the Firth of Forth and to the Site are possible. In contrast, views within urban areas and woodland along the coastline are heavily restricted by intervening built form and / or vegetation.
- 6.5.55 Viewpoint 3 (ES Volume 2 - Figure 6.6) is representative of the few locations within the Study Area from which direct, unrestricted views of the Site are possible from this route.
- 6.5.56 As a regionally important route views from the Fife Coastal Path are considered to have medium value.

### Core Paths

- 6.5.57 The distribution of Core Paths within the Study Area is shown in ES Volume 2 - Figure 6.2.
- 6.5.58 Core Paths generally traverse the Study Area from east to west, following the contours of the coastline and coastal hills and within the urban area of Dalgety Bay; to the north of Dalgety Bay Core Paths connect with the wider network around Fordell Castle GDL, Inverkeithing, and the wider countryside. There are a small number of connecting paths running broadly north-south between these routes.
- 6.5.59 Core Paths that pass along the coastline west of Dalgety Bay and Donibristle Bay tend to have views towards the Site restricted by built form and / or vegetation. Some coastal sections of routes south of 'Sealstrand', and within open and elevated countryside to the north-east, have the potential for mid to long range views of the Site. In contrast, views within urban areas and woodland are generally restricted by intervening built form and vegetation.
- 6.5.60 Viewpoints 3 and 6, demonstrated in ES Volume 2 - Figures 6.6 and 6.9 are representative of the local Core Path network across a range of distances within the Study Area.
- 6.5.61 As a locally recognised visual amenity resource, Core Paths are considered to have medium value.

## Open Space

- 6.5.62 Defined Open Space (Policy C4 of the adopted Local Plan) comprises both public, and semi-public (i.e. private, but with permitted access) areas. The locations of open space within the Study Area are shown on ES Volume 2 – Figure 6.2.
- 6.5.63 As a result of screening by built form, vegetation and, to an extent, differences between inland and shoreline topography, views of the Site are restricted to nearby open space adjacent to DBSC, at Donibristle Bay and Downing Point, to the east of Ross Plantation and at the western edge of Crow Hill Wood. Even within these areas, one tends to have to stand close to the coastal edge in order to gain views of the Site along the arcing coastline.
- 6.5.64 Viewpoints 1-4 (ES Volume 2 – Figures 6.4 to 6.7) are representative of views from open space across a range of distances within the Study Area.
- 6.5.65 As an important recreational asset for access to and from the coastline and beaches within the Study Area, the value of views from open space is considered to be medium.

## Road Network

- 6.5.66 There is one major 'A' road, the A921, situated to the north of the Study Area. AECOM's site assessment confirmed that the screening effect of intervening topography and vegetation would result in no intervisibility from this route. As a result, the A921 has been scoped out of further assessment.
- 6.5.67 There are a number of residential access roads within and surrounding the settlement of Dalgety Bay. These routes are considered as part of the assessment of residential receptors.

## Railways

- 6.5.68 The Fife Coast Railway crosses the Study Area from west to east, north of the A921. AECOM's site assessment confirmed that intervening topography and vegetation would result in no intervisibility from the railway. As a result no further assessment of this route has been undertaken.

## Users of Recreational Watercraft

- 6.5.69 The Firth of Forth is a substantial body of water which provides access for both commercial and recreational watercraft.
- 6.5.70 Views from open water offer unrestricted 360 degree long range panoramas across the Firth of Forth.
- 6.5.71 Views inland are part of the experience seen 'in the round'. Within the Study Area, when looking inland to the north, such views would take in a variety of natural and built features including steep wooded braes and the sweeping coastline, the urban area of Dalgety Bay, Braefoot Oil Terminal and distant views to Burntisland and North Queensferry (including the road and rail bridges that span the Forth).
- 6.5.72 Viewpoints 4 and 5 are used to illustrate the nature of medium to long range views from recreational watercraft.
- 6.5.73 Views from recreational watercraft users are considered to have medium value.

## 6.6 Environmental Design and Management

### Appreciation of the Proposed Development

- 6.6.1 In order to fully understand and accurately report on the likely landscape and visual effects it is important to have detailed knowledge of the Development. This is achieved through a review of technical drawings and information, including plans, sections, elevations and visualisations.
- 6.6.2 A detailed description of the Development is provided in ES Volume 1 - Chapter 2 and the following outlines the main elements and components with the potential to affect landscape character and visual amenity during construction:
- Establishment of the working platform and storage area;

- Establishment of the construction compound, enclosed by a 1.8m high temporary fence to assist in screening the compound in views from nearby residential properties. The compound is likely to include a primary administrative compound containing; cabins, welfare facilities and storage space for plant, machinery and construction materials;
  - Storage of existing revetment to be set aside for re-use in the new revetment;
  - Laying of geotextile membrane in trenches;
  - Placement of stockpiled protection armour over the bedding layer;
  - Use of tracked excavators and four wheel drive dumper trucks to move stockpiled material;
  - Remove of the two existing slipways and jetty structures and excavation of foreshore in a series of cells in order to process material;
  - Phased construction of the new slipway from the foreshore; formed in sections of pre-cast concrete slabs, infilled with granular material; and
  - Construction of the concrete headwall and minimal backfilling of excavated areas.
- 6.6.3 The key elements of the Development likely to result in landscape and visual effects during operation (post construction) would comprise:
- Slipway comprising two distinct concrete slipway areas. The western portion of the slipway is approximately 56m in length and 10m in width and includes a 1:5 slope at the landward extent grading to a 1:10 slope as it approaches the sea and tapers to the MLWS. The eastern portion of the slipway also consists of a 1:10 slope and measures approximately 56m in length. The width of the eastern portion of the slipway ranges from approximately 40m at the landward extent to 35m at the seaward extent.
  - A retaining wall will be installed at the top of the western extent of the slipway to maintain the Headland rock armour.
  - The jetty structure 4m in width, 56m in length and 2.2m in height from the adjacent slipways. The structure is horizontal from the landward extent, before dropping to a 1:10 slope, then 1:5 slope as it approaches the sea; and
  - Rock armour varying between 5m and 20m, following the contours of the coastline at a nominal thickness in the order of 1-1.5m.
- 6.6.4 The following section outlines the potential landscape and visual effects which may occur as a result of the Development.
- 6.6.5 This assessment acknowledges that effects would change over time and, therefore, identifies effects separately during the construction, and operation (post construction) phases of the Development.

## Mitigation

- 6.6.6 A key principle of landscape assessment is that the assessment should take account of the effect of any proposed mitigation (GLVIA3, p. 116, para 6.45).
- 6.6.7 Mitigation measures are undertaken as a response to anticipated adverse effects and can be described as primary or secondary.
- 6.6.8 Primary mitigation measures are steps taken during the design phase of the Development to help minimise potential effects, based on key sensitivities, constraints and opportunities identified through baseline study and appraisal. Secondary mitigation measures are those that seek to further reduce potential effects that could not be designed out and have been informed by the detailed assessments.
- 6.6.9 Proposed mitigation measures associated with the Development are embedded in the design. These have not been informed by the LVIA. No secondary mitigation measures are proposed.



## 6.7 Landscape Assessment

- 6.7.1 This section sets out the assessment of the level of the predicted residual landscape effects that would occur during construction and operational phases of the proposals.

### Landscape Designations – Cullaloe Hills and Coast Local Landscape Area (LLA)

- 6.7.2 The Cullaloe Hills and Coast LLA is considered to have medium value in the context of this assessment.
- 6.7.3 The Development would be located approximately 0.67km from this LLA at its closest point. As such, any effects would be indirect.
- 6.7.4 Within the Study Area the LLA boundary includes the A921 and railway lines. The oil terminal at Braefoot Bay is outside of, but adjacent to, the LLA as is the eastern edge of the Dalgety Bay urban area. The presence of this built form and associated infrastructure influences the character locally and would tend to make the LLA more tolerant to change. It is therefore considered that the Cullaloe Hills and Coast LLA has a low susceptibility to change to the type of development proposed.
- 6.7.5 Taking into account that this is a regionally valued landscape covering a large area, containing a variety of natural and built features, it is considered that the sensitivity to the Development would be low.

### Construction

- 6.7.6 The presence and movement of construction machinery, vehicles, compounds and stockpiles would be incongruous within the wider landscape. Change would be perceptible from limited parts of the LLA; however, considering the separating distances involved, there would be little change to the aesthetic and perceptual aspects of the designated landscape itself. The characteristics of the LLA would remain unaffected, with minimal change perceived in context of the wider landscape of the developed western extent of Dalgety Bay, and busy shipping lane of the Firth of Forth.
- 6.7.7 All construction effects would be temporary. Taking these matters into account the magnitude of change is assessed as low, resulting in a minor adverse level of effect which is not significant.

### Operation

- 6.7.8 During operation (post construction) the Development would introduce features already characteristic to the wider landscape. While greater in scale and extent than existing features, this would result in a very small change on the aesthetic and perceptual aspects of the LLA. Overall, there would be minimal change on the reasons for designation and features of interest of this designated landscape.
- 6.7.9 As a result the magnitude of effect would be negligible, resulting in a negligible level of effect, which is not significant.

### Landscape Designations – St.Colme GDL

- 6.7.10 The St.Colme GDL is considered to have high value in the context of this assessment.
- 6.7.11 The Development would be located approximately 0.35km from this GDL at its closest point. As such, any effects would be indirect.
- 6.7.12 The boundary of the GDL is partly defined by the A921 to the north, to the south is the Braefoot Oil Terminal, while to the west and east are the urban areas of Dalgety Bay and Aberdour respectively. The presence of these built influences would tend to make the GDL more tolerant to change to the type of development proposed. It is considered that the St.Colme Garden and Designed Landscape has a medium susceptibility to change.
- 6.7.13 Taking into account that this is a nationally valued landscape, with some tolerance to change of the type proposed, it is considered that the sensitivity of the GDL is medium.



## Construction

- 6.7.14 The presence and movement of construction machinery, vehicles, compounds and stockpiles would be incongruous within the wider landscape character. Change would be perceptible from limited parts of the St.Colme GDL. Considering the separating distances involved, there would be little change to the aesthetic and perceptual aspects of this designated landscape. The characteristics of the GDL would remain unaffected, with minimal change perceived in the wider landscape context of the developed western extent of Dalgety Bay, and busy shipping lane of the Firth of Forth
- 6.7.15 All construction effects would be temporary. Taking these matters into account the magnitude of change is assessed as low, resulting in a minor adverse level of effect which is not significant.

## Operation

- 6.7.16 During operation (post construction), the Development would introduce features already characteristic to the wider landscape. While greater in scale and extent than existing features, this would result in a very small change on the aesthetic and perceptual aspects of the GDL. Overall, this would result in minimal change on this designated landscape.
- 6.7.17 As a result the magnitude of effect would be negligible, resulting in a negligible level of effect, which is not significant.

## **Landscape Character - C.17 Other Intertidal Shores**

- 6.7.18 The LCT C.17 is considered to have medium value in the context of this assessment.
- 6.7.19 Part of the Development is located within this LCT and would therefore have both direct (physical) and indirect effects.
- 6.7.20 This LCT covers much of the Fife coastline and therefore contains, or is influenced by, a variety of natural and built form. Within the Study Area this LCT includes the existing rock armour and slipway to the west of the Bay; while to the east the coastline of the Bay is defined more by natural features.
- 6.7.21 This LCT already contains features similar to those proposed and, therefore, is considered to have a low susceptibility to change to the type of development proposed.
- 6.7.22 This is not a designated landscape. While containing a number of the natural characteristics of this LCT, modern development such as existing coastal protection works and slipway, and nearby urban areas, influence the character of the landscape locally. Overall it is assessed as having a low sensitivity.

## Construction

- 6.7.23 Construction activities would include the presence of personnel and machinery needed to clear the land, remove existing rock armour, jetty and slipway, and that used in the construction process. Temporary work compounds and supporting infrastructure would also be introduced and include fencing associated with a construction area, and construction signage. Deliveries of material by barge and boat will be moored within this LCT.
- 6.7.24 Construction activity would be temporary, and expected to result in an intensive physical change across the Site; a small extent in the context of the wider LCT. The presence of construction activity would be incongruous with the character of LCT C.17. The presence of large watercraft would be less contrasting on the basis of existing commercial shipping activity on the Firth of Forth. Indirect change would arise as a result of the influence of construction activity on aesthetic and perceptual aspects of the landscape character which would, nevertheless, remain appreciable. On balance, the magnitude of effect would be low.
- 6.7.25 All construction effects would be temporary. Taking these matters into account the level of effect on C.17 Other intertidal Shores would be minor adverse, which is not significant.

## Operation

- 6.7.26 During operation (post construction), new rock armour and the new slipway and jetty would result in a small increase in the scale and extent of the existing coastal protection and slipway

at Dalgety Bay. The Development would introduce features already characteristic of the existing landscape character, albeit larger in scale and extent. This would result in little change to an appreciation of the landscape character.

- 6.7.27 Taking these matters into account the magnitude of effect would be negligible, resulting in a negligible level of effect, which is not significant.

### **Landscape Character – C.19 Firth of Forth and Tay**

- 6.7.28 The LCT C.19 Firth of Forth and Tay is considered to have medium value in the context of this assessment.
- 6.7.29 The Development is partly within this LCT, and would therefore have both direct (physical) and indirect effects.
- 6.7.30 This LCT covers the expanse of the Firth of Forth to the south of the Study Area; from the coastline to the north and north-west, to the open body of water that stretches to the north Lothian coast to the south. This LCT has a strong maritime influence. Within the Study Area this LCT also includes the developed coastline to the west of Dalgety Bay, existing sea defences and man-made piers and extends as far as the Braefoot Oil Terminal. Taking these matters into account this LCT is considered to have a low susceptibility to change to the type of development proposed.
- 6.7.31 This is not a designated landscape. While it is reflective of a number of the natural characteristics of this LCT, development influences the landscape character locally along the coastline. Overall it is assessed as having a low sensitivity.

### **Construction**

- 6.7.32 Construction activities would include the presence of personnel and machinery needed to clear the land, remove existing rock armour and slipway, and used in the construction process. Temporary work compounds and supporting infrastructure would also be introduced and include fencing associated with a construction area, and construction signage.
- 6.7.33 Construction activity would be temporary and expected to result in an intensive physical change across the Site; a small extent in the context of the wider LCT. The presence of construction activity would be incongruous with the character of LCT C.19. Indirect change would arise in the wider context as a result of the influence of construction activity on aesthetic and perceptual aspects of the landscape character which would, nevertheless, remain appreciable. On balance, the magnitude of effect would be low.
- 6.7.34 All construction effects would be temporary. Taking these matters into account the level of effect on C.19 Firth of Forth and Tay would be minor adverse, which is not significant.

### **Operation**

- 6.7.35 During operation (post construction), the new rock armour and concrete headwall would result in a small increase in the scale and extent of the existing coastal protection at Dalgety Bay. The Development would introduce features already characteristic of the existing landscape character. As a result, would be little change to an appreciation of LCT C.19.
- 6.7.36 Taking these matters into account the magnitude of effect would be negligible, resulting in a negligible level of effect, which is not significant.

### **Landscape Character – LCU CH74: Aberdour Hills**

- 6.7.37 Principally as a result of the presence of the St. Colme GDL and Cullaloe Hills and Coast LLA, LCU CH74 is considered to have Medium value in the context of this assessment.
- 6.7.38 The Development lies approximately 0.67km to the south-west of this character unit and as such all effects would be indirect.
- 6.7.39 As noted in the 2009 LLDR, this LCU is influenced by the urban edge of Aberdour, the oil terminal at Braefoot, A921 and railway line. While this character unit contains some important natural and cultural features, the LLDR states that pressures from built developments and industry disturb the naturalness of the landscape. On balance, it is considered that this LCU has a low susceptibility to change to the type of development proposed.

6.7.40 This character unit is assessed as having medium sensitivity.

## Construction

- 6.7.41 The presence and movement of construction machinery, vehicles, compounds and stockpiles would be incongruous within the wider landscape character. Change would be perceptible from parts of the LCU; however, considering the separating distances involved, there would be little change to the aesthetic and perceptual aspects of this landscape. The characteristics of LCU CH74 would remain unaffected, with minimal change perceived in the wider landscape context of the developed western extent of Dalgety Bay and busy shipping lane of the Firth of Forth.
- 6.7.42 All construction effects would be temporary. Taking these matters into account the magnitude of change is assessed as low, resulting in a minor adverse level of effect which is not significant.

## Operation

- 6.7.43 During operation, new rock armour, headwall and the new slipway would result in a small increase in the scale and extent of the existing coastal protection and slipway at Dalgety Bay. The Development would introduce features already characteristic of the wider landscape, with minimal change perceived in the wider landscape context of the developed western extent of Dalgety Bay, and busy shipping lane of the Firth of Forth. There would be a very small indirect change to the landscape character of CH74: Aberdour Hills which would, nevertheless, be perceptible.
- 6.7.44 As a result the magnitude of effect would be negligible, resulting in a negligible level of effect, which is not significant.

## 6.8 Assessment of Visual Amenity

- 6.8.1 This section sets out the assessment of the likely visual effects that would occur during the construction and operational phase of the Development.
- 6.8.2 Table 6.4 to 6.9 below contain an assessment of the representative viewpoint locations identified in Table 6.3. The main elements likely to result in visual effects during construction and operation are outlined above in Sections 6.6.2 and 6.6.3. This section should be read in conjunction with ES Volume 2 - Figures 6.4 to 6.9.

Table 6.4 - Viewpoint 1 - Dalgety Bay Sailing Club (ES Volume 2 – Figure 6.4)

Baseline Conditions			
Grid ref: 316477 683087	Direction of view: East	Distance to site: 0m	Viewpoint Elevation: 8.0m AOD
Receptor: Recreational			
Value: The value of this view is considered to be medium.			

Assessment of Effects
<p><u>Sensitivity to Change</u></p> <p>This viewpoint is representative of recreational receptors for whom the view is generally considered important. Receptors are likely to be at this location in part for an enjoyment of the available view, and therefore the susceptibility to change is considered to be medium. The sensitivity of the view is considered to be medium.</p>
<p><u>Construction Effects</u></p> <p>During the construction period access to the headland and slipway would be partially restricted. From this location and those nearby there would be direct close range views of construction machinery associated with the phased removal of the existing slipway and jetty and construction of the new headwall, slipway and jetty. Re-profiling of the existing slope at the landward side, turning over of the foreshore and stockpile of rock armour material at low tide will be seen across a large extent of the view.</p> <p>In terms of offshore activity, the delivery of revetment material and / or concrete by barge and boat would be prominent when large watercraft would also appear in the view.</p> <p>Construction activity is temporary and reversible, but would occupy a large part of the view in close proximity to this location; resulting in a high magnitude of effect. The level of effect on receptors at this location during construction would be major adverse, which is significant.</p>
<p><u>Operational Effects</u></p> <p>During operation, the new slipway would be visible in the foreground of the view, extending across the majority of the horizontal field of view; although below the height of the landward coast.</p> <p>The Development would be prominent by virtue of its scale and proximity but would not fundamentally change the characteristics of the view. Considering the existing composition, the proposed changes would not detract from, or introduce new features into the view.</p> <p>The change would be permanent and irreversible. The magnitude of effect would be low, resulting in a minor adverse level of effect, which is not significant.</p>

Table 6.5 - Viewpoint 2 - East of Donibristle Bay (ES Volume 2 – Figure 6.5)

Baseline Conditions			
Grid ref: 316205 682832	Direction of View: North east	Distance to site: 270m	Viewpoint Elevation: 2.7m AOD
Receptor: Recreational			
Value: The value of this view is considered to be medium.			

Assessment of Effects
<p><u>Sensitivity to Change</u></p> <p>This view is representative of recreational receptors for whom the view is generally considered important. Receptors are likely to be at this location in part for an enjoyment of the available view, and therefore the susceptibility to change is considered to be medium. The sensitivity of the view is considered to be medium.</p>
<p><u>Construction Effects</u></p> <p>During the construction period there would be direct medium range views of the contractors working area, and temporary storage of existing revetment material in a relatively prominent location along the coastline. Large scale machinery used in construction activities associated with the turning over of the foreshore and movement of material would be openly visible and noticeable, but seen within a small extent of the available views.</p> <p>In terms of offshore activity, delivery of materials by barge and boat would be noticeable and extend views of construction activity to include both onshore and offshore parts of the view. However, this change would be seen in the context of the Dalgety Bay Sailing Club and busy commercial shipping channel of the Firth of Forth.</p> <p>Construction activity is temporary and reversible, and would occupy a small extent of the view seen at medium range from this location. While noticeable, the changes would not become key features of the view, resulting in a low magnitude of effect. The level of effect would be minor adverse, which is not significant.</p>
<p><u>Operational Effects</u></p> <p>During operation at low tide (MLWS) there would be views of the new rock armour blanket along the headland. However, the new armour stone would only result in a small extension to the existing rock armour visible from this location, and perceived as part of a naturally rocky part of the coastline.</p> <p>The change would be permanent and irreversible. Overall, the magnitude of effect would be negligible, resulting in a negligible level of effect, which is not significant.</p>

Table 6.6 - Viewpoint 3 - Fife Coastal Path, Crow Hill Wood east of 'Sealstrand' (ES Volume 2 – Figure 6.6)

Baseline Conditions			
Grid ref: 316479 683693	Direction of View: South west	Distance to site: 320m	Viewpoint Elevation: 5.5m AOD
Receptor: Residential / Recreational			
Value: The value of this view is considered to be medium.			

Assessment of Effects
<p><u>Sensitivity to Change</u></p> <p>This view is representative of residential and recreational receptors for whom the view is generally considered important, but may not be the primary focus. Therefore the susceptibility to change is considered to be Medium. The sensitivity of the view is considered to be medium.</p>
<p><u>Construction Effects</u></p> <p>During the construction period there would be direct medium range views of the temporary storage of existing revetment material. Movement of machinery involved in the removal of material from the landward strip at Boat Park North and South would be noticeable. Views of the construction compound would be partially restricted by intervening planting and a 1.8m high temporary fence. At low tide (MLWS) there would be views of large scale construction machinery on the foreshore, and stockpile of new rock armour material. In terms of offshore activity, delivery of new armour stone by barge and its temporary storage on the beach would be noticeable in the view, albeit in a portion of the view looking towards the busy commercial shipping channel of the Firth of Forth.</p> <p>Construction activity would occupy a relatively small part of the view from this location although in a relatively prominent location on the headland. However, the appearance of construction activity would not fundamentally alter the characteristics of the view; resulting in a medium magnitude of effect.</p> <p>Overall, taking the relative proximity, temporary and reversible nature of the change, the level effect on receptors at this location during construction would be moderate adverse, which is significant</p>
<p><u>Operational Effects</u></p> <p>During operation at low tide (MLWS) there would be views of the rock armour blanket along the coastline to the headland. The scale and extent of rock armour would be greater than the existing sea defences within the view. The Development would introduce features already existing in the view and as a result would not therefore change its characteristics. While these features would be greater in extent and scale than those they replace, when considering the separating distance and wide view available these would occupy a small extent of the view and would not be perceived as prominent features.</p> <p>Overall, the magnitude of effect would be low, resulting in a minor adverse level of effect, which is not significant.</p>

Table 6.7 - Viewpoint 4 - 'Downing Point' west of Donibristle Bay (ES Volume 2 – Figure 6.7)

Baseline Conditions			
Grid ref: 315961 682457	Direction of View: North east	Distance to site: 715m	Viewpoint Elevation: 4.9m AOD
Receptor: Recreational			



Value: The value of this view is considered to be medium.

## Assessment of Effects

### Sensitivity to Change

This view is representative of recreational receptors for whom the view is generally considered important, but may not be the primary focus. Therefore the susceptibility to change is considered to be medium.

The sensitivity of the view is considered to be medium.

### Construction Effects

During the construction period there would be direct long range views of the contractors working area, and temporary storage of existing revetment material. Large scale machinery used in construction activities associated with the turning over of the foreshore and movement / stockpiling of material would be noticeable, but seen within a very small extent of the available view.

In terms of offshore activity, delivery of materials by barge and boat would be noticeable and extend views of construction activity to include both onshore and offshore parts of the view. However, this change would be seen in the context of the Dalgety Bay Sailing Club and a busy commercial shipping channel of the Firth of Forth.

Construction activity is temporary and reversible, and would occupy a very small extent of the view seen at long range from this location. While noticeable, the changes would not become key features of the view, and are sufficiently distant such that there would be a small change to the composition of the view; resulting in a low magnitude of effect. The level of effect would be minor adverse, which is not significant.

### Operational Effects

During operation at low tide (MLWS) there would be views of the new rock armour blanket along the headland. However, the new armour stone would only result in a small extension to the existing rock armour visible from this location, and perceived as part of a naturally rocky part of the coast.

The change would be permanent and irreversible. Overall, the magnitude of effect is considered to be negligible, resulting in a negligible level of effect, which is not significant.

Table 6.8 - Viewpoint 5 - 'Braefoot Point', east of Dalgety Bay (ES Volume 2 – Figure 6.8)

Baseline Conditions			
Grid ref: 317690 683105	Direction of View: West	Distance to site: 1.13km	Viewpoint Elevation: 4.0m AOD
Receptor: Recreational			

Value: The value of this view is considered to be Medium.

## Assessment of Effects

### Sensitivity to Change

This view is representative of recreational receptors for whom the view is generally considered important, but may not be the primary focus. Therefore the susceptibility to change is considered to be medium.

The sensitivity of the view is considered to be medium.

### Construction Effects

During the construction period there would be direct long range views of construction activity across the site: the contractors working area and construction compound, and temporary storage of existing revetment material on the Headland, Phased construction of the new slipway and jetty; and construction activities associated with the turning over of the foreshore and movement / stockpiling of material would all be noticeable, but seen within a small extent of the available view.

In terms of offshore activity, delivery of materials by barge and boat would be noticeable and extend views of construction activity to include both on and offshore parts of the view. However, this change would be seen in the context of the Dalgety Bay Sailing Club and the busy commercial shipping channel of the Firth of Forth.

Construction activity is temporary and reversible, and would occupy a small extent of the view seen at long range from this location. While noticeable the changes are sufficiently distant such that there would be a small change to the composition of the view and the changes would not become a key feature of the view; on balance resulting in a Negligible magnitude of effect. The level of effect would be Negligible, which is not significant.

### Operational Effects

During operation at low tide (MLWS) there would be views of new rock armour blanket and concrete slipway along the distant shoreline. The Development would appear slightly greater in extent and scale than the existing slipway and rock armour. Since these features are already present in existing views the Development would not become a key feature or change the composition of the view. The Development and would occupy a small portion of the available panorama seen at long range.

The change would be permanent and irreversible. Overall, the magnitude of effect during operation would be negligible, resulting in a negligible level of effect, which is not significant.

Table 6.9 - Viewpoint 6 - Core Path (Fife Council ref.724), north of Dalgety Bay (ES Volume 2 – Figure 6.9)

Baseline Conditions			
Grid ref: 317781 683821	Direction of View: South west	Distance to site: 1.36km	Viewpoint Elevation: 31.6m AOD

Receptor: Recreational
Value: The value of this view is considered to be medium.
<b>Assessment of Effects</b>
<p><u>Sensitivity to Change</u></p> <p>This view is representative of recreational receptors for whom the view is generally considered important, but may not be the primary focus. Therefore the susceptibility to change is considered to be medium.</p> <p>The sensitivity of the view is considered to be medium.</p>
<p><u>Construction Effects</u></p> <p>From this distant, elevated location there would be direct, long range views of the construction compound and construction activity across the Site. However, this change would occupy a small extent of the view from this location, and seen in the context of the developed part of Dalgety Bay and the busy commercial shipping channel of the Firth of Forth.</p> <p>Construction activity is temporary and reversible. While noticeable, the viewpoint is sufficiently distant such that there would be a small change to the composition of the view, which would not be perceived as key features in the panorama; resulting in a negligible magnitude of effect. Overall, the level of effect would be negligible, which is not significant.</p>
<p><u>Operational Effects</u></p> <p>During operation the Development would appear slightly greater in extent and scale than the existing slipway and rock armour within the view; however, since these features are already seen in existing views, the changes would not alter the composition of the view, or become new features. The Development would occupy a small portion of the available panorama seen at long range.</p> <p>Overall, the magnitude of effect during operation would be negligible, resulting in a negligible level of effect, which is not significant.</p>

## 6.9 Mitigation and Monitoring

- 6.9.1 Mitigation measures are undertaken as a response to anticipated adverse effects and can be described as primary or secondary.
- 6.9.2 Primary mitigation measures are steps taken during the design phase of the Development to help minimise potential effects, based on key sensitivities, constraints and opportunities identified through baseline study and appraisal. Secondary mitigation measures are those that seek to further reduce potential effects that could not be designed out and have been informed by the detailed assessments.
- 6.9.3 Proposed mitigation measures associated with the Development are embedded in the design. These have not been informed by the LVIA. No secondary mitigation measures are proposed.
- 6.9.4 Two significant visual effects during construction have been identified: a major adverse effect at Viewpoint 1: Dalgety Bay Sailing Club (see Table 6.4); and a moderate adverse effect at Viewpoint 3: Fife Coastal Path, Crow Hill Wood east of 'Sealstrand' (see Table 6.6). Taking into account the nature of the views described in section 6.5, no mitigation measures will be

possible or appropriate. Although unavoidable, these effects would be temporary and reversible.

## 6.10 Residual Effects

- 6.10.1 Residual effects are those that remain as changes to the landscape and visual amenity in the long term.
- 6.10.2 Due to the limited scope for landscape and visual mitigation measures it is considered that residual effects would be the same as those predicted to occur during the operational (post construction) phase of the Development described above. A summary table of effects is provided in ES Volume 1 – Chapter 13.

## 7. WATER ENVIRONMENT

### 7.1 Introduction

- 7.1.1 This Chapter of the ES assesses the potential environmental impacts on the water environment and takes into account surface water (coastal), flood risk, drainage infrastructure, and groundwater. Reference is also made to the Coastal Processes Report (February 2017) which has been submitted in support of the associated planning and marine licence applications.
- 7.1.2 A desktop study of the hydrological and hydrogeological features associated with the Development has been undertaken and a site inspection was carried out by an AECOM hydrologist.
- 7.1.3 The Study Area for the purposes of this Chapter is formed by the coastal frontage of Dalgety Bay, in the vicinity of the Dalgety Bay Sailing Club (DBSC). Ground elevations at the Study Area are below 5 metres above ordinance datum (mAOD) and much of the Development will be carried out between Mean High Water Springs (MHWS) and Mean Low Water Springs (MLWS).
- 7.1.4 No work is planned to take place within or immediately adjacent to any watercourses, however, there a number of other receptors which fall within the Study Area. The Study Area has been defined through the scoping process, by review of mapping and by a site visit to establish the construction access routes, working areas and the potential for hydrological connection to the work areas. The significant water features included in this assessment are therefore assessed to be:
- The Firth of Forth;
  - Burntisland Groundwater Body; and,
  - Drainage infrastructure, including Scottish Water drainage assets.

### 7.2 Legislative and Planning Policy Context

#### Overarching Legislation

- 7.2.1 Two key pieces of legislation, namely; the EU Directive 2000/60/EC Water Framework Directive (WFD) transposed into the Water Environment and Water Services Act (Scotland) 2003 and The Water Environment (Controlled Activities) (Scotland) Regulations 2011 regulate the water environment aspects for a development of this nature. This legislation aims to protect and enhance the status of aquatic ecosystems, prevent further deterioration to such ecosystems, promote sustainable use of available water resources, and contribute to the mitigation of floods and droughts.
- 7.2.2 A review of the Scottish Natural Heritage (SNH) Sitelink website identified a number of designations for surface and groundwater features, and these have been noted in the establishment of the baseline conditions and taken into account in the assessment of importance. Listed below is all relevant legislation for the assessment of the water environment in relation to the Development:
- EU Directive 2000/60/EC (Water Framework Directive (WFD)), transposed into the Water Environment and Water Services Act (Scotland) 2003 ('**the WEWS Act**');
  - Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR) in respect of discharges to surface or groundwater ('**the CAR Regulations**'); and,
  - Flood Risk Management (Scotland) Act 2009 and the Flood Risk Management (Flood Protection Schemes, Potentially Vulnerable Areas and Local Plan Districts) (Scotland) Regulations 2010 ('**the Flood Risk Management Act**').

## National Policy and Guidance

7.2.3 The following national policies and guidance have informed this assessment:

- Scottish Planning Policy (SPP) 2014;
- PAN 51 - Planning, Environmental Protection and Regulation (Revised 2006);
- PAN 61 - Planning and Sustainable Urban Drainage Systems;
- PAN 79 - Water and Drainage;
- SEPA Policy No. 19 - Groundwater Protection Policy for Scotland;
- SEPA Interim Position Statement on Planning and Flooding;
- SEPA Engineering Activities in The Water Environment: Good practice guide – River Crossings;
- SEPA Land Use Planning System SEPA Guidance Note 31, 'Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems';
- SEPA Technical Flood Risk Guidance for Stakeholders;
- SEPA Pollution Prevention Guidelines have been revoked in order to undergo revision. However, in Scotland they are to be used as a source of information on good practice and are therefore listed below:
  - PPG 1 General Guide to the Prevention of Pollution, 2013;
  - PPG 2 Above Ground Oil Storage Tanks, 2011;
  - PPG 3 Use and design of oil separators in surface water drainage systems, 2006;
  - PPG 4 Treatment and disposal of sewage where no foul sewer is available, 2006;
  - PPG 5 Works and maintenance in or near water, 2007;
  - PPG 6 Working at Construction and Demolition Sites, 2012;
  - PPG 7 Safe storage - The safe operation of refuelling facilities, 2011;
  - PPG 8 Safe Storage and Disposal of Used Oil, 2004;
  - PPG 21 Polluting Incident Response Planning, 2009; and,
  - PPG 22 Dealing with spills, 2011.
- Scottish Natural Heritage (SNH), A Handbook on Environmental Impact Assessment;
- CIRIA, C532 Control of water pollution from construction sites;
- CIRIA, C648 Guidance on Controlling water pollution from linear construction projects; and,
- CIRIA, C741 Environmental good practice on site guide (fourth edition).

## UK Marine Policy Statement (2011)

7.2.4 The UK Marine Policy Statement is the framework for preparing Marine Plans and taking decisions affecting the marine environment. The overarching objective related to protection of the water environment is to “*ensure a sustainable marine environment which promotes healthy, functioning marine ecosystems and protects marine habitats, species and our heritage assets*” (p.3).



## Scotland's National Marine Plan (2015)

- 7.2.5 Scotland's National Marine Plan exists under the requirements of the both the Marine (Scotland) Act 2010 (which governs Scotland's inshore waters) and by the Marine and Coastal Access Act 2009 (which governs Scotland's offshore waters).
- 7.2.6 The plan contains both general and topic specific policies, those policies that are of relevance to the Development include:
- Policy GEN 8 Coastal process and flooding; and,
  - Policy GEN 12 Water quality and resource.

## Local Policy

### Dunfermline & West Fife Local Plan (2012)

- 7.2.7 The Dunfermline and West Fife Local Plan is one of three local plans that cover the Fife local authority area and provides direction with regard to the future development of the Dunfermline and West Fife geographical area. The policies outlined below are relevant to the Development in terms of the water environment:

#### **Policy E3: Development Quality – Environmental Impact**

*"New development must make a positive contribution to the quality of its immediate environment both in terms of its environmental impact and the quality of place it will create. This will be achieved through the application of the following principles which the Council will take into account in assessing planning applications. New development is required to:*

- (a) secure the most practicable energy efficiency benefits by use of layout, siting, orientation, building design features, and other energy efficient measures;*
- (b) demonstrate a commitment to landscape protection and improvement taking into account linkages to existing landscape features and the need to provide biodiversity enhancement;*
- (c) include measures to promote, enhance, and add to biodiversity;*
- (d) address foul and surface water drainage issues;*
- (e) include water and energy conservation measures;*
- (f) incorporate appropriate waste recycling, segregation, and collection facilities; and,*
- (g) minimise waste by design and during construction.*

*Developers will also be required to have regard to relevant supplementary planning guidance produced in this regard".*

#### **Policy E20: Water Environment.**

*"Development will not be permitted where it would have an adverse affect, either directly or indirectly, on the ecological status of waterbodies or the quality of groundwater".*

- 7.2.8 A new Local Development Plan (LDP), covering the entire Fife area is due to be adopted in early 2017 and a Proposed Plan was published for consultation in October 2014 and is therefore a material consideration. The Proposed LDP policy outlined below is considered relevant to the Development with respect to the water environment:

#### **Policy 12: Flooding and the Water Environment.**

*"Development proposals will only be supported where they can demonstrate that they will not, individually or cumulatively:*

- *Increase flooding or flood risk from all sources (including surface water drainage measures) on the site or elsewhere;*
- *Reduce the water conveyance and storage capacity of a functional flood plain;*

- Detrimentially impact on water quality and the water environment, including its natural characteristics, river engineering works, or recreational use;
- Detrimentially impact on future options for flood management;
- Require new defences against coastal erosion or coastal flooding; and,
- Increase coastal erosion on the site or elsewhere”.

## Fife Shoreline Management Plan 2 (SMP2) (2011)

7.2.9 Dalgety Bay is covered under Policy Unit 13 St David's Bay to Braefoot Point of the SMP2, which advises as follows:

*“The coastal frontage here comprises shingle with some areas of intertidal mudflat. The Policy Unit is dominated by the coastal town of Dalgety Bay. The modern town, which was built in 1962, takes its name from the main bay it adjoins in the eastern extent, but the town stretches over numerous coves and bays including Donibristle Bay and St David's Bay. The coastal defences comprise various rock and masonry revetments between natural rocky headlands. Hopeward Point forms the statutory limit of the Coast Protection Act 1949”.*

7.2.10 The overall policy is to ‘hold the line’ for currently defended sections as there is little coastal erosion or flooding that is of concern to the properties and historic buildings of Dalgety or further along the coast to the east. Holding the line for existing defences would prevent “the heavily built up areas from being inundated. The natural protection within the bay will maintain the undefended sections. Flooding is predicted within the centre of the Policy Unit where there are currently no defences. This has minimal impact upon residences and is proposed to be allowed to flood allowing for some gain in inter-tidal habitat within this area. Dalgety Bay has a history of uncovering small radioactive particles. SEPA regularly monitor the area and are in discussions with the MOD in removal of further buried small radioactive particles to minimise any risk to the local community. SEPA are also in the process of developing a long term remediation plan for the area, provision of which will be incorporated into the adopted policy for the Policy Unit”. (p.84)

## 7.3 Assessment Methodology

7.3.1 The assessment of potential effects on the water environment has been carried out with reference to the guidance and techniques presented within the ‘Design Manual for Roads and Bridges’ (DMRB), Volume 11, Section 3, Part 10 ‘Road Drainage and the Water Environment’.

### Identifying Baseline Conditions

7.3.2 Water resources features in the vicinity of the Development were identified initially from Ordnance Survey maps, a desktop review of previous reports and other background information, and data collected from a site visit. This initial review was supplemented by consultations with statutory organisations and further consideration of available data. The Study Area assessed includes the Fife coastline adjacent to the Site, the shallow and deep aquifers underlying the Site and drainage system outfalls in the vicinity of the Development.

### Flooding

7.3.3 Data from various sources regarding flooding has been reviewed, including:

- SEPA online flood maps;
- Fife SMP2;
- AECOM's ‘Wave and Overtopping Study, Dalgety Bay Remediation Works’, (May 2016);
- AMEC's ‘Dalgety Bay Coastal Processes Review’ (March 2013); and,
- Correspondence with Fife Council Coastal Team (see ES Volume 3 - Appendix 7.1).

## Coastal Processes

- 7.3.4 Information regarding the coastal processes affecting the study area was obtained from these sources:
- AECOM's 'Wave and Overtopping Study, Dalgety Bay Remediation Works' (May 2016);
  - AMEC's 'Dalgety Bay Coastal Processes Review' (March 2013);
  - Fife SMP2 and Appendix C1 Coastal Processes and Appendix C5 (Supporting Information) (2011); and,
  - AECOM's 'Coastal Processes Report', (February 2017).

## Water Quality Data

- 7.3.5 SEPA has developed a classification system in line with the requirements of the WFD, which is applied to all significant waterbodies in Scotland and includes consideration of water quality. This system is based on an assessment of key chemical and ecological indicators. The classification system categorises waterbodies into the following bands: High, Good, Moderate, Poor, and Bad. A full description of this system is available on the SEPA website (<http://www.sepa.org.uk/environment/water/classification/>).

## Groundwater

- 7.3.6 Maps for the characterisation of groundwater for the WFD were referred to as part of the assessment of groundwater status. These included the British Geological Survey (BGS) Groundwater Vulnerability Map, the Superficial Aquifer Map, and the Bedrock Aquifer Map. Groundwater data published by SEPA showing the current classification of the groundwater in the study area were also utilised for this assessment.

## Drainage Network Structures

- 7.3.7 Information regarding the drainage network and associated outfall structures in the vicinity of the Development was gathered from the AMEC Final Factual Investigation Report (2013), Scottish Water model and plans, and during a site walkover.

## Receptor Importance

- 7.3.8 The importance of a water environment feature is a synthesis of its environmental importance, socio-economic value, recreational value, and also its resilience to cope with change. The importance of water environment features was evaluated using the guidance provided in DMRB Volume 11, Section 3, Part 10, Tables A4.1 'Water Features: Attributes and Indicators of Quality', A4.3 'Estimating the Importance of Water Environment Attributes', as well as additional criteria based on the professional experience of the assessment team. From this guidance Table 7.1 below has been compiled to show the objective tests, which have been used in this Chapter to assess importance.

Table 7.1 - Characteristics Defining Receptor Importance (broadly in line with DMRB Guidance)

Importance of Resource/Receptor	Characteristics
High	Very high importance and rarity on an international scale and with very limited potential for substitution. Examples include: <b>Surface Water:</b> EC Designated Salmonid/Cyprinid Fishery WFD

Importance of Resource/Receptor	Characteristics
	<p>Class 'High'. Site protected/designated under EC or UK habitat legislation (SAC, SPA, SSSI, WPZ, Ramsar site, salmonid water)/ Species protected by EC legislation.</p> <p><b>Groundwater:</b> Principal aquifer providing a regionally important resource or supporting site protected under EC and UK habitat legislation.</p> <p><b>Flood Risk:</b> Floodplain or defence protecting more than 100 residential properties from flooding.</p> <p><b>Drainage Infrastructure:</b> Essential infrastructure.</p>
Medium	<p>High importance and rarity, national scale, and limited potential for substitution. Examples include: <b>Surface Water:</b> WFD Class 'Good'. Major Cyprinid Fishery. Species protected under EC or UK habitat legislation.</p> <p><b>Groundwater:</b> Principal aquifer providing locally important resource or supporting river ecosystem.</p> <p><b>Flood Risk:</b> Floodplain or defence protecting between 1 and 100 residential properties or industrial premises from flooding.</p>
Low	<p>High or medium importance and rarity, regional scale, limited potential for substitution. Examples include:</p> <p><b>Surface Water:</b> WFD Class 'Moderate'.</p> <p><b>Groundwater:</b> Aquifer providing water for agricultural or industrial use with limited connection to surface water.</p> <p><b>Flood Risk:</b> Floodplain or defence protecting 10 or fewer industrial properties from flooding.</p>
Very Low	<p>Low or medium importance and rarity, local scale. Examples include:</p> <p><b>Surface Water:</b> WFD Class 'Poor'.</p> <p><b>Groundwater:</b> Unproductive strata.</p> <p><b>Flood Risk:</b> Floodplain with limited constraints and a low probability of flooding of residential and industrial properties.</p>

7.3.9 The importance of receptors has been scaled from very low, to low, medium and high. To ensure the transparency of this assessment, the key environmental, socio-economic, recreational, and resilience indicators used to derive the importance of each water body are identified in Section 7.4 'Baseline Conditions'.

### Level of Impacts

7.3.10 Impacts have been assessed firstly in terms of the importance of the receptor and secondly in terms of magnitude of impact as shown in Table 7.2 (e.g. High, Medium, Low, and Very Low).

Table 7.2 - Characteristics Defining Level of Impacts (broadly in line with DMRB Guidance)

Level of Impact	Characteristics
High	<p>Results in loss of attribute and/ or quality and integrity of the attribute. Examples may include:</p> <p><b>Surface Water:</b> Loss or extensive change to a fishery, loss or extensive change to a designated Nature Conservation Site</p> <p><b>Groundwater:</b> Loss of, or extensive change to, an aquifer. Potential high risk of pollution to groundwater from routine runoff. Loss of, or extensive change to, groundwater supported designated wetlands.</p> <p><b>Flood Risk:</b> Increase in peak flood level (1% annual probability) &gt;100 mm.</p>
Medium	<p>Results in effect on integrity of attribute, or loss of part of attribute. Examples may include:</p> <p><b>Surface Water:</b> Partial loss in productivity of a fishery.</p> <p><b>Groundwater:</b> Partial loss or change to an aquifer. Potential medium risk of pollution to groundwater from routine runoff. Partial loss of the integrity of groundwater supported designated wetlands.</p> <p><b>Flood Risk:</b> Increase in peak flood level (1% annual probability) &gt;50 mm</p>
Low	<p>Results in some measurable change in attributes quality or vulnerability. Examples may include:</p> <p><b>Surface Water:</b> No impact on structures</p> <p><b>Groundwater:</b> Potential low risk of pollution to groundwater from routine runoff. Minor effects on groundwater supported wetlands.</p> <p><b>Flood Risk:</b> Increase in peak flood level (1% annual probability) &gt;10mm.</p>
Very Low	<p>Effects which are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error, these effects are unlikely to influence decision making, irrespective of other effects.</p>

## Significance of Effects

Table 7.3 below presents a matrix indicating how effects are defined by considering the magnitude of effect and importance of receptor. Shaded areas represent 'significant' effects. Professional judgement has been used to apply the criteria to assess receptor importance, and magnitude of impact as each situation is unique.

Table 7.3 - Classification of Effects

Value of Receptor	Magnitude of Impact			
	High	Medium	Low	Very Low
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Very Low	Minor	Negligible	Negligible	Negligible

## Assessment Years

- 7.3.11 The baseline established for this assessment has been assumed to remain constant up to the time when the Development is completed. This is because there is no planned improvement to the Firth of Forth waterbody or Burntisland groundwater body over the River Basin Management Planning (RBMP) cycles to 2021 (based on 2014 data from SEPA Water Environment Hub).

## 7.4 Baseline Conditions

- 7.4.1 Waterbodies and watercourses within the Study Area are shown on ES Volume 2 – Figure 7.1, 'Water Receptors'. Details for each waterbody were gained from desktop studies and a site visit undertaken on 27<sup>th</sup> October 2016. The responses received as part of the scoping process, relevant to the water environment are provided in Section 7.4.2 below. The baseline conditions of the water environment receptors relevant to the assessment are outlined in the following sections. Table 7.10 provides a summary of this baseline information and the importance of each receptor.

## Scoping Responses

- 7.4.2 A Scoping Report was issued for comment in July 2016 and comments have since been received. The comments relevant to the water environment are outlined in Table 7.4 and Table 7.5 below and specific responses provided.

Table 7.4 - Response to Scottish Environment Protection Agency (SEPA) Scoping Comments (SEPA Letter PCS/148094, dated 10 August 2016)

SEPA Comment	AECOM Response
Water Framework Directive and River Basin Management Planning: ES should identify if the impacts of the proposal are likely to lead to deterioration of the marine environment or present opportunities for improving the marine environment.	Addressed within this Chapter
To meet RBMP objectives, consider restoration, coastal realignment, soft engineering or the incorporation of naturalistic features in the design of the shoreline works, or planting with salt tolerant species. Guidance includes: <ul style="list-style-type: none"> <li>WFD Mitigation Measures Manual.</li> <li>Estuary Edges: Ecological Design Guidance.</li> </ul>	Addressed within this Chapter.



SEPA Comment	AECOM Response
ES should identify impacts of flood risk, including with regards potential release of contaminants from the compound and due to modifications to flood defences and detail appropriate mitigation. Contact to be made with local authority's flood prevention team.	Addressed within this Chapter.
A regular inspection regime should be put in place to monitor any changes and carry out any maintenance to the rock armouring as required. This should also take place after storm events.	<p>Upon completion, the rock armour will be maintained as appropriate by Fife Council in line with the recommendations of the Management Strategy.</p> <p>As outlined in the Memorandum of Agreement (MoA) which was signed in April 2015 by DIO, Fife Council, and SEPA; SEPA will be responsible for undertaking a 24 month 'Validation Monitoring Period' to ensure the finalised Development meets the requirement of delivering the Management Strategy. Beyond this period SEPA will remain responsible for post completion monitoring in line with their regulatory role, for the purpose of public health re-assurance.</p>
Additional site investigation will provide relevant information with regards groundwater.	<p>Additional ground investigations are programmed to be carried out in early 2017. The primary purpose of the ground investigation works is to assess the engineering properties within the underlying soils to inform future construction works. However, a number of sub-objectives have also been identified, including an assessment of non-radiological contamination on the Site and the identification of the full depth of known radium contamination across areas of the Site where the Management Strategy requires foreshore turnover.</p>

Table 7.5 - Response to Scottish Water (SW) Scoping Comments (Letter from Scottish Water, dated 1st April 2016)

SW Comment	AECOM Response
There are two Scottish Water (SW) assets within/adjacent to the area shown on the 'Location	The location of all drainage infrastructure has been confirmed

SW Comment	AECOM Response
Plan of Development'. Recommend that the developer confirms the location of this (and other) infrastructure through obtaining detailed plans from SW Asset Plan Providers. Subsequent arrangements should be made to ensure that there is no conflict with these assets.	from a site visit and inspection undertaken of the SW network model received.

## Firth of Forth

### Setting

- 7.4.3 Dalgety Bay lies on the north side of the Firth of Forth, about 4km east of the Forth Rail Bridge at North Queensferry. On the south west corner of the bay, around the headland is the Dalgety Bay Sailing Club (DBSC), with its associated buildings, car park, boat park, slipways and jetty.
- 7.4.4 The area is used by birdwatchers, walkers and beach users for informal recreation activities. Recreational activities in the Firth of Forth include sailing, canoeing and boat trips.
- 7.4.5 The coastline around the DBSC is protected to some degree by informal rock armour and the policy outlined in the Fife SMP 2 is to 'Hold the Line' (see Section 7.2). There is thought to be minimal erosion in this area and it is anticipated that the Development will at least maintain the existing level of protection.
- 7.4.6 Around the headland, there is a collection of debris within the soil profile, including building materials, clinker, metal and glass fragments within an ash made ground layer (AMEC, GI Report, 2013). It is the presence of radiological particles within the debris that is of concern and the reason for the remediation works.

### WFD Status

- 7.4.7 The Study Area is immediately adjacent to the Firth of Forth, which is a coastal water body and currently has 'Good' overall WFD status (see Table 7.6). The Water Framework Directive (WFD) waterbody at Dalgety Bay is Kinghorn to Leith Docks (ID: 200041), which has an area of 167km<sup>2</sup>.

Table 7.6 - WFD Status Breakdown for the Kinghorn to Leith Docks Waterbody (SEPA Water Environment Hub Website)

Status	Current	2021	2027	Long Term
Overall	Good	Good	Good	Good
Physical condition	Good	Good	Good	Good
Freedom from invasive species	High	High	High	High
Water quality	Good	Good	Good	Good

### Designations

- 7.4.8 The Firth of Forth has a number of environmental designations, covering the Study Area, which includes a Site of Special Scientific Interest (SSSI), a Special Protection Area (SPA) and Ramsar wetland. The designations cover a range of aspects, including unique habitats and geology, bird species and invertebrates, along with archaeological and other landscape assets.

- 7.4.9 There is a number of bathing water protected areas within the Firth of Forth, which are of varying condition. Those bathing waters within the Kinghorn to Leith Docks waterbody are listed in Table 7.7 and show that the condition is generally good, with only one location not meeting the target objective. These are all multiple kilometres from the Study Area and are therefore not considered further.

Table 7.7 - Bathing Waters Protected Areas in the Firth of Forth (SEPA Water Environment Hub)

Location	Waterbody ID	Current Condition	Approx. Distance from Study Area
Aberdour (Harbour)	UKS7616086	Good	4km
Aberdour Silver Sands	UKS761602	Excellent	4.7km
Burntisland	UKS761608	Good	9.6km
Kinghorn (Pettycur)	UKS7616029	Good	11.9km
Kinghorn (Harbour Beach)	UKS7616072	Not at target objective	13.1km

## Flooding

- 7.4.10 The AECOM report 'Wave and Overtopping Study, Dalgety Bay remediation Works', (May 2016), assesses the near shore wave conditions for use in the design of the rock revetments within Dalgety Bay. The Report concludes that the land behind the existing informal coastal defence is at risk of flooding from still water levels and from wave overtopping effects. Correspondence with Fife Council Coastal Team has indicated that there are no official records of flooding in the Study Area (see ES Volume 3 – Appendix 7.1).
- 7.4.11 The highest extreme water level estimated from the Coastal Flood Boundary conditions dataset is 4.67 (10,000 year event). The water level for the 200 year event is 4.07mOD. Residential properties in the vicinity of the DBSC are located above 5mAOD (although exact threshold levels are not known).
- 7.4.12 SEPA's Flood Risk Management maps (<http://map.sepa.org.uk/floodmap/map.htm>) indicates that adjacent low lying areas are likely to be at risk of flooding from the sea and the DBSC Clubhouse may also be at risk in high, medium and low probability events.
- 7.4.13 The Fife SMP2 shows the predicted extent of coastal flooding in the area. Flooding is indicated through the Ross Plantation, extending to the back gardens of the residential properties located along The Wynd. Both the SEPA and SMP2 flood maps are indicative only, but on review of these and with due consideration of the scale and nature of the Development, it is deemed that there will be no increased risk of flooding as a result of the Development.

## Sediment Processes

- 7.4.14 AECOM's 'Wave and Overtopping Study' (2016), AMEC's 'Coastal Process Review' (2013) and AECOM's 'Coastal Processes Report' (2017), provide details of the nature of the coastline and processes acting on the coastal area in the vicinity of the DBSC. The Bay is sheltered from offshore waves by the Firth Estuary with local waves influenced more by wind conditions. The sediment regime in the Study Area is dominated by north-eastwards longshore drift of sediment.

## Assessment of Importance

- 7.4.15 The importance of the Firth of Forth has been derived based on the characteristics outlined in Table 7.1. It has several designations including SSSI, SPA, Ramsar and bathing waters. The coastline and estuary waters are important for recreation and tourism and the estuary is also used for commercial traffic. The water quality is 'Good', however, the waterbody is relatively large and dynamic which will encourage dilution and dispersion, so it is therefore not very vulnerable to localised water quality changes overall. The importance is assessed as being High due to its environmental, recreation and tourism related importance (see Table 7.10 for a more detailed evaluation).
- 7.4.16 Some low lying areas of the coast are susceptible to flooding, although the coastline is protected with informal rock armour for much of its length. Vacant coastal land which may already flood is assessed to have a Low importance but adjacent properties have a High importance.

## **Burntisland Groundwater Body**

### WFD Status

- 7.4.17 The Burntisland groundwater body underlies the town of Dalgety Bay and covers an overall area of 76km<sup>2</sup>. The waterbody has a WFD status of 'Good', which includes both quantity and quality (see Table 7.8). The aquifer is part of the Clackmannan group, which is moderately productive with generally low yield, dominated by fracture flow. The aquifer is affected by mining in some areas, including historic and current activities to the north of Dalgety Bay, although this does not have an impact on the WFD status.
- 7.4.18 Groundwater in the area is likely to have a low vulnerability to contamination (BGS map, User Guide: Groundwater Vulnerability (Scotland) GIS dataset, Version 2, OR/11/064, 2011).

Table 7.8 - WFD Status Breakdown for the Burntisland Groundwater Body (SEPA Water Environment Hub)

Status	Current	2021	2027	Long Term
Overall	Good	Good	Good	Good
Water flows and levels	Good	Good	Good	Good
Water quality	Good	Good	Good	Good

- 7.4.19 A Ground Investigation survey undertaken by AMEC in 2013, indicated that groundwater is present in the superficial deposits within the Study Area (marine beach and raised marine deposits), at shallow depth. Levels vary between 0.3mAOD and 6mAOD across the Study Area and are affected by tides (see AMEC GI Report, 2013, Appendix G). The groundwater body is likely to contribute to the baseflow of nearby watercourses and the Firth of Forth estuary to some degree, but in the locality of the Site, this will not be a significant factor due to the considerable distance to watercourses and the size of the estuary.




## Assessment of Importance



- 7.4.20 The importance of the Burntisland Groundwater body has been derived based on the characteristics outlined in **Error! Reference source not found.** It has 'Good' status for both quality and quantity and supports several small watercourses in the area and the Ramsar wetland at Dalgety Bay. There are no known groundwater flooding issues and the waterbody is indicated to have a low vulnerability to pollution. The importance is therefore assessed as being Low (see Table 7.10 for a more detailed evaluation).

## Scottish Water Assets

- 7.4.21 Several outfall pipes exist within the vicinity of the Development at Dalgety Bay and were located during the walkover survey (see ES Volume 2 - Figure 7.1 and Table 7.9). Four of these are functioning Scottish Water (SW) outfalls but are located outwith the immediate vicinity of the Development at a distance of approximately 140m (Outfall 1) and 230m (Outfall 4) from the nearest Site boundary. However, a pipeline runs from Outfall 4, to a location offshore which lies within the Management Strategy Areas (MSAs) identified through the Management Strategy.
- 7.4.22 There is one outfall pipe running from the DBSC Clubhouse which is confirmed to be a discharge from the sink within the building. One further outfall exists within the Study Area but it appears to be disused as there was no flow on the day of surveying and it was blocked with seaweed (Outfall 3 in the table below). A small part of the pipeline conveying the Combined Sewer Overflow (CSO) out to sea is located within the Site to the north of the Boat Park.

Table 7.9 - Drainage Discharges in the Study Area Vicinity

No.	Type	Notes	Within MSA	Coordinates	Image
1	SW surface water outfall	In working order and shown in model	X	316280: 682987	
2	Drainage from Sailing Club sink	Confirmed by Sailing Club	✓	316465: 683102	
3	Surface water outfall	Abandoned	✓	316441: 683223	

No.	Type	Notes	Within MSA	Coordinates	Image
4	SW foul water outfall	In working order and shown in model, 300mm diameter	X	316200: 683361	
5	SW Surface Water Outfall	In working order, pipe 500mm diameter	X	316150: 683440	
6	SW Surface Water CSO Outfall	Within SW model	X	316120: 683120	No photo available, located close to MLWS

### Assessment of Importance

7.4.23 The importance of the SW pipe network is assessed as being High as they are considered essential infrastructure and would be costly to replace if they were damaged during construction (see Table 7.10). The unlicensed and redundant pipes are assessed to have Low importance.

## 7.5 Summary of Receptor Sensitivities

7.5.1 The qualities of the identified receptors discussed in the preceding Sections have been compiled into a summary table (Table 7.10), with their assigned importance values.



Table 7.10 - Importance of Receptors

Waterbody	WFD Status	Vulnerability to pollution	Recreation	Value to Economy	Flooding	Biodiversity	Overall Importance
Firth of Forth	Overall WFD Status assessed as 'Good' <b>High</b>	Large size of waterbody with high potential for dilution and dispersion <b>Low</b>	Bathing waters at a distance from the study area (5 in the adjacent coastal waterbody). The nearest bathing waters is 4 km away <b>Medium</b>	Recreation, tourism, local population <b>High</b>	Informal coastal protection protects land and houses <b>Medium</b>	SSSI, SPA, Ramsar <b>High</b>	<b>High</b>
Burntisland Groundwater Body	Overall WFD Status assessed as 'Good' <b>High</b>	Moderate size of waterbody, low vulnerability <b>Low</b>	Contribution to baseflow of Dour, Tiel and Dronachy Burns <b>Low</b>	No known economic uses <b>Low</b>	No groundwater flooding known <b>Low</b>	Contribution to baseflow of Dour, Tiel and Dronachy Burns, and Ramsar wetland <b>Low</b>	<b>Low</b>
Drainage Outfalls	N/A	NA	NA	Essential infrastructure <b>High</b> Unlicensed/ redundant infrastructure <b>Low</b>	NA	NA	<b>High</b>  <b>Low</b>

## 7.6 Assessment

- 7.6.1 The following sections set out the range of potential impacts and effects resulting from the Development, their magnitude and overall significance based on the importance of the receptor. The effects are split into construction (Table 7.11 to 7.15) and operation (Table 7.16 to Table 7.20) phase effects and are assessed prior to the implementation of mitigation measures.
- 7.6.2 Impacts are assessed without the application of specific secondary mitigation measures and are considered adverse, unless otherwise stated.

### Construction Impacts

#### Surface Water Quality

- 7.6.3 As discussed in ES Volume 1 – Chapter 2, the construction of the Cover System will be carried out between high tides, by removing existing rock armour (where currently present) in strips to minimise the duration the unprotected embankment is exposed to erosion. This will be detailed through Construction Method Statements as part of a wider Construction Environmental Management Document (CEMD) and agreed with relevant stakeholders prior to the commencement of works.
- 7.6.4 Nevertheless, it is important as part of the EIA process to consider the potential release of pollutants (oil, fuel etc.) relating to construction processes which could act as sources of pollution to surrounding waters during the construction phase and assess the resulting impact that such a release may have on surface water quality.
- 7.6.5 The proposed construction methods for each MSA are detailed in ES Volume 1 – Chapter 2, Development Description and primary mitigation measures, such as working between high tides, have been developed to reduce potential risk to the water environment through design.
- 7.6.6 Construction material will include large boulders, small stone/ granular filling in bulk bags, geotextile and precast concrete blocks which will largely be delivered by sea and will be stored in stockpiles. The risk of contamination or pollution of the water environment from these materials is very low.
- 7.6.7 Wet concrete will be delivered by road and poured by pump from a concrete mixer lorry. Pouring of concrete will be undertaken between tides and therefore, no liquid concrete will be released to the water environment.
- 7.6.8 The only significant risk to the water environment therefore stems from contamination of coastal water due to factors such as damage of fuel tanks or leakage of oil of plant working in the intertidal zone.
- 7.6.9 The location of the construction compound is demonstrated in ES Volume 2 – Figure 1.6. While it is proposed to be located approximately 10m from the MHWS, there is some potential for the accidental spillage and release of pollutants such as oil, fuel and washing effluent to coastal water through pathways such as surface run-off, or from wave action when water levels are high.
- 7.6.10 In addition, any material stockpiles close to the coastal area could be eroded during high tides by waves, increasing the levels of suspended solids in the estuary temporarily.
- 7.6.11 Table 7.11 below provides an assessment of potential impacts and subsequent effects without mitigation applied.

Table 7.11 - Surface Water Quality Predicted Impact Assessment (Construction)

Water Body	Importance of Relevant Receptor	Magnitude of Impact	Significance of Effect
Firth of Forth	<b>High</b>	Direct, localised, short-term, temporary effect <b>Low</b>	<b>Moderate</b>

## Flooding

- 7.6.12 Some low lying areas of the coastal land are predicted to flood in the existing situation. Construction activities and modifications to the existing informal coastal defences could lead to a temporary change in flood risk to land as there could be sections of the informal rock revetment removed at any time during construction to allow for the remediation work and rebuilding of the structures. This may lead to localised exposure of the surrounding land as wave run up could be increased. Table 7.12 below provides an assessment of potential impacts and subsequent effects.

Table 7.12 - Flooding Predicted Impact Assessment (Construction)

Water Body	Importance of Relevant Receptor	Magnitude of Impact	Significance of Effect
Vacant coastal land	<b>Low</b>	Indirect, short-term, temporary effect <b>Medium</b>	<b>Minor</b>

## Infrastructure

- 7.6.13 The drainage outfalls and pipelines identified in the vicinity of the Study Area could be accidentally impacted during construction. Movement of vehicles and excavation works could lead to damage to outfalls or underground pipework. Table 7.13 below provides an assessment of potential impacts and subsequent effects.

Table 7.13 - Infrastructure Predicted Impact Assessment (Construction)

Water Body	Importance of Relevant Receptor	Magnitude of Impact	Significance of Effect
SW Pipeline	<b>High</b>	Direct, permanent effect <b>Medium</b>	<b>Major</b>
Drainage Outfalls	<b>Low</b>	Direct, permanent effect <b>Medium</b>	<b>Minor</b>

## Groundwater

- 7.6.14 Groundwater movement could be impacted through dewatering of excavations which could locally reduce groundwater levels. Based on the preliminary data available from AMEC's 2013 GI report, groundwater is encountered at a shallow depth between 0.3-6m below ground level (mbgl) and is strongly influenced by tides. This suggests that any local changes to the movement of groundwater during construction are unlikely to have a significant impact, as groundwater is locally recharged from the coastal water. Table 7.14 below provides an assessment of potential impacts and subsequent effects. During construction, structures will not be placed into the ground to restrict groundwater flow.

Table 7.14 - Groundwater Movement Predicted Impact Assessment (Construction)

Water Body	Importance of Relevant Receptor	Magnitude of Impact	Significance of Effect
Burntisland Groundwater Body	<b>Low</b>	No effect <b>Very Low</b>	<b>Negligible</b>

- 7.6.15 Potential environmental considerations relating to the quality of the groundwater resource include pollutants potentially being released from plant working in excavations and exposure or mobilisation of spoil or material stockpiles. Table 7.15 below provides an assessment of potential impacts and subsequent effects. It should be noted, shallow groundwater is recharged from the Firth of Forth, and therefore the potential impacts on water quality are assessed as surface water and not groundwater.

Table 7.15 - Groundwater Quality Predicted Impact Assessment (Construction)

Water Body	Importance of Relevant Receptor	Magnitude of Impact	Significance of Effect
Burntisland Groundwater Body	<b>Low</b>	No effect <b>Very Low</b>	<b>Negligible</b>

## Operation Impacts

### Surface Water Quality

- 7.6.16 The proposed Cover System is designed to ensure that there is a significant reduction in the volume of radiological material that could be released onto the beach and into the coastal water. Removal of radiological waste material and covering of remaining material will ensure that the volume of radiological material found along the beach should be significantly reduced. The reduction in erosion achieved by the Cover System should also lead to a reduction in the volume of suspended sediment in the coastal water, which will be beneficial for water quality. Table 7.16 below provides an assessment of potential impacts and subsequent effects.

Table 7.16 - Surface Water Quality Predicted Impact Assessment (Operation)

Water Body	Importance of Relevant Receptor	Magnitude of Impact	Significance of Effect
Firth of Forth	<b>High</b>	Positive, direct, long-term, permanent effect <b>Low</b>	<b>Minor Beneficial</b>

## Flooding

- 7.6.17 The Development is not designed to affect flooding or flood risk. However, the rebuilding of some areas of the extant rock armour and introduction of rock armour in other areas is expected to lead to improvement. Other indirect benefits may include the reduction of erosion due to the improvement in the coastal defences provided by the Cover System and the possible reduction of wave run up due the seaward widening of the rock revetment and the subsequent dissipation of energy on the rougher surface.
- 7.6.18 The Slipway could cause a localised increase in wave run up as it is likely to have wider, more coherent and smoother surfaces than the existing structures. However, this will not have a significant flood risk impact due to topography and adjacent land uses. Table 7.17 below provides an assessment of potential impacts and subsequent effects.

Table 7.17 - Flooding Predicted Impact Assessment (Operation)

Water Body	Importance of Relevant Receptor	Magnitude of Impact	Significance of Effect
Vacant coastal land	<b>Low</b>	Positive, long term effect. <b>Medium</b>	<b>Minor Beneficial</b>

## Infrastructure

- 7.6.19 Following completion of the works, the outfalls will be unaffected by the scheme. Table 7.18 below provides an assessment of potential impacts and subsequent effects.

Table 7.18 - Infrastructure Predicted Impact Assessment (Operation)

Water Body	Importance of Relevant Receptor	Magnitude of Impact	Significance of Effect
SW Pipeline	<b>High</b>	No impact anticipated <b>Very Low</b>	<b>Minor</b>
Drainage Outfalls	<b>Low</b>	No impact anticipated	<b>Negligible</b>

Water Body	Importance of Relevant Receptor	Magnitude of Impact	Significance of Effect
		<b>Very Low</b>	

## Groundwater

- 7.6.20 The Development is unlikely to go deeper into groundwater than the existing informal rock armour or act as a barrier to movement of groundwater. Groundwater is recharged from the sea and therefore, there is unlikely to be any change in groundwater levels in the vicinity of the Development. Table 7.19 below provides an assessment of potential impacts and subsequent effects.

Table 7.19 - Groundwater Movement Predicted Impact Assessment (Operation)

Water Body	Importance of Relevant Receptor	Magnitude of Impact	Significance of Effect
Burntisland Groundwater Body	<b>Low</b>	Direct, localised, permanent effect <b>Very Low</b>	<b>Negligible</b>

- 7.6.21 The existing informal defences are unlikely to be having any impact on groundwater quality and it is not anticipated that the Development will cause any change to this baseline situation. Table 7.20 below provides an assessment of potential impacts and subsequent effects.

Table 7.20 - Groundwater Quality Predicted Impact Assessment (Operation)

Water Body	Importance of Relevant Receptor	Magnitude of Impact	Significance of Effect
Burntisland Groundwater Body	<b>Low</b>	No impact anticipated <b>Very Low</b>	<b>Negligible</b>

## 7.7 Mitigation and Monitoring

- 7.7.1 Table 7.21 and Table 7.22 describe the mitigation required to address the significant adverse impacts described in above.

Table 7.21 - Construction Stage Mitigation Measures

Specific Issues	Mitigation Requirements
Sediment mobilisation and spillage or discharge of other	The Contractor will produce a Construction and Environmental Management Document (CEMD) which will describe the specific procedures to be put in place to control sediment mobilisation, surface water discharges, and chemical spillages. The CEMD will be discussed and agreed with SEPA and Marine Scotland prior to commencement of



Specific Issues	Mitigation Requirements
pollutants (including radium) into coastal water.	<p>site works and all staff on site will be briefed on and trained in the procedures contained within the CEMD. The CEMD shall incorporate best practice guidance as detailed in PPG's published by SEPA and CIRIA Reports C532, C584, &amp; C648, as a minimum. In particular, the following measures shall be adopted on site:</p> <ul style="list-style-type: none"> <li>• A CAR Licence (if required) and Marine Licence shall be obtained prior to starting work on site and this shall be displayed prominently on a notice board in the site offices;</li> <li>• The Contractor will apply for a temporary discharge licence under the Controlled Activity Regulations if required by SEPA for the construction stage;</li> <li>• Identify and clearly sign all surface water features within the construction site during site set up and brief personnel on their location during induction;</li> <li>• The Contractor will use self-bunded tanks or provide impervious bunds around any fuel, oil (minimum capacity 110%), and other chemical stores, and shall centralise and minimise the number of these stores if any are required on site;</li> <li>• Refuelling will be permitted only within the construction compound and will only take place on hardstanding, or an appropriate temporary cover system (geotextile and stone) to mitigate any potential cross contamination. This will be reinstated upon completion of work;</li> <li>• Chemical and fuel stores, and welfare facilities will be located as far from the edge of the MHWS mark as possible and will be located on hardstanding or an appropriate temporary cover system (geotextile and stone);</li> <li>• Welfare facilities will be provided and maintained by a specialist contractor;</li> <li>• Appropriate wash down and decontamination of vehicles will be agreed prior to commencement of works;</li> <li>• Stripped areas, stockpiles, and areas of excavation will have fabric silt fences placed so as to intercept the surface water run-off from these areas;</li> <li>• The Contractor shall give consideration to creating the sustainable drainage system infrastructure at the outset of construction work, should this be required, or shall use suitable proprietary treatment systems (e.g. lamella clarifiers);</li> <li>• Appropriate consideration will be given to the location of construction materials and other stockpiles so that they are as far from the intertidal zone or other water bodies as practically possible;</li> <li>• Plant shall be stored and maintained away from surface water features. No plant, equipment or stores shall be left on the foreshore within the intertidal zone after each shift. Mobile plant when parked and all static plant shall be fitted with plant nappies;</li> <li>• All mobile plant shall carry spill kits and spill kits shall also be located close to the working environment where they can be easily</li> </ul>

Specific Issues	Mitigation Requirements
	<p>accessible but above MHWS. Staff shall be trained in their use. After use, spill kits should be replaced;</p> <ul style="list-style-type: none"> <li>• Wet working will be avoided;</li> <li>• The Contractor shall instigate re-vegetation of stripped areas on a sectional basis as early as possible within the programme to reduce the potential for silt laden run off;</li> <li>• The CEMP shall identify a clear monitoring regime to confirm the application of the above mitigation requirements. It is anticipated that the Contractor's site management personnel would be made responsible for monitoring, and in practice many of the measures could be monitored based on a daily or weekly inspection of the site and the completion of a "mitigation requirements" tick sheet. These tick sheets would then be retained as auditable evidence of the monitoring of the mitigation requirements;</li> <li>• Where necessary, a Pollution Incident Response Plan will be implemented, in accordance with SEPA PPG21 and PPG22. This will include formulation of emergency procedures to address accidental pollutant releases and spillages, and will include appropriate staff briefings and training, as required; and,</li> <li>• Works shall be monitored as appropriate by the Ecological Clerk of Works (ECoW) to ensure that no chemical spillages have occurred, and should they occur ensure that they are immediately cleaned up in accordance with the Pollution Incident Response Plan.</li> </ul>
Flooding	Any temporary risk of flooding could be mitigated by daily review of the flood warning system for the Firth of Forth operated by SEPA to ensure preparation can be made ahead of predicted floods.
Contamination of groundwater	<p>As noted above, the Contractor shall produce a CEMD, which will describe the specific procedures to be put in place to control site discharges and the potential for pollutant spillages. The CEMD shall be discussed and agreed with SEPA prior to commencement of site works, and all staff on site shall be briefed on and trained in the procedures contained within the CEMD. The CEMD shall incorporate best practice guidance as detailed in PPG's published by SEPA and CIRIA Reports C532, C584 &amp; C648, as a minimum. In particular, the following measures shall be adopted on site in relation to mitigating the potential effects on groundwater quality:</p> <ul style="list-style-type: none"> <li>• Construction workforce sewage and washing effluent should be contained and taken offsite;</li> <li>• The Contractor shall provide bunds around any fuel, oil, and other chemical stores, and shall centralise and minimise the number of these stores if any are required on site;;</li> <li>• The Contractor shall complete all servicing, fuelling, and storage of vehicles at construction compounds or off-site;</li> <li>• Appropriate wash down and decontamination of vehicles will be agreed prior to commencement of works;</li> <li>• The Contractor shall implement appropriate drainage control measures should they be required at the site to prevent areas of standing surface water that could become contaminated and</li> </ul>

Specific Issues	Mitigation Requirements
	<p>infiltrate into the shallow groundwater; and,</p> <ul style="list-style-type: none"> <li>As noted above, these are to be monitored by the Contractor's site personnel based on regular inspections and maintain records for inspection.</li> </ul>
Damage to drainage outfalls	All drainage outfalls should be clearly marked on site and a plan showing each should be displayed in the contractor's compound area. Barriers could be placed around Scottish Water structures to minimise the risk of damage. It should be ensured that all outfalls are fully licensed prior to works around them commencing.

Table 7.22 - Operation Stage Mitigation Measures

Specific Issues	Mitigation Requirements
Monitoring and Maintenance	Upon completion, the rock armour will be maintained as appropriate by Fife Council in line with the recommendations of the Management Strategy.

## 7.8 Residual Effects

- 7.8.1 No significant residual effects on the water environment have been identified as part of this assessment.
- 7.8.2 Potential effects on water quality during construction have been recognised. However, provided the mitigation measures identified in Section 7.7 are implemented, the magnitude of impact on water quality during construction is assessed to be Very Low, resulting in a residual effect of Minor, which is not significant.
- 7.8.3 It should also be noted that once operational, the Development will have Minor positive effects on water quality and in terms of flood risk and erosion protection.
- 7.8.4 Potential effects on drainage infrastructure located in the vicinity of the Development (the SW pipeline) have also been recognised. Again, however this asset will not be adversely impacted during the works provided the proposed mitigation measures are adhered to. In this case, the magnitude of impact is assessed to be Very Low, with a resultant Minor effect, which is not significant.

## 7.9 References

EU Directive 2000/60/EC (Water Framework Directive (WFD)), transposed into the Water Environment and Water Services Act (Scotland) 2003 (the "WEWS" Act)

The Water Environment (Controlled Activities) (Scotland) Regulations 2011 in respect of discharges to surface or groundwater

Scottish Government, 2009; Flood Risk Management (Scotland) Act

Scottish Government, 2014; National Planning Framework for Scotland 3

Scottish Government, 2014; SPP (Scottish Planning Policy) - Flooding & Drainage and Environmental Impact Assessment

Scottish Environmental Protection Agency, 2011; Policy No. 41 - Planning Authority Protocol, Development at Risk of Flooding: Advice and Consultation

Scottish Environmental Protection Agency, 2009; Interim Position Statement on Planning and Flooding

Scottish Environmental Protection Agency, 2009; Policy No. 19 - Groundwater Protection Policy for Scotland V3

Highways Agency / Scottish Executive Development Department, 2009; Design Manual for Roads and Bridges, Volume 11, Section 3, Part 10, HD 45/09

Scottish Natural Heritage, 2009; A Handbook on Environmental Impact Assessment; Guidance for Competent Authorities, Consultees and others involved in the Environmental Impact Assessment Process in Scotland.

Scottish Natural Heritage, 2016; Sitelink Website, <http://gateway.snh.gov.uk/sitelink/index.jsp>

CIRIA, 2001; Report C532 Control of water pollution from construction sites

CIRIA, 2003; Report C584 Coastal and Marine Environmental Site Guide

CIRIA, 2006; Report C648 Control of Water Pollution from Linear Construction Projects

Scottish Environment Protection Agency, 2016; Online Water Environment Hub - <http://www.sepa.org.uk/data-visualisation/water-environment-hub/>

Scottish Environment Protection Agency, 2016; Online Flood Management Map

British Geological Survey, 2016; online geology maps, 1:50,000

SNIFFER, 2011; Vulnerability of Groundwater in the Uppermost Aquifer, version 2, Scale 1:100,000

British Geological Survey / Scottish Environment Protection Agency, 2004; Bedrock Aquifer Map and Superficial Aquifer Map, Scale 1:100,000

Ordnance Survey, 2016; Digital mapping 1:10,000 maps

Microsoft Corporation, 2016; Bing maps aerial images

Fife Council, 2011; Shoreline Management Plan

## 8. NATURE CONSERVATION

### 8.1 Introduction

- 8.1.1 This Chapter provides an assessment of the potential impacts of the Development on ecological receptors. Proportionate measures are provided to avoid, mitigate or compensate for predicted adverse impacts, and, where appropriate, enhancement measures are also suggested.
- 8.1.2 Potential impacts on ecological receptors can be related to impacts on landscape, the water environment, ornithology and noise and vibration. This Chapter should therefore be read in conjunction with these Chapters of the ES as well as AECOM's Coastal Processes Report (February 2017) which has been submitted as part of the planning and marine licence applications.
- 8.1.3 The following drawings support this assessment and are located in Volume 2 of the ES:
- Figure 8.1 – Designated Sites within 2km of the Site; and,
  - Figure 8.2 – Phase 1 Habitat Survey of the Site and surroundings.
- 8.1.4 For the purposes of this Chapter the Survey Area encompasses the terrestrial extent of the Site plus a suitable buffer as demonstrated in ES Volume 2 – Figure 8.1.

### 8.2 Legislative and Planning Policy Context

#### Nature Conservation Legislation

##### Conservation (Natural Habitats, &c.) Regulations 1994 (as amended in Scotland)

- 8.2.1 The Conservation (Natural Habitats, &c.) Regulations 1994 (**'the Habitats Regulations'**) protect European Protected Species (EPS) and European designated sites (Special Areas of Conservation (SACs) and Special Protection Areas (SPAs)). For EPS (e.g. all bats, otter *Lutra lutra*, great crested newt *Triturus cristatus* and natterjack toad *Bufo calamita*) it is an offence to:
- Deliberately or recklessly kill, injure or take an EPS (or its eggs where applicable);
  - Deliberately or recklessly disturb an EPS at a place of shelter, or elsewhere if this could impair its ability to breed or affect its local distribution; or,
  - Damage, destroy or obstruct access to an EPS place of shelter (whether occupied or not).
- 8.2.2 Places of shelter include all bat roosts, otter holts and laying-up areas, and great crested newt foraging/hibernation habitat up to 500m from breeding ponds where connective habitat exists.
- 8.2.3 Actions which would be EPS offences can be licensed, but only if the reason is one of the specified purposes in Regulation 44(2), there is no satisfactory alternative, and the action is not detrimental to the 'favourable conservation status' of the species. Developments affecting European protected sites must be subject to a Habitats Regulations Appraisal (HRA) and site integrity must be maintained.

##### Wildlife & Countryside Act 1981, Nature Conservation (Scotland) Act 2004 and Wildlife & Natural Environment (Scotland) Act 2011 (as amended in Scotland)

- 8.2.4 Together, these Acts protect birds and certain animals/plants that are not EPS (see above), regulate non-native species, protect Sites of Special Scientific Interest (SSSIs) and place a duty on public bodies to further the conservation of biodiversity. For Schedule 5 animals (e.g. red squirrel *Sciurus vulgaris*, water vole *Arvicola amphibius*, pine marten *Martes martes* and wildcat *Felis sylvestris*) it is an offence to intentionally or recklessly (or knowingly cause/permit another person to):
- Kill, injure or take the animal (not currently applicable to water vole);
  - Damage, destroy or obstruct access to the animal's places of shelter; or,

- Disturb the animal whilst at a place of shelter.
- 8.2.5 Common reptiles are protected from intentional or reckless killing/injuring, and together with common amphibians from sale/trade. For birds it is an offence to intentionally or recklessly:
- Kill, injure or take any wild bird or its eggs;
  - Take, damage, destroy or interfere with the nest of any wild bird whilst in use or being built (or at any time for eagles), or obstruct/prevent any wild bird from using its nest; or,
  - Disturb Schedule 1 birds at or near an active nest or lek, or their dependent young (or harass eagles, hen harrier or red kite at any time).
- 8.2.6 Licensing is not possible for wild birds for development. Some actions affecting Schedule 5 species which would be offences can be licensed, including for development where there is significant social, economic or environmental benefit and no satisfactory alternative. Developments affecting SSSIs are generally only allowed if there are reasons of national importance and site integrity will be maintained. Under this legislation, it is an offence to spread any non-native species in the wild.

### [Protection of Badgers Act 1992 \(as amended in Scotland\)](#)

- 8.2.7 It is an offence to: wilfully kill, injure or take a badger; intentionally or recklessly damage, destroy or obstruct a badger sett, or disturb a badger in a sett (or allow someone to do these things). A sett is any structure or place with signs of current use by badger. Some actions which would be offences can be licensed, but for development it is not possible to licence direct removal or killing of badgers.

### [EU Directive 2000/60/EC Water Framework Directive \(WFD\)](#)

- 8.2.8 Through the WFD, SEPA require that developers identify groundwater-dependent terrestrial ecosystems (GWDTEs) within 100m of roads/trenches or 250m of substantial constructions, and pressures on them. If avoidance is not possible, mitigation should be developed to minimise impacts, particularly from drainage, pollution and waste management. SEPA may request planning conditions to guarantee mitigation.

### **Key Planning Policy**

### [Scottish Planning Policy \(SPP\) 2014](#)

- 8.2.9 SPP recognises the environment as a national asset offering opportunities for enjoyment, recreation and sustainable economic activity. In summary, the policy principles most relevant to this nature conservation assessment state that the planning system should:
- facilitate positive change while maintaining/enhancing distinctive landscape character;
  - conserve and enhance protected sites and species, maintaining healthy ecosystems and the natural processes which provide important services to communities;
  - protect and improve the water environment and soil;
  - protect and enhance ancient woodland, hedgerows and trees with high ecology/landscape value; and,
  - seek biodiversity benefits from new development where possible.
- 8.2.10 SPP emphasises the biodiversity duty of public bodies and the legislative requirements for protected sites and species.

### [Ancient Woodland](#)

- 8.2.11 Although there is no legislation specifically protecting ancient woodland, SPP identifies it as an important and irreplaceable national resource that should be protected and enhanced,



along with other native and long-established woodlands with high nature conservation value. Scottish ancient woodland is defined as land that is currently wooded and has been continually wooded since 1750 or the mid-1800s, depending on the earliest mapping available. The Ancient Woodland Inventory (AWI) is a provisional guide to the location of ancient woodland in Scotland, which has important biodiversity and cultural value by virtue of its antiquity. It is described as provisional because not all ancient woodland is guaranteed to have been identified, especially small patches. Thus any woodland not in the AWI that is demonstrably ancient (by presence on early mapping and/or appropriate ecological characteristics) should be treated as ancient woodland.

### National and Local Biodiversity Priorities

- 8.2.12 The Scottish Biodiversity List (SBL) and UK Biodiversity Action Plan (UK BAP) provide lists of priority habitats and species of key importance to biodiversity in Scotland and the UK, and action plans to aid their conservation. Similarly, the Fife Local Biodiversity Action Plan (LBAP) includes objectives and guidance for enhancement of biodiversity in Fife. These sources can help to inform ecological impact assessment and mitigation.

### Local Development Plan (LDP)

- 8.2.13 Policies and documents within the Dunfermline and West Fife Local Plan (2012) set out the planning requirements concerning environmental assets, biodiversity and green networks within Fife. The FIFEplan Proposed Local Development Plan (LDP) (2014) is also considered. the FIFEplan LDP Proposals Map identifies Dalgety Bay as being within a 'Green Network Policy Area' and part of the Site is identified as an 'Existing Green Network Asset'. These policy principles are set out under Baseline Conditions section below.

## 8.3 Assessment Methodology

- 8.3.1 Assessment of ecological impacts is known as Ecological Impact Assessment (EclA), for which there is no universally agreed method, although certain general principles and approaches are widely accepted. The method used here provides a systematic and transparent assessment of the significance of impacts upon ecological receptors. It is based on guidance from the Chartered Institute of Ecology and Environmental Management (CIEEM 2016). Other guidance and information sources have been used where appropriate for specific ecological receptors, and are stated where employed.

### Desk Study

- 8.3.2 Existing baseline information was collated through consultation and desktop research utilising a number of sources, including:
- Fife Nature;
  - SNH SiteLink website;
  - National Marine Plan Interactive web portal (NMPi).
  - UK Biodiversity Action Plan (UK BAP);
  - Scottish Biodiversity List;
  - Fife Local Biodiversity Action Plan (LBAP);
  - The Dunfermline and West Fife Local Plan; and,
  - FIFEplan Proposed Plan.

### Field Survey Methodology

#### Habitats

- 8.3.3 An extended Phase 1 Habitat Survey was undertaken in June 2016 by an AECOM ecologist experienced in botanical and habitat survey, including National Vegetation Classification

(NVC) survey. The standard Phase 1 Habitat Survey methodology was used (JNCC, 2010), the extended aspect comprising close attention to species composition of all habitats, assessment of habitat potential for protected species, note of protected species evidence, mapping of non-native invasive plant species, and any other relevant ecological information. Phase 1 field mapping was undertaken using high resolution aerial photography combined with Ordnance Survey mapping to maximise mapping accuracy, and subsequently digitised using ArcGIS. A Phase 1 habitat map is provided in ES Volume 2 - Figure 8.2.

- 8.3.4 During the above habitat surveys, note was made of potential Groundwater Dependent Terrestrial Ecosystems (GWDTEs) in accordance with SEPA guidance, the purpose of which is to help ensure the WFD is fully implemented regarding the water needs of terrestrial ecosystems.

### Bats

- 8.3.5 Ground-based assessment of roost potential in trees and structures was undertaken in June 2016, using binoculars and torches as necessary. The survey followed guidance in published literature (Hundt, 2012). Searches were made for cavities that bats might use such as rot holes, cracks, splits, woodpecker holes and loose bark, and any voids in built structures. Evidence of bats was recorded if found, such as oil/urine staining, bat droppings below or within potential roost features, bat odour, bat squeaking and flies around possible roost entrances.

### Badger

- 8.3.6 Survey for badger was undertaken during the extended Phase 1 Habitat Survey in June 2016 by AECOM ecologists with extensive experience of survey for badger and other protected species. The survey followed guidance in published literature (Harris et al, 1989). Evidence searched for included: setts, spoil heaps and bedding; guard hairs; latrines; footprints, trails and scratch marks; and foraging activity. Badger evidence was mapped using high resolution aerial photography superimposed with Ordnance Survey base mapping and a GPS as necessary to maximise accuracy, with accompanying field notes. Where possible, setts were classed as main, annexe, satellite or outlier, and holes described as well-used, partially-used or disused.

### Otter & Water Vole

- 8.3.7 Survey for otter and water vole was undertaken during the extended Phase 1 Habitat Survey in June 2016 by AECOM ecologists with extensive experience of otter and other protected species survey. The survey followed guidance in published literature (Chanin, 2003; Kruuk, 2006; Liles, 2003; Strachan, 2007) where appropriate to a site survey. Evidence searched for included holts, laying-up areas, spraints/latrines, footprints, trails and foraging evidence. Evidence was mapped using high resolution aerial photography superimposed with Ordnance Survey base mapping and a GPS as necessary to maximise accuracy, with accompanying field notes.

### Intertidal Survey

- 8.3.8 A Phase 1 intertidal survey of the Management Strategy Area was carried out on the 25<sup>th</sup> and 26<sup>th</sup> September 2014 by Amec Foster Wheeler. A full methodology can be found in the Intertidal Phase 1 Survey Report in ES Volume 3 - Appendix 8.1.

### Impact Assessment Methodology

- 8.3.9 Assessment of impact on ecological receptors is based on the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines (CIEEM 2006 and 2016) and also incorporates good practice from other sources as referenced. The process is summarised below:

- **Baseline:** Existing conditions are defined and receptors that might be impacted considered;
- **Value:** Each ecological receptor is assigned value at a specified geographical level;
- **Impacts:** The type and significance of likely impacts are determined;
- **Mitigation:** Measures are developed to avoid/reduce/compensate for significant negative impacts;
- **Residual Impacts:** Likely remaining impacts after proportionate mitigation are determined;
- **Enhancement:** Opportunities to benefit nature conservation may be determined; and,
- **Monitoring:** If appropriate, proposals are made for post-construction monitoring.

### Assessing the Value of Ecological Receptors

8.3.10 An ecological receptor is a site, habitat or species of nature conservation value. Receptor values are described within a geographic frame of reference so that legal and policy implications can be widely understood. Examples of types of receptor which might fall into various geographic classes are given in Table 8.1 below (adapted from CIEEM 2006 and 2016).

Table 8.1 - Geographic Values for Ecological Receptors

Value	Examples of types of receptor (subject to professional judgement)
International	Internationally designated site (or candidate/proposed international site). Sustainable area (or part of a larger sustainable area) of Annex I habitat. Sustainable internationally-significant population, or site supporting one.
National (UK or Scotland)	Nationally designated site (or site considered worthy of such designation). Sustainable area of a national priority habitat which is a significant proportion of the resource. Sustainable nationally-significant population (e.g. 1% of national resource) or site supporting one.
County (Fife)	County site designation (e.g. LNR, LNCS/SINC). Sustainable area of a county priority habitat which is a significant proportion of the resource.
District	Habitats or populations considered intermediate between county value and local value.
Local / Parish	Priority habitat not large enough for higher value, or degraded with low restoration potential. Habitat or population which appreciably enriches the local resource.
Site/Zone of influence	Heavily managed or modified habitat of low ecological value. Common and widespread species.

8.3.11 Valuation of ecological receptors is subject to professional judgement, based on factors such as:

- Rarity, endemism, mobility and geographic range;

- Trends, size/extent and vulnerability;
- Typicalness, diversity, and connectivity/fragmentation;
- Value to other receptors (e.g. buffer habitat or food source);
- Potential for substitution/re-creation; and,
- Sustainability and intrinsic value to stakeholders.

8.3.12 Valuation is not automatically affected by legislative protection or priority listing. For example, badgers are strictly protected but may only be of local value if widespread and common (though legal requirements must still be met). Similarly, species or habitat action plans are aids to conservation and do not imply specific value, since occurrences may be fragmented, atypical or otherwise in unfavourable condition. Thus a habitat may be a national or local priority, but valuation considers the amount and quality so that small areas of poor-quality habitat are not over-valued.

### Assessing Impacts

8.3.13 Likely impacts are characterised using the parameters outlined in Table 8.2 below (adapted from CIEEM 2016).

Table 8.2 - Impact Parameters

Parameter	Description
Direction	Whether the impact will have a positive or negative effect.
Magnitude	The 'size', 'amount' or 'severity' of the impact, determined quantitatively as far as possible.
Extent	The area over which the impact occurs.
Duration	The time the impact is expected to last before recovery or replacement (if possible) of the receptor, considered on an ecological rather than human timescale. The duration of an impact can exceed the duration of the activity causing it (e.g. breeding failure after the activity causing it).
Timing and Frequency	Precise timing of an activity is important since the impact might not occur if it avoids critical seasons or life stages. Frequency considers activity repetition, which can cause greater impact.
Reversibility	A reversible (temporary) impact permits recovery in a reasonable timescale or effective mitigation.

8.3.14 Impacts may occur during the construction, operation and decommissioning phases of a development. They may be direct or indirect (also termed secondary). Direct impacts are attributable to an action associated with a development. Indirect impacts are often produced away from a development or as a result of other initial impacts.

### Assessing Significance

8.3.15 An impact (positive or negative) is significant at a specified geographical level if it affects the integrity of a site or ecosystem or the conservation status of a species or habitat. If not significant at the level the receptor was valued, an impact could be significant at a lower geographical level.

8.3.16 The integrity of a site or ecosystem is defined as *"the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified"* (CIEEM 2006). Sites or ecosystems achieving this are in favourable condition. Consideration is given to whether site processes will be removed or changed, effects on component habitats or average

population size/viability of component species, and whether these effects will move condition away from favourability.

- 8.3.17 Initially, impact significance does not consider mitigation/enhancement measures. Determination of residual impacts takes this into account, with the aim that, wherever possible, residual impacts are not significant or significant at a lower geographic level than the unmitigated impacts.
- 8.3.18 Four levels of impact confidence are used in accordance with CIEEM guidelines (CIEEM 2006):
- Certain/near-certain: Estimated probability 95% or higher;
  - Probable: Estimated probability higher than 50% but less than 95%;
  - Unlikely: Estimated probability less than 50% but higher than 5%; and,
  - Extremely unlikely: Estimated probability less than 5%.
- 8.3.19 The reason for including a confidence category of 'extremely unlikely' is that although some effects may be improbable, they could have serious implications should they occur.

## 8.4 Baseline Conditions

### Consultation

- 8.4.1 A Scoping Opinion regarding the Development was issued by Fife Council, in association with Marine Scotland in September 2016. The consultees relevant to nature conservation were SNH, SEPA and Marine Scotland, their responses are summarised in Table 8.3 below.

Table 8.3 - Scoping Responses

Consultee	Description
SEPA	Consult UK Biodiversity Action Plan and Local Biodiversity Action Plan lists for marine and coastal features found within the areas of development, and consider mitigation measures, as appropriate.
SNH/Marine Scotland	Impacts of using barges to bring material in and out of the remediation site will be an important issue for the HRA on the SPA to consider. It may be necessary to consider potential impacts on marine mammals and fish from noise associated with barge-related activity or associated rock dumping. Noise modelling may be required.
SNH	The scoping report does not currently make any reference to other protected species outwith consideration of the designated sites. Should consider the need for surveys of protected species (especially where licencing may be required).
SNH	Priority Marine Features (PMFs) should also be considered during subtidal and intertidal survey work, particularly where habitat may be lost or temporarily disturbed.
SNH	Consider what controls and mitigation may be implemented to prevent the introduction and spread of Marine Non- Native Species (MNNS).
SNH	Coastal Process results to be assessed and referenced by the HRA process to consider impacts on the SPA.
Marine Scotland	Impacts on benthic ecology should be considered, informed by baseline surveys, not only on the directly impacted areas of shoreline and shallow subtidal which will be altered by the proposed works but also throughout the full extent of Dalgety Bay. Data collected from coastal processes investigations could be used to inform design/extent of these surveys.

Consultee	Description
Marine Scotland	The Forth District Salmon Fishery Board will be able to advise on whether the site has any known local significance for diadromous fish and should be consulted.
Marine Scotland	There are currently no marine aquaculture sites registered with Marine Scotland Science located in the vicinity of the proposed remediation works at Dalgety Bay. However, there is one active land based tank site situated ~1 km north west of the proposed works.
Fife Council	Ross Plantation and trees around Club House are protected by a Tree Preservation Order and therefore any potential impacts on those trees should be assessed, justified and suitable mitigation proposed.

8.4.2 Further to discussion with Marine Scotland, the Forth District Salmon Fishery Board was also consulted, who responded as follows: *“During and following the described remediation works at Dalgety Bay, sediments and contaminants are likely to be released into the water column, bringing any passing migrating fish (e.g. Atlantic salmon and sea trout) into contact with materials that they do not normally interact with”*. See Volume 3 – Appendix 8.2 for full correspondence.

8.4.3 The Fife local Botanical Society of the British Isles (BSBI) recorder was consulted regarding a possible notable plant in the vicinity of the Site (see Protected & Notable Species Records below for further discussion).

## Designated Sites

### Otterston Loch

8.4.4 Otterston Loch is located 1.2km north of Dalgety Bay. It is a small, shallow water body notified for the adjacent wetland habitats including fen areas and wet woodland characterised by alder *Alnus glutinosa* and greater tussock-sedge *Carex paniculata*.

### Firth of Forth SPA/Ramsar/SSSI

8.4.5 The Firth of Forth SPA site is also designated as a Ramsar site, and a Site of Special Scientific Interest (SSSI). The boundary of the SPA coincides with that of the Ramsar site and the SSSI, and covers the majority of the Site as demonstrated in ES Volume 2 - Figure 8.1. The SPA covers 6,313.72ha, the majority of which is intertidal habitats. The Firth of Forth SPA qualifying features are 28 named species of birds and the waterfowl assemblage, all listed as non-breeding. The Ramsar site qualifying species are nine species of bird and the waterfowl assemblage, all non-breeding. Since the SPA/Ramsar site designations concern birds only, they are addressed in the ES Volume 1 – Chapter 9, ‘Ornithology’.

8.4.6 The notified features of the SSSI include 29 bird species, mostly non-breeding but including some breeding species, which are addressed in ES Volume 1 – Chapter 9, ‘Ornithology’. The SSSI is also notified for the following:

- Invertebrates: beetle assemblage (unfavourable declining) associated with notified grassland habitats (see below), and northern brown argus *Aricia artaxerxes* (favourable maintained) associated specifically with grassland containing rock rose *Helianthemum nummularium*;
- Habitats: lowland neutral grassland and maritime cliff (unfavourable declining); sand dunes (unfavourable no change), saltmarsh (unfavourable recovering); saline lagoon (favourable declining); transition grassland (referring to coastal reedbeds, favourable maintained); mudflats (not assessed);
- Vascular plant assemblage (favourable recovered); and,



- Geology/geomorphology: various rock exposures, fossil deposits, volcanic rocks, mineralogy and raised beaches (all favourable maintained apart from Carboniferous-Permian Igneous and Lower Carboniferous which were assessed as unfavourable no change).

## Forth Islands SPA

- 8.4.7 Beyond the Firth of Forth SPA, the nearest European site to the proposed works is the Forth Islands SPA to the east (approx. 2.2km to the nearest edge). The Forth Islands SPA qualifying features are 14 named species of birds and the seabird assemblage, all listed as breeding. Since this designation concerns birds only, it is addressed in ES Volume 1 – Chapter 9, ‘Ornithology’.

## Outer Firth of Forth & St Andrews Bay Complex proposed SPA

- 8.4.8 This marine SPA has proceeded from draft to consultation and is now a proposed SPA (‘pSPA’). Since this designation concerns birds only, it is addressed in ES Volume 1 – Chapter 9, ‘Ornithology’.

## Ross Plantation Listed Wildlife Site

- 8.4.9 This locally designated site for nature conservation consists of the Ross Plantation dominated by sycamore *Acer pseudoplatanus* with frequent mature oaks *Quercus* sp. and a reasonably semi-natural ground flora including extensive native bluebell *Hyacinthoides non-scripta* (see Habitats section below). It is located immediately adjacent to the northern edge of the Site.

## Ancient Woodland

- 8.4.10 Areas included in the Ancient Woodland Inventory (AWI) are shown on ES Volume 2 - Figure 8.1.
- 8.4.11 The AWI shows that the Ross Plantation adjacent to the Site is ancient woodland. In particular it is ancient woodland of plantation origin, and although this may limit its floristic diversity there is a reasonably semi-natural ground flora including extensive native bluebell (see Habitats section below).
- 8.4.12 Regardless of origin and ground flora, ancient woodland in general, and the ancient woodland here, does support a higher level of biodiversity than other woodland, and this is likely to include species groups that are not easily recordable (such as fungi and invertebrates) in addition to larger fauna and plants. As noted above, SPP states that ancient woodland is important and irreplaceable, and that it should be protected and enhanced.

## Green Networks

- 8.4.13 This section considers only Green Network Assets in proximity of the Site which could therefore be impacted. Designation by the local authority of an area as Green Network does not automatically imply high ecological value. Thus the areas of Green Network close to the Site include the very species-poor amenity grassland and scattered trees between Dalgety Bay housing and the coastal edge.
- 8.4.14 Areas of more significant ecological value within the nearby Green Network Assets are described below:
- The Ross Plantation immediately adjacent to the Site. This is also designated as a Wildlife Site and consists of mature, broadleaved woodland (see Habitats section below). This Green Network component also includes a small amount of amenity grassland at the Dalgety Bay Sailing Club (DBSC).
  - An area comprising grassland and smaller extents of other habitats along the coastal strip from the north side of Donibristle Bay to DBSC, including plantation and grassland. The majority of this is amenity grassland but it includes more species-rich



grassland at the north end of Donibristle Bay (see Sand Leek section below), and the very thin strip of unmown grassland with scattered maritime species around the coastal edge within and beyond the Site (see Habitats section below).

### **Protected & Notable Species Records**

- 8.4.15 A review of the protected and notable species records was undertaken and those considered to be present within the Site and nearby habitats (i.e. those for which suitable habitat exists) are detailed below. Records older than 1990 were not considered.

#### **Protected Mammals**

- 8.4.16 The majority of otter records returned were associated with the watercourse west of Otterston Loch (the SSSI 1.2km north of the Site) or nearby. One record was located east of the Site at Inverkeithing and one record on Inchcolm Island in the Firth of Forth, the latter demonstrating that otters do at times use the Firth of Forth.
- 8.4.17 Records of bats including one roost were returned from the settlement of Dalgety Bay; however, none are within 1km of the Site.
- 8.4.18 All badger records were located in the north east of the town of Dalgety Bay, in the area of Otterston Loch and Pinehill Wood. These areas are 1.2km from the Site at the closest. Point.
- 8.4.19 Two records of water vole were returned in the area of Dalgety Bay, one from the north section of the Ross Plantation within the area of a small burn. These are older records (1991) and taking into account the current habitat (established broadleaved woodland overshadowing an isolated, short (80m) section of un-culverted burn with mostly shallow water), it is extremely unlikely that water voles are present here.
- 8.4.20 Seven recent red squirrel records were returned for the town of Dalgety Bay including one 2010 record from nearby housing.
- 8.4.21 Harbour porpoise are represented by 11 records along the coast between St David's harbour and Inchcolm Island. Three of these were dead individuals found on the shore in Dalgety Bay. Striped dolphin was documented by one record to the east of Dalgety Bay and one Atlantic white-sided dolphin was recorded west of the bay; both records are over 1km from the Site. Six records of whale species were returned; four of these were minke whales which had been washed up dead, which could therefore have been brought in from some distance on the incoming tide. The remaining two records are humpback whales both within the deeper Firth of Forth with one record near Inchcolm Island and one less precise record south west of Dalgety Bay.

#### **Notable Mammals**

- 8.4.22 One grey seal record was returned from Long Craig, the rocky outcrop at the mouth of Dalgety Bay. Several records also exist on Haystack (9) and Inchcolm Island (4). Two records of common seal were returned from Inchcolm Island, and one from Haystack.

#### **Notable Plants**

- 8.4.23 The Fife Nature records included five records of sand leek *Allium scorodoprasum* from the 1km square containing the Site. Sand leek is a scarce plant in Scotland. Two of these records were incorrectly grid referenced (falling within the mudflats of Dalgety Bay); two others were located on the north shore of Dalgety Bay well beyond possible disturbance from the Development.
- 8.4.24 The fifth sand leek record is located (according to the grid reference) on the shore by the DBSC, in an area used for boat storage. However, the grid reference disagrees with the named location of 'New Harbour', which refers to the small stone breakwater and associated sheltered water just beyond the south end of the Site. No sand leek was observed during the Phase 1 habitat survey (which was carried out at an optimal time) at either location, and the

very thin coastal grassland strip does not appear to offer enough unmown grassland for the 'hundreds in flower' noted in the record comment (it could not flower in mown grassland because the flowering stem is relatively tall).

- 8.4.25 To clarify the situation, the local Fife BSBI recorder was consulted to help determine whether sand leek occurs in the Site or not. The BSBI recorder reported that verified locations of sand leek occur in adjacent 1km squares but not the 1km square containing the Site. One of the verified locations is the 1km square to the south; this contains very little land and the only viable location is the promontory at the north end of Donibristle Bay. This promontory could be interpreted as the southern end of 'New Harbour' and also contains extensive patches of unmown banks amongst mown grassland which matches another comment in the record stating that the sand leek was 'isolated by cutting'.
- 8.4.26 In view of the above information, the record of sand leek at the DBSC is considered to be erroneous and to actually refer to sand leek on the promontory between New Harbour and Donibristle Bay, which is well beyond possible disturbance from the works.

## Fish

- 8.4.27 The Firth of the Forth is known to contain diadromous fish (here comprising salmonids, smelt, lampreys and eel) which may use the area of Dalgety Bay for foraging/predator avoidance and/or may pass by during migration. However, there is no watercourse of significance<sup>1</sup> for diadromous fish adjacent to Dalgety Bay, and this much reduces the importance of the area for them. This is confirmed in the River Forth Fisheries Trust response (see ES Volume 3 – Appendix 8.2) where it was highlighted that fish species, particularly salmon and sea trout, migrate past Dalgety Bay on the way to/from productive rivers in the inner Forth estuary such as the Teith, Devon and Allan Water.
- 8.4.28 The Forth Fisheries Management Plan<sup>2</sup> includes known distributions of several species including salmon, trout and eel, none of which are indicated in these distributions in southern Fife. Whilst this will partly reflect recording effort, it suggests low significance for these species in the Dalgety Bay area. More significantly, the Forth Fisheries Management Plan indicates that watercourses in the wider area around Dalgety Bay from Inverkeithing to Aberdour were found to *not* contain salmon. Although not specified for this area, this absence is likely to result from either barriers to migration and/or lack of suitable watercourse habitat, and this is likely to also be reflected in other diadromous fish.

## Habitats

- 8.4.29 The following descriptions of habitats within the surveyed area refer to Phase 1 habitat types and are shown on ES Volume 2 - Figure 8.2. 'TN' refers to 'Target Notes', which are also shown in Figure 8.2 and indicate the location of habitat features described below.

## Woodland

- 8.4.30 Woodland is the most extensive habitat within the Survey Area, all classified as mature, broadleaf plantation. The largest woodland stand (TN7) is the Ross Plantation Wildlife Site; this is dominated by mature planted sycamore, but with frequent mature oak *Quercus* sp., a shrub layer of holly *Ilex aquifolium* and hawthorn *Crataegus monogyna*. It has a reasonably good semi-natural ground flora dominated by native bluebell *Hyacinthoides non-scripta*, with frequent broad buckler-fern *Dryopteris dilatata*, locally frequent ground elder *Aegopodium podagraria*, and variable smaller quantities of bramble *Rubus fruticosus* agg. and various herbaceous plants including herb robert *Geranium robertianum*, wood avens *Geum urbanum* and water avens *G. rivale*. The semi-natural ground flora, particularly the extensive native

<sup>1</sup> The largest is the stream running through the upper part of Ross Plantation, ~1m wide with generally low water levels, and culverted beneath the town of Dalgety Bay.

<sup>2</sup> Forth District Salmon Fishery Board & River Forth Fisheries Trust (2009). *A Management Plan for the Forth Catchment*.

bluebell, combined with scattered mature oaks, increases the ecological value of this habitat beyond normal broadleaved plantation (hence it is symbolised differently in ES Volume 2 - Figure 8.2). Rhododendron was also recorded scattered throughout the shrub layer; this is an invasive non-native species and is discussed further in section below.

- 8.4.31 Two other significantly smaller areas of plantation woodland are present to the north and west of the DBSC. These are overwhelmingly dominated by sycamore. The block the north of the DBSC (TN5) has a disturbed ground flora with ruderal species such as common nettle *Urtica dioica* amongst grasses, native bluebell, garlic mustard *Alliaria petiolata* and red campion *Silene dioica*. The block to the west (TN4) has is predominantly mown grassland beneath with occasional small patches of native bluebell.
- 8.4.32 Scattered trees, predominantly sycamore with some ash *Fraxinus excelsior*, are present across parts of the amenity grassland with limited amounts of scattered gorse *Ulex europaeus* and hawthorn scrub also present.

### Grassland

- 8.4.33 Following woodland, the next most abundant habitat type in the surveyed area is amenity grassland. This forms recreational and garden areas along the coast. To the south, between the road named 'The Wynd' and the sea, the amenity grassland contains scattered topiary exotic shrubs and a beech hedge.
- 8.4.34 Thin strips of coastal grassland were recorded along the seaward edge of the Survey Area. Couch grass *Elymus repens* and curled dock *Rumex crispus* were frequent throughout this habitat with other more maritime species in places. The extremely thin strip from New Harbour southwards (TN1) is variable with a variety of herbs including sea mayweed *Tripleurospermum maritimum*, red campion, cat's ear *Hypochaeris radicata* and occasional bird's-foot trefoil *Lotus corniculatus*. The wider patch of grassland at the head of the beach at New Harbour (TN2) is ruderal and dominated by couch grass. The very thin strip between New Harbour and the DBSC (TN3) is very locally wider with red fescue *Festuca rubra*, bird's-foot trefoil, sea plantain *Plantago maritima* and thrift *Armeria maritima*.
- 8.4.35 On the north side of the DBSC the thin strip of coastal grassland is more disturbed with frequent ruderal species and a more limited maritime influence comprising occasional sea mayweed (TN6). Adjacent to Ross Plantation the grassland is less disturbed but continues to display a limited maritime influence comprising species such as silverweed *Potentilla anserina* and common scurvygrass *Cochlearia officinalis* agg.; this maritime influence declines landwards within a few metres, beyond which the grassland is less diverse and classified as semi-improved rather than coastal (TN8).

### GWDTEs

- 8.4.36 The habitats described above contain no species indicative of a water table near or at the surface, and thus no Ground-Water Dependent Terrestrial Ecosystems (GWDTEs) are present within the Survey Area.

### Non-Native Invasive Species

- 8.4.37 Several scattered stands of Rhododendron were recorded amongst the understory vegetation within the Ross Plantation woodland. This plant is regarded as an invasive non-native plant species of UK concern<sup>3</sup>; however, the threat of spread outwith this particular isolated plantation woodland is considered to be low.

<sup>3</sup> These are species identified in Schedule 9 of the WCA (although this now legally applies in England only) and the 14 high-impact plant species identified by Invasive Species Scotland.

## Protected & Notable Species (Survey)

### Terrestrial Protected Species

- 8.4.38 No evidence of specially protected species was recorded during the surveys.
- 8.4.39 The marine habitat of Dalgety Bay is suitable for foraging otter with fish and crustaceans likely to provide a seasonal food resource. The bay is also likely to be used as a commuting feature connecting adjacent freshwater habitats. However, due to the engineered nature of the majority of the foreshore and high level of disturbance from pedestrians and dogs, there is limited suitable habitat for refuge location, and none were found within the Survey Area.
- 8.4.40 No evidence of badgers was found during the surveys. Whilst the Ross Plantation would in theory be suitable for badgers, it is isolated and disturbed by people and dogs, and there is limited other suitable habitat nearby, which renders the Plantation suboptimal. This is reflected in the absence of badger records nearby (the nearest being outside the town of Dalgety Bay to the north-east).
- 8.4.41 No trees or structures within the Survey Area were considered to have greater than negligible potential to support roosting bats. The woodland edges have potential to be used as commuting features or foraging resources.
- 8.4.42 Despite occasional records of red squirrel in the town of Dalgety Bay, the Ross Plantation and nearby woodland is unlikely to sustain a population of red squirrel due to its very isolated nature and small extent. Whilst this does not preclude presence of dreys in this woodland, no dreys were noted in the woodland near the Site during the surveys.
- 8.4.43 As noted above, there is a record of water vole from the short small stream within the woodland of the Ross Plantation (beyond the Survey Area), which is culverted under the town of Dalgety Bay beyond the plantation. As noted previously, this habitat is unsuitable for water vole and it is considered very unlikely that water vole would be present. There will also be no impacts on this area as it is located approximately 350m from the Site.
- 8.4.44 A small area of tree-shaded swamp with limited open water within the Ross Plantation 300m from the Site is considered unfavourable for great crested newt. It is also highly isolated with no connectivity to other suitable habitat, the settlement of Dalgety Bay and the Firth of Forth representing significant barriers in all directions. This habitat may be used by other common amphibians (although this possibility is reduced by the presence of water fowl).

### Marine Mammals

- 8.4.45 During site surveys grey seal were noted hauled out on the Long Craig rock at the mouth of Dalgety Bay (approximately 770m from the Site). Inchmickery and Cow & Calves designated seal haul out area is located 7.5km south east from the Site. No common seals were observed, but their presence (in smaller numbers than grey seals) was confirmed during the desk study and is also demonstrated by the fact that the Firth of Forth is a harbour (common seal conservation area (an area where stringent controls are applied on the granting of licences to kill/remove harbour seals)).

### Benthic Habitat

- 8.4.46 Detailed results of the Intertidal Phase 1 Survey undertaken by Amec Foster Wheeler can be found in the full report (ES Volume 3 - Appendix 8.1). In summary, the shoreline within the Site is typical of a low to moderately exposed climax community. Substrates recorded include bedrock, mixed shingle, and sedimentary shoreline characterised by muddy sand. One Priority Marine Feature (PMF) was recorded, a small patch of blue mussel *Mytilus edulis* on littoral sediments (LS.LBR.Lmus.Myt) east of DBSC. Priority Marine Features are habitats and species which are considered to be marine nature conservation priorities in Scottish waters.

## Receptors Screened out of Further Assessment

### Otterston Loch SSSI

- 8.4.47 There is no credible impact pathway to this SSSI because of: i) the static nature of the notified feature (wetland habitat), ii) distance from the Site (minimum 1.2km), iii) lack of hydrological connectivity to the Site, and iv) the buffering effect of intervening habitat (including the settlement of Dalgety Bay). Therefore no impacts are considered possible on this SSSI.

### Water Vole

- 8.4.48 No suitable habitat for water vole was recorded during the site surveys and although two desk study records were returned within 350m of the Site, these are considered to be erroneous because the watercourse in question is unsuitable. This watercourse is also well beyond disturbance distance. For these reasons no impacts are expected on water vole, and this receptor is not considered further.

### Great Crested Newt & Other Amphibians

- 8.4.49 There are no local records of great crested newt and the shaded swamp with limited open water is considered unfavourable habitat, and is highly isolated by the surrounding settlement of Dalgety Bay and Firth of Forth. For these reasons no impacts are expected on great crested newt, and this receptor is not considered further.
- 8.4.50 Other common amphibian species are potentially present in this swamp area (records of common frog and common toad were returned from the general area of Dalgety Bay town in the desk study). However, based on the distance between the Site and this habitat, and the substantial intervening buffer provided by the Ross Plantation, no impacts are expected on common amphibians, and this receptor is also not considered further.

### Red Squirrel

- 8.4.51 Very small, isolated areas of suitable woodland habitat for red squirrel are present within the Survey Area alongside a small number of desk study records in the wider area of Dalgety Bay. The habitats present are unlikely to sustain a population of red squirrel due to their small area and high degree of isolation, and competition from grey squirrels which are also known to be present from the desk study. However, no evidence of squirrel (such as dreys or feeding signs) were recorded during site surveys within woodland near the Site. For these reasons no impacts are expected on red squirrel, and this receptor is not considered further.

### Badger

- 8.4.52 The Ross Plantation is highly isolated and there is little other suitable habitat for badger nearby. Furthermore, no evidence of badger was recorded during the surveys and all recent badger records were located north east of the town of Dalgety Bay in the area of Otterston Loch and Pinehill Wood 1.2km from the Site. For these reasons no impacts are expected on badger, and this receptor is not considered further.

### Whales and Dolphins

- 8.4.53 Since 1990 two records of dolphin have been recorded within 2km of Dalgety Bay: one striped dolphin and one Atlantic white-sided dolphin. Both are common Atlantic species but are very unusual in inshore waters on the east coast of Britain. It is possible these records are misidentified bottlenose dolphin. The resident population of bottlenose dolphins in the Moray Firth are known to travel as far south as the Firth of Forth but are infrequent visitors (no records of bottlenose dolphin were returned during the desk study). Dolphin species within the Firth of Forth are demonstrated to be highly mobile, infrequent visitors, they are therefore very unlikely to be significantly impacted by the proposed remediation works and as such these receptors are not considered further in this report.



8.4.54 Minke whale was represented only by records of dead whales washed up within the search area. This species is fairly common and widespread within inshore waters around Scotland but as no live records were returned it is difficult to establish the likely frequency that this species visits the Firth of Forth; however, the busy, inner estuary habitat is considered highly unsuitable for this species. Only two records of humpback whale were recorded within the 2km search area in 25 years. This species is highly migratory and is known from inshore waters; however they are extremely rare visitors to inland estuary areas. Given the unsuitability of the habitat in the vicinity of the Site (and proposed barge vessel route), and infrequency of the records of whale species, impacts upon minke or humpback whales are considered highly unlikely and these receptors are not considered further in this assessment.

### Common Seal

8.4.55 Only three records of common seal from the past 25 years were returned from the desk study. The species has suffered a recent population decline in the Firth of Forth with only 148 individuals recorded during the latest available Scottish Rural College Management Area count. Due to the infrequency of records of this species in the vicinity of the Site, impacts upon common seal are considered highly unlikely and this receptor is not considered further in this report. Note however that mitigation proposals regarding the more frequently recorded grey seal could also benefit any rare occurrences of common seal.

### INNS – Rhododendron

8.4.56 As noted in Section 8.4.37 above, several scattered stands of Rhododendron were recorded amongst the understory vegetation within the Ross Plantation woodland. Although this plant is regarded as an invasive non-native plant species of UK concern, and to be responsible for the spread of this plant into the wild is an offence, it does not occur within or in disturbance distance of the Site. For this reason no works are expected to result in the spread of rhododendron, and this receptor is not considered further.

### Notable Plants

8.4.57 As explained above (see protected & notable species), an ambiguous record of sand leek near DBSC is considered erroneous following consultation with the local BSBI recorder, and the record is thought to actually refer to sand leek occurring on the promontory between New Harbour and Donibristle Bay to the south. Sand leek is not considered to occur near the Site. For this reason no impacts are expected on sand leek, and this receptor is not considered further.

### Receptors Assessed in ES Ornithology Chapter

8.4.58 The qualifying species of the Firth of Forth SPA/Ramsar site, Forth Islands SPA and Outer Firth of Forth & St Andrews Bay Complex proposed SPA are all birds. As such, these designated areas and potential impacts upon them are fully identified and discussed in ES Volume 1 - Chapter 9 'Ornithology', along with the notified birds of the Firth of Forth SSSI, rather than in this Chapter. Non-avian notified features of the Firth of Forth SSSI are however considered in this Chapter.

### Value of Ecological Receptors

8.4.59 The assessed value of ecological receptors identified in the baseline conditions are given in Table 8.4 below, together with the rationale.

Table 8.4 – Value of Ecological Receptors

Receptor	Value	Rationale
Firth of Forth SSSI	National	SSSIs are statutory sites designated at the national



Receptor	Value	Rationale
		level.
Ross Plantation Listed Wildlife Site, Green Network Asset and Ancient Woodland	County	This wildlife site has been noted to have significant local conservation importance during the Scottish Wildlife Trusts' Wildlife Sites programme. The presence of extensive native bluebells and frequent mature oaks amongst the dominant sycamore (a scarce habitat in Fife), and its identification as Ancient Woodland, increases its ecological value beyond that of typical plantation. Ancient woodland is a scarce resource described as irreplaceable in Scottish Planning Policy. Loss of or damage to significant areas of ancient woodland would appreciably degrade the county resource but would not be significant nationally.
Ancient Woodland	See right	The only ancient woodland in the Survey Area comprises the Ross Plantation, which is evaluated above.
Other woodland (part of Green Network Asset along coastal edge)	Local / Parish	The Green Network Asset along the coastal edge includes small areas of low ecological value sycamore plantation by the DBSC. The limited coastal grassland and low value sycamore plantation Such woodland habitat is common and widespread and is considered to enhance the local biodiversity resource, but is not of sufficient diversity, rarity, naturalness or extent to be of greater geographic value.
Coastal grassland (part of Green Network Asset along coastal edge)	Local / Parish	The coastal grassland recorded within the whole Survey Area consists of very thin, narrow strips containing common and widespread flora along with a limited and often sparse maritime flora comprising species which are common and widespread along the coast. Given the limited extent of this habitat near the Site, combined with relatively low diversity and lack of rarity, loss or damage to this habitat would be of local significance only.
Other terrestrial habitats	Site/Zone of influence	The other recorded habitats are either i) of low ecological value and both common and widespread (e.g. semi-improved neutral grassland strips) or ii) of negligible ecological value (extensive amenity grassland). These are of site significance only.
Benthic habitats (excluding mud and the PMF which are assessed separately)	Site/Zone of influence	Shingle and hard substrate benthic habitats (see also SSSI for mud habitat and below for PMF benthic habitat) were recorded. The shingle has a negligible ecological value; due to its mobility it supports only few benthic species. The hard substrates are considered to have low to moderate ecological value based on the diversity of lichen and algae present plus associated common Crustacea and invertebrate communities. These habitats are common and widespread, and no protected or notable species were recorded, and as

Receptor	Value	Rationale
		such this receptor is of Site significance only.
Bats	Local / Parish	No bat roosts were recorded in the Survey Area however common bat species are known to be present in the wider area from desk study data. All species of bat are afforded the highest level of legal protection (European Protected Species). Suitable woodland edge habitats are present within the Survey Area which have potential as commuting features/foraging resources. A large reduction of such resources and consequent negative effect on bats would likely be of significance at the local/parish level.
Otter	District	Otters are generally common throughout Scotland where appropriate freshwater habitat exists such as watercourses/water bodies (coastal populations are largely restricted to the north and west). Although common, territories are often large occurring over districts rather than locally. Suitable freshwater habitat is highly localised in the landscape, with the coast in the area of Dalgety Bay likely to primarily provide a commuting function between these areas, as well as a seasonal foraging resource. No otter refuges were recorded within the Survey Area. Given the above, indirect disturbance to otters within the Site would likely be more than locally significant to otter populations, but not of county-level significance or above. Note that strict legal obligations regarding otter under the Conservation Regulations still apply.
Common porpoise	District	This highly mobile marine species was recorded on 11 occasions since 1990 scattered along the coastline within the Survey Area. The species is known to occur in the Firth of Forth on a regular basis, likely when pursuing a foraging resource. Due to the special protection afforded to this species, its high mobility within the Firth of Forth and beyond plus the scattered nature of the desk study records, this receptor is considered to be of district value. Note that strict legal obligations under the Conservation Regulations still apply.
Grey seal	Local / Parish	Grey seals were recorded on Long Craig at the mouth of Dalgety Bay and both seal species are known to be present from the desk study. Both species are known to breed in the Firth, with long established pupping grounds present on rocky islands such as the Isle of May. The seals recorded are likely to have been using Long Craig as a temporary haul out area (this is not a designated haul out area) when exposed by the tide. As such, this receptor is valued as locally significant.
Diadromous fish	Local/Parish	The area around Dalgety Bay is not considered

Receptor	Value	Rationale
		significant for diadromous fish for reasons discussed above, in particular the lack of a significant adjacent watercourse. However, small quantities of such fish, particularly salmon and sea trout smolt avoiding predators, could use the area en route to other parts of the River Forth catchment.
PMF – blue mussel on littoral sediments	Local/Parish	This PMF is known to occur in the Firth of Forth and is recorded frequently around the Dalgety Bay area along the coast of Fife and Edinburgh <sup>4</sup> . Based on the distribution of this PMF in the Firth of Forth, and the very small size of the patch near the Site, this receptor is afforded local/Parish significance.

<sup>4</sup> Source: National Marine Plan Interactive, accessed 20/12/2016  
(<http://www.gov.scot/Topics/marine/seamanagement/nmpihome>)

## 8.5 Assessment

8.5.1 The table below sets out the potential construction and operational impacts on ecological receptors, together with summarised mitigation and resulting residual impacts.

Table 8.5 - Predicted Construction/Operational Impacts on Ecological Receptors

Receptor	Magnitude & extent	Timing, frequency, duration & reversibility	Impact significance (unmitigated)	Proposed mitigation	Residual impact significance
Firth of Forth SSSI	<p>1.6ha of this SSSI (0.025%) is within the direct working footprint of the remediation works and will be subject to disturbance. Of the notified habitat features, only neutral grassland and mudflats are present.</p> <p>The affected neutral grassland (the surveyed thin coastal grassland strip within the Site) is very small at c.0.026ha. The majority of this is disturbed species-poor grassland (in Area BN), only 0.003ha being part of the extremely thin more maritime-influenced strip along the coastal edge south of the DBSC (Area H), which does not however contain scarce or notable species. A very small area (0.007) of non-notified amenity grassland habitat will be lost, this habitat is non-functional to the SSSI (no notified bird species were recorded roosting here – see ES Volume 1 – Chapter 9).</p> <p>The nature of and extent of these grasslands rules out significance for the northern brown argus and beetle</p>	<p>Minimal loss of very small areas of lower value notified coastal grassland, this can be reversed and enhanced by sowing coastal grassland seed mix (see right).</p> <p>Irreversible loss of an extremely small area of mudflat habitat.</p>	<p>No significant impact on SSSI as a whole. This receptor was valued at national level but due to the nature of and extremely small areas of habitat affected, impacts are considered significant at site or local level only.</p> <p>In addition, SSSI consent will be obtained through the planning process.</p>	<p>It is recommended that a coastal grassland seed mix of local provenance be sown along the coastal edge to replace and enhance the minor loss of coastal grassland at the edge of Area H at negligible cost (see Coastal Grassland section below).</p>	<p>No significant impact on SSSI as a whole. Probable positive impact at site or local level following sowing of coastal grassland seed mix along headland edge (see Coastal Grassland section below).</p>

Receptor	Magnitude & extent	Timing, frequency, duration & reversibility	Impact significance (unmitigated)	Proposed mitigation	Residual impact significance
	<p>assemblage notified features.</p> <p>Marginal areas (0.09ha) of mudflat will be affected (mostly marine biotope type LS.LSa.FiSa.Po – Polychaetes in littoral fine sand) which contributes to the SSSI designation. The area of habitat to be disturbed in proportion to the area of mud in Dalgety Bay or the SSSI is extremely small. No changes are expected to coastal processes so no indirect impacts are expected on marine habitats beyond the immediate area of the works footprint.</p> <p>The remaining habitat within the affected area of the SSSI is 1.5ha of intertidal rock substrate; this habitat is not a SSSI notified feature and is discussed in the 'benthic habitat' section below.</p> <p>As described in the Ornithology chapter, only a small number of a limited species of birds utilised the area of the SSSI within the works footprint for foraging (the maximum noted at any one time was 12 redshank) indicating it is a poor quality foraging area. It is therefore unlikely to contribute significant resource to the carrying capacity of the designated area, and as such this minor loss of habitat is not expected to affect the avian assemblage of the SSSI.</p> <p>No significant geological features are</p>				

Receptor	Magnitude & extent	Timing, frequency, duration & reversibility	Impact significance (unmitigated)	Proposed mitigation	Residual impact significance
	present in the surveyed area.				
Ross Plantation Listed Wildlife Site, Green Network Asset & Ancient Woodland	A very small area (0.01Ha) of peripheral vegetation at the east corner of this woodland will be lost to the working footprint of the remediation works. This comprises species-poor rough grassland with some scrub. No trees will be removed, as the Site does not encroach far enough. This loss is extremely small in relation to the size of the Wildlife Site and insignificant since the Wildlife Site and Ancient Woodland comprises the woodland and no trees will be removed.	As the Site does not encroach into the woodland, disturbance will be temporary. The works will take place over two summers, after which the peripheral vegetation will be left to naturally regenerate. It is expected that a rough grassland flora will develop and be comparable to baseline conditions within the a few growing seasons.	No significant impact	None required	No significant impact
Other woodland (part of Green Network Asset along coastal edge)	The loss of a line of very small thin immature sycamore trees (up to c.5 trees) may be required to facilitate construction of the new slipway. These trees have negligible ecological value limited to potential use by breeding birds (although such use is unlikely given immediately adjacent disturbance by people and negligible cover). Given the plentiful mature plantation, this very slight impact is not considered significant at any level.	Reversible in the medium term through regrowth if allowed, but since the impact is slight this is not obligatory.	No significant impact	None required, given the very small nature of these trees and plentiful adjacent mature plantation.	No significant impact
Coastal	Approximately 0.07ha of coastal	It is expected that the	Significant impact at	Ensure the	Probable positive impact



Receptor	Magnitude & extent	Timing, frequency, duration & reversibility	Impact significance (unmitigated)	Proposed mitigation	Residual impact significance
grassland (part of Green Network Asset along coastal edge)	grassland habitat will be lost to the working footprint of the remediation works, this includes 0.04ha of this habitat outwith that discussed under Firth of Forth SSSI above. As noted above the grassland in Area BN is poor. The very small amount (0.01ha) of slightly more maritime grassland within the Site along the headland (Area H) is better quality.	less floristically diverse ground flora along the eastern aspect (Area BN) will regrow to be comparable with baseline conditions within a few growing seasons. The better quality but very narrow strip in Area H is likely to be permanently impacted by the construction disturbance and installation of concrete headwalls, but this can be reversed and enhanced by sowing coastal grassland seed mix (see right).	site level only	remediation includes sowing of a coastal grassland seed mix of local provenance in the area behind the concrete headwall in Area H once filled with topsoil.	at Site or Local level following sowing of coastal grassland seed mix.
Other terrestrial habitats	All other habitats involve small encroachments upon amenity and semi-improved neutral grassland of low ecological value.	Partially reversed as amenity grassland disturbed by the working footprint will be reinstated.	No significant impact	None required	No significant impact
Benthic habitats (excluding mud and the PMF which are assessed)	0.16ha of shingle habitat will be lost to the works footprint. This habitat does not support a rich fauna and therefore the loss of such a small area is considered negligible. 1.2ha of hard rocky shore substrate may be lost or at least highly	Possible permanent loss of up to 1.2 ha of moderately diverse hard substrate benthic habitat. It is highly probable that the rock	Significant impact at site level only	Natural recolonization of installed hard substrate (rock armour) comparable to	Significant impact at site level only

Receptor	Magnitude & extent	Timing, frequency, duration & reversibility	Impact significance (unmitigated)	Proposed mitigation	Residual impact significance
separately)	disturbed by the works footprint. Where lost this habitat will be replaced by rock armour which will provide a similar substrate.	armour installed will be colonised by similar benthic habitats to those that are currently present, although due to changes in exposure/rock chemistry these may not be identical to the baseline.		the baseline will occur over time (but the duration and extent of this natural mitigation cannot be known).	
Bats	No bat refuges were recorded but bat species may use the woodland areas as a foraging/commuting resource. Since no trees will be removed, with possible exception of up to five very thin immature sycamores by the slipway, no significant impacts upon this receptor are likely.	Possible permanent loss of up to five thin immature sycamore of negligible consequence at the slipway. Possible temporary and localised disturbance over two summers from works beside woodland will be limited.	No significant impact	None required	No significant impact
Otter	Indirect disturbance may occur to otters using the coastal areas within and near to the Site and barge route. Due to the very busy nature of Dalgety Bay with the popular local sailing club and frequent walkers (often with dogs), it is very likely that otter populations using this area are already habituated to a level of disturbance. Additionally, the vicinity of	Temporary disturbance over two summers is possible but likely to be minimal given the lack of otter evidence at Dalgety Bay apart from a single desk study record of otter nearby	Unlikely significant negative impact at the District level.	Standard method statements and mitigation to minimise impacts upon commuting/ foraging otter (and other non-	No significant impact

Receptor	Magnitude & extent	Timing, frequency, duration & reversibility	Impact significance (unmitigated)	Proposed mitigation	Residual impact significance
	the Site does not constitute high quality otter foraging habitat.	in the Firth of Forth at Inchcolm. No significant loss of foraging area.		protected mammals)	
Common porpoise	<p>Over 25 years only 9 live records of this species were returned during the desk study however they are known to be infrequent visitors to the area. Disturbance may occur to porpoise using the coastal areas within and near to the Site and barge route.</p> <p>However, works will be timed to coincide with low tide (necessary to allow access to the working area) therefore minimal noise/vibration will occur within the water. Work below the MLWS will be required to install a small area of the jetty structure. This will be constructed using pre-cast concrete sections, no piling will be required, and therefore noise/vibration which may potentially affect marine mammals present nearby will be reduced to a minimum. 31 barge movements are anticipated over 2 summer seasons; this increased maritime activity is considered to be insignificant in relation to the baseline activity within the Firth of Forth, to which the receptor is already likely to be habituated.</p>	Possible temporary disturbance over two summer seasons.	No significant impact	The design of the works process (see left) constitutes in-built design mitigation. No further mitigation is considered necessary.	No significant impact
Grey seal	Disturbance may occur to grey seal	Possible, temporary	No significant impact	The design of	No significant impact

Receptor	Magnitude & extent	Timing, frequency, duration & reversibility	Impact significance (unmitigated)	Proposed mitigation	Residual impact significance
	<p>using the coastal areas within and near to the Site and barge route; or to animals hauled out on Long Craig, Inchcomb or Haystack. Due to the very busy nature of the Firth of Forth with many recreational and commercial boats/ships, it is very likely that seal populations are already habituated to certain levels of disturbance.</p> <p>Works will be timed to coincide with low tide (necessary to allow access to the working area) therefore minimal noise/vibration will occur within the water. Work below the MLWS will be required to install a small area of the jetty structure. This will be constructed using pre-cast concrete sections, no piling will be required, therefore noise/vibration which may potentially affect marine mammals present nearby will be reduced to a minimum. Barge movements will take place at high tide (necessary to allow access into the bay) therefore avoiding the period when seals are most likely to be hauled out on the smaller, nearby outcrops such as Long Craig.</p>	disturbance over two summer seasons.		the works process (see left) constitutes in-built design mitigation. No further mitigation is considered necessary.	
Diadrom-ous fish	Impacts on diadromous fish are considered negligible because: a) the area around Dalgety Bay is not considered significant for diadromous	Impacts would be temporary but also negligible (see left).	No significant impact	The design of the works process (see left) constitutes	No significant impact

Receptor	Magnitude & extent	Timing, frequency, duration & reversibility	Impact significance (unmitigated)	Proposed mitigation	Residual impact significance
	fish; b) the works footprint is very small compared to the whole of Dalgety Bay and nearby marine habitat; c) coastal processes are not expected to change such that indirect impacts on marine habitat further afield are unlikely; d) the works process will not result in excessive underwater vibrations (because the majority of work will take place at low tide and the small area at the slipway requiring work in water will involve pre-cast concrete sections with no piling) and e) release of sediment and contaminants into the water of the Firth of Forth (a concern raised by RFFT) will be avoided through stringent pollution control measures.			in-built design mitigation. No further mitigation is considered necessary.	
PMF – blue mussel on littoral sediments	This Priority Marine Feature (PMF) is located over 75m from the works footprint at Area H, therefore no direct impacts are anticipated. AECOM's Coastal Processes Report (January 2017) states that the development will not significantly impact the sediment transport processes within Dalgety Bay beyond 5-10m from the works footprint, therefore changes in the baseline intertidal habitats out with this area as a result of the works are not considered likely. Barge movements are proposed to enter the Site from a south-easterly direction; the PMF exists due east from	Coastal processes are not expected to change as a result of the development in the short or long term, and the works (including barge movements) are not expected to impact this PMF.	No significant impact	Suitable method statements will ensure that pollution (including disturbance of sediments outside the works footprint) does not occur.	No significant impact

Receptor	Magnitude & extent	Timing, frequency, duration & reversibility	Impact significance (unmitigated)	Proposed mitigation	Residual impact significance
	the Site and as such barge movements are not likely to have an effect on this feature.				



## 8.6 Mitigation and Monitoring

### Design Mitigation

- 8.6.1 The minimal area of the works footprint results in negligible impingement on terrestrial habitats. The re-landscaped and seeded sections at the head of the new revetments in Areas H and S will partially compensate for loss of coastal grassland habitat, and potentially enhance the local floral biodiversity. Additionally, careful siting of the construction compound on amenity grassland habitat further reduces the ecological impact of the Development.
- 8.6.2 The in-built timing of the works (over two, six-month summer periods) will be a primary mitigating component. Works will take place during the day avoiding impacts upon crepuscular/nocturnal receptors including bats and otter.
- 8.6.3 Construction works and depositing of materials will take place at low tide, which will reduce the potential for disturbance to marine mammals and fish through noise/vibrations traveling within the water.
- 8.6.4 Finally, barge movements will take place at high tide and as such will cause minimal disturbance to grey seals using haul out features in close vicinity.

### General Mitigation

- 8.6.5 A Construction Environmental Management Document (CEMD) and associated Construction Method Statements (CMSs) will be produced by the Contractor and agreed with the relevant authorities in advance of construction. This will detail environmental effects, mitigation measures, timescales and responsibilities.
- 8.6.6 Works will be supervised when necessary by an Ecological Clerk of Works (EcoW). In particular the EcoW will: a) supervise clearance of breeding bird habitat during the breeding season (see ES Volume 1 – Chapter 9 for further discussion); and b) ensure that mitigation measures to avoid pollution are effective.
- 8.6.7 The following standard procedures should be incorporated into Method Statements to avoid potential disturbance to protected species using the Site and surrounding habitat during the works:
  - Avoid suitable protected species habitat where possible and avoid creating any obstructions to commuting features (such as woodland edges);
  - Where possible, avoid working during the hours of darkness and within 2 hours after sunrise and 2 hours before sunset; and,
  - Providing exit ramps from any exposed trenches or holes (to prevent otters, and other mammals, entering and becoming trapped).
- 8.6.8 Good practice management measures for working near water will be adhered to including SEPA Pollution Prevention Guidelines. Controls and contingency measures will be provided for management of run-off from construction areas, silt management, and management of fuel, oil, chemicals and materials.
- 8.6.9 The introduction and spread of Marine Non-Native Species (MNNS) should be managed by producing a Marine Biosecurity Plan and following the Scottish Governments Code of Practice on Non-Native Species. This code of practice recommends the following which are the main elements of a biosecurity plan:
  - Adopting a precautionary approach and not carrying out operations which might lead to the spread of NNS until there is a clear understanding of the situation;
  - Carrying out risk assessments to understand the risk of spreading a NNS, setting out how to avoid it happening;
  - Seeking advice and following good practice; and,
  - Reporting the presence of NNS.
- 8.6.10 No additional monitoring is considered necessary with respect to Nature Conservation.

## 8.7 Residual Effects

- 8.7.1 All residual effects assessed in this Chapter are insignificant, with the exception of one significant impact upon intertidal habitat at the Site level only. This constitutes a minor loss (1.3Ha maximum) of rocky substrate benthic habitat which will be replaced largely by rock armour and the new Slipway structure.
- 8.7.2 It is likely that in the long term intertidal habitats comparable to baseline conditions will colonise the new rock substrate, however this receptor has been assessed as such due to the undeterminable time scale in which habitats will recolonise the new rock substrate, and lack of certainty regarding the exact habitats which will occur.
- 8.7.3 Residual effects also includes one probable positive impact (at site or local level only) following successful sowing and growth of coastal grassland seed mix behind the new concrete headwall in Area H.

## 8.8 References

- Chanin, P. (2003). Monitoring the Otter *Lutra lutra*. Conserving Natura 2000 Rivers Monitoring Series No. 10, English Nature, Peterborough.
- CIEEM (2016). Guidelines for Ecological Impact Assessment in the United Kingdom. CIEEM, Winchester.
- Fife Biodiversity Partnership (2013) Fife Local Biodiversity Action Plan (LBAP). Fourth Edition. Fife Council.
- FIFEplan Proposed Plan interactive mapping accessed between 5<sup>th</sup> and 19<sup>th</sup> December 2016 (<http://arcgisweb.fife.gov.uk/LocalViewExt/Sites/ldpPROPOSED/>)
- Harris, S., Cresswell, P. & Jefferies, D. (1989). Surveying Badgers – An occasional publication of the Mammal Society, No. 9. Mammal Society, London
- Hundt, L. (ed) (2012). Bat Surveys: Good Practice Guidelines (2nd edition). Bat Conservation Trust, London.
- JNCC (2010). Handbook for Phase 1 habitat survey – a technique for environmental audit. JNCC, Peterborough.
- Kruuk, H. (2006). Otters: ecology, behaviour and conservation. Oxford University Press, Oxford.
- Liles, G. (2003). Otter Breeding Sites. Conservation and Management. Conserving Natura 2000 Rivers Conservation Techniques Series No. 5, English Nature, Peterborough.
- National Marine Plan Interactive, accessed 20/12/2016 (<http://www.gov.scot/Topics/marine/seamanagement/nmpihome>)
- Scottish Biodiversity List
- SNH SiteLink website (<http://www.snh.gov.uk/publications-data-and-research/snh-information-service/>)
- Strachan, R. (2007). National survey of otter *Lutra lutra* distribution in Scotland 2003-04. Scottish Natural Heritage Commissioned Report No. 211 (ROAME No. F03AC309).

## 9. ORNITHOLOGY

### 9.1 Introduction

- 9.1.1 This Chapter provides an assessment of the potential impacts on birds resulting from the physical implementation of the preferred option for remediation identified through the Management Strategy. ES Volume 1 - Chapter 2 provides a detailed description of the physical works and construction processes required for implementing the Management Strategy.
- 9.1.2 Proportionate measures are provided in this chapter to avoid, mitigate or compensate for predicted adverse impacts, and, where appropriate, enhancement measures.
- 9.1.3 The following Appendices support this assessment:
- ES Volume 3 - Appendix 9.1: AECOM ornithology baseline report;
  - ES Volume 3 - Appendix 9.2: AMEC ornithology baseline report;
  - ES Volume 3 - Appendix 9.3: AMEC desk study report; and,
  - ES Volume 3 - Appendix 8.1: AMEC intertidal survey report.
- 9.1.4 The following drawings support this assessment:
- ES Volume 2 - Figure 9.1: Map showing designations within 5km;
  - ES Volume 2 - Figures 9.2 – 9.5: Terrestrial breeding birds visits 1 to 4;
  - ES Volume 2 - Figure 9.6: VP locations for waterfowl surveys;
  - ES Volume 2 - Figure 9.7: Map of all recorded roosting locations April-September 2015;
  - ES Volume 2 - Figure 9.8: Map of all recorded foraging locations April-September 2015;
  - ES Volume 2 - Figure 9.9: Map of all recorded other behaviour locations April-September 2015; and,
  - ES Volume 2 - Figures 9.8 – 9.14: Maps showing recorded locations of separate species April-September 2015.
  - ES Volume 2 – Figures 9.15 – 9.17: Maps showing wider noise modelling extents than those given for the Noise Chapter (ES Volume 1 - Chapter 11), in order to better demonstrate impacts on birds.

### 9.2 Legislative Background

- 9.2.1 This Section summarises the most relevant legislation and planning policy.

#### Conservation (Natural Habitats, &c.) Regulations 1994 (as amended in Scotland)

- 9.2.2 With respect to birds, the most important aspect of the 'Habitats Regulations' (which implement the EU Habitats Directive) is the designation and protection of European sites for birds, which are known as Special Protection Areas (SPAs). Developments affecting European protected sites such as SPAs must be subject to a Habitats Regulations Appraisal (HRA), and site integrity must be maintained.

#### Wildlife & Countryside Act 1981, Nature Conservation (Scotland) Act 2004 and Wildlife & Natural Environment (Scotland) Act 2011 (as amended in Scotland)

- 9.2.3 In addition to many other nature conservation aspects, these Acts govern the protection of birds, and the notification and protection of Sites of Special Scientific Interest (SSSIs) some of

which are notified for ornithological interest. Additionally, these Acts place a duty on public bodies to further the conservation of biodiversity.

9.2.4 Under this legislation it is an offence to intentionally or recklessly:

- Kill, injure or take any wild bird or its eggs;
- Take, damage, destroy or interfere with the nest of any wild bird whilst in use or being built (or at any time for eagles), or obstruct/prevent any wild bird from using its nest;
- Disturb birds listed on Schedule 1 at or near an active nest or lek, or their dependent young (or harass eagles, hen harrier or red kite at any time).

9.2.5 Licensing is generally not possible for wild birds for development purposes. Developments affecting SSSIs are generally only allowed if there are reasons of national importance and site integrity will be maintained.

### EC Directive 2009/147/EC on the Conservation of Wild Birds ('Birds Directive')

9.2.6 Transposition of the Birds Directive into Scottish law occurs via the Wildlife & Countryside Act, Habitats Regulations and other legislation. Annex I lists rare, vulnerable and regularly occurring migratory bird species for which SPAs must be designated. Most Annex I species are also on Schedule 1 of the Wildlife & Countryside Act; some are not but are still regarded as important by statutory nature conservation agencies. Species on Annex I but not Schedule 1 include: common, arctic and sandwich terns; golden plover; bar-tailed godwit; the UK breeding subspecies of dunlin; little egret; nightjar; short-eared owl; barnacle goose; and lesser and Greenland white-fronted geese.

### Birds of Conservation Concern 4 (BoCC4)

9.2.7 The latest BoCC list ('BoCC4') was published in 2015. Species on the BoCC4 Red List show severe declines in population or range, or are globally threatened. Species on the BoCC4 Amber List show moderate declines in population or range, or are rare/localised breeders, on the European Red List, or have internationally important populations in the UK. Species on the Green List are not of conservation concern. BoCC4 confers no legal status but assists in evaluating impacts and determining proportionate mitigation.

### Scottish Planning Policy (SPP), 2014

9.2.8 SPP recognises the environment as a national asset offering opportunities for enjoyment, recreation and sustainable economic activity. In summary, the policy principles most relevant to ornithology state that the planning system should:

- facilitate positive change while maintaining/enhancing distinctive landscape character;
- conserve and enhance protected sites and species, maintaining healthy ecosystems and the natural processes which provide important services to communities;
- protect and improve the water environment and soil;
- protect and enhance ancient woodland, hedgerows and trees with high ecology/landscape value; and,
- seek biodiversity benefits from new development where possible.

9.2.9 SPP emphasises the biodiversity duty of public bodies and the legislative requirements for protected sites and species (of which the ornithological aspects are summarised above).

## 9.3 Assessment Methodology

### Approach to the Assessment

- 9.3.1 In order to accurately predict the potential impacts associated with the proposed remediation works upon bird species, an extensive programme of bird surveys was undertaken. The bird surveys took account of the status and sensitivity of birds likely to be present, and were designed to consider the likely effects on birds associated with:
- The effects of direct habitat loss within the works footprint;
  - Modifications to inter-tidal habitats as a consequence of the hard engineering associated with the remedial works;
  - Disturbance to birds within the work area and environs, as a consequence of construction work within and adjacent to the foreshore, as well as the movement of construction vessels delivering material (rock armour) to Site.
- 9.3.2 The degree of disturbance/displacement of birds by various factors was the subject of a literature review undertaken by AMEC Foster Wheeler (see Appendix 9.3), and the bird surveys included disturbance monitoring. The degree to which the works are likely to change coastal processes and sedimentation (and hence intertidal habitat used by birds) has also been assessed (see AECOM Coastal Processes Report (February 2017) submitted as part of the planning and marine licence applications).

### Consultations & Desk Studies

- 9.3.3 Throughout the planning and the implementation of the bird surveys, as well as the compilation of this report, due attention has been given to previous consultations undertaken by AMEC Foster Wheeler, which included statutory and non-statutory conservation organisations. The desk study by AMEC Foster Wheeler (see Appendix 9.3) included BTO Wetland Bird Survey (WeBS) data and a literature review of bird disturbance, and this information is incorporated into this Chapter.

### Survey Methodology – Summer & Winter Waterfowl

- 9.3.4 The survey methodology consisted of twice monthly site visits between the months of September 2014 and September 2015. The survey methodology was based on the Wetland Bird Survey (WeBS) (Gilbert et al 1998) with modifications made based upon the requirements of this particular study. Each survey comprised a six hour watch undertaken from two vantage points, to best cover the Study Area. The focus of the visits alternated between a three hour watch either side of high tide, and three hours either side of low tide. The surveys undertaken between late September 2014 and March 2015 were undertaken by AMEC Foster Wheeler, and thereafter until early September 2015 by AECOM.
- 9.3.5 Dates, times and tidal/weather conditions of the surveys are given in Table 9.1 below.

Table 9.1 - Dates, Times and Conditions of Surveys.

Visit no.	Date	Survey Period	Tidal State	HT / LT time	Weather
1	24/09/2014	0719-1219	L	0919	Dry, Wind W F1, Visibility >1km, Cloud Cover 2/8, Temp 11c
2	25/09/2014	1317-1917	H	1617	Dry, Wind W F4-5, Visibility >1km, Cloud Cover 8/8, Temp 15c
3	10/10/2014	0721-	L	1021	Dry, Wind W F1, Visibility >1km,

Visit no.	Date	Survey Period	Tidal State	HT / LT time	Weather
		1321			Cloud Cover 4/8,
4	21/10/2014	1104-1704	H	1404	Dry, Wind WNW F6-7, Visibility >1km, Cloud Cover 2/8,
5	05/11/2014	1015-1615	L	1315	Dry, Wind NE F1-2, Visibility >2km, Cloud Cover 2/8,
6	14/11/2014	0940-1540	H	1240	Heavy rain, Wind SE F5-7, Visibility 1km, Cloud Cover 8/8
7	04/12/2014	1001-1601	L	1301	Dry, No wind, Visibility >1km, Cloud Cover 6/8,
8	16/12/2014	1015-1615	H	1312	Dry, Wind S F2-3, Visibility >1km, Cloud Cover 2/8,
9	13/01/2015	0930-1530	L	1218	Snow showers, Wind SE F2-3, Visibility >2km, Cloud Cover 5-7/8,
10	30/01/2015	0815-1415	H	1109	Dry, Wind SE F2, Visibility >2km, Cloud Cover 2/8, Temp 11c
11	12/02/2015	1015-1615	L	1315	Dry, Wind W F1-2, Visibility >1km, Cloud Cover 0-8/8,
12	16/02/2015	0915-1515	H	1215	Dry, Wind SE F1-2, Visibility >2km, Cloud Cover 7/8,
13	04/03/2015	1100-1700	H	1352	Dry, Wind SE F3, Visibility >2km, Cloud Cover 3/8,
14	13/03/2015	0905-1505	L	1205	Dry, Wind SW F0-1, Visibility >2km, Cloud Cover 7/8,
15	30/04/2015	09.40	H	12.40	Dry, Wind F4, Visibility >1km, Cloud 40%
16	06/05/2015	06.40	L	09.42	Rain, Wind F2, Visibility >1km, Cloud 100%
17	04/06/2015	13.00	H	16.01	Dry, Wind F4, Visibility >1km, Cloud 40%
18	23/06/2015	09.30	L	12.30	Dry, Wind F4, Visibility >1km, Cloud 40%
19	13/07/2015	09.30	H	12.36	Dry, Wind F4, Visibility >1km, Cloud 40%
20	24/07/2015	10.15	L	13.24	Dry, Wind F4, Visibility >1km, Cloud 40%
21	13/08/2015	10.21	H	14.12	Dry, Wind F1-2, Visibility >1km, Cloud 10%
22	28/08/2015	06.02	L	08.10	Dry, Wind F1, Visibility >1km, Cloud 45%
23	09/09/2015	10.33	H	13.15	Dry, Wind F2-3 Visibility >1km, Cloud



Visit no.	Date	Survey Period	Tidal State	HT / LT time	Weather
					100%

## Targeted Species

- 9.3.6 Priority species targeted during the surveys consisted of all those designated via the Firth of Forth SPA/Ramsar/SSSI, Forth Islands SPA, Inchmickery SSSI and the Outer Firth of Forth & St Andrews Bay Complex pSPA. Other non-designated waterbirds were also recorded.

## Hourly Counts

- 9.3.7 Based consecutively around either high or low tide (three hours either side), each count commenced on an hourly basis, as stated previously the survey methodology was based upon the Wetland Bird Survey (WeBS) (Gilbert et al. 1998) with modifications, as a means of promoting observation mapping, presentation and recording.
- 9.3.8 The Study Area consisted of a one kilometre zone around Dalgety Bay, based upon two vantage points (see ES Volume 2 - Figure 9.2); their locations were selected as a means of optimising the coverage of the bay and Site allowing for the constraints associated with land access issues and minor visual obstructions (refer to the Survey Constraints section of this Chapter below).
- North Vantage Point (Winter) NT 16464 83188
  - South Vantage Point (Winter) NT 16472 83060
  - North Vantage Point (Summer) NT 16446 83263
  - South Vantage Point (Summer) NT 16201 82851 (moved due to access constraints, with agreement from SNH)
- 9.3.9 To further the mapping of species observations, the 1km zone was subdivided into five distance bands of 200m each. Once a target species was observed its location was mapped within the appropriate distance band, using the corresponding BTO species code. Where several birds of the same species were recorded within close proximity to each other, a central representative point was selected by the observer and mapped accordingly. This was particularly appropriate when recording large numbers of roosting or feeding birds, in such instances birds would be divided into blocks, counted and mapped accordingly.
- 9.3.10 In-addition to target species being mapped, a corresponding entry was documented on an hourly count recording form, which also detailed the observed distance zone, species code, number of individual birds and an activity code as detailed below:
- A. Feeding / foraging;
  - B. Roosting / loafing;
  - C. Alert but neither feeding or foraging; or
  - D. Other i.e. preening.
- 9.3.11 Other than the first survey (six hourly counts) seven hourly counts were achieved per visit, with each count following a largely progressive sequence around the Study Area, as a means of reducing errors associated with double counting due to bird movements.
- 9.3.12 The majority of the Study Area was observable from the north vantage point; consequently the majority of the hourly counts were undertaken from this location. The surveyor moved to the south vantage point in-order to count the remaining part of the Study Area not visible from the previous.
- 9.3.13 All surveys were undertaken during conditions with at least 1km visibility.



## Disturbance Monitoring

- 9.3.14 On conclusion of the hourly count surveys, all disturbance events which occurred within the Study Area viewed from the north vantage point were recorded, as the majority of the Study Area could be observed from this location.
- 9.3.15 During each disturbance event the target species was recorded; together with the number of individuals involved, and their response. The disturbance responses of birds were categorised into the following five types:
- Level 1 – No response;
  - Level 2 – Behavioural change (alarm calls, alarm posture, heads up, change in feeding /roosting activity etc.);
  - Level 3 – Take flight / move but return to within 200m of original location;
  - Level 4 – Take flight / move >200m from original location but remain within the survey area; and,
  - Level 5 – Departure from the survey area.
- 9.3.16 The types of disturbance event were also recorded, which included walkers, dog walkers, radiation monitoring personnel, boats and people working on boats.

## Survey Constraints

- 9.3.17 Moored sailing boats in the Study Area sometimes caused visual obstructions, but not to a degree considered significant.
- 9.3.18 Owing to land access issues the southern vantage point had to be relocated to an area west of DBSC, resulting in the surveyor being absent from the main north vantage point for periods of up to 30 minutes during each count. This may have caused some disturbance events to go unobserved, although again not to a degree considered significant.

## Survey Methodology – Terrestrial Breeding Birds

- 9.3.19 Breeding bird surveys were undertaken in April, May and June 2016 by an AECOM ecologist experienced in ornithological survey, using an adaptation of the Common Bird Census methodology and comprising four survey visits. A transect was devised such that all vegetation within the Site, and where possible beyond this, were approached within 50m. Each survey visit began shortly after dawn and was finished within four hours of sunrise. The conditions during all the surveys were ideal or satisfactory (wind Beaufort 0 to 3; no precipitation; good visibility; not sub-optimally cold). In addition to recording of breeding birds during the bird survey visits, records were also kept of more notable breeding species found during other fieldwork. Occupied nests, adults carrying food or nest material, and newly fledged young were taken as definite breeding signs; displaying, singing, territorial dispute and alarm calling were considered to indicate likely breeding activity. Field mapping of BTO species and activity codes was undertaken using high resolution aerial photography combined with Ordnance Survey mapping to maximise accuracy, and subsequently digitised using ESRI ArcGIS.

## Impact Assessment Methodology

- 9.3.20 This assessment is based on Ecological Impact Assessment (EcIA) guidelines produced by the Chartered Institute of Ecology and Environmental Management (CIEEM 2016), which provide guidance on evaluating ecological receptors, characterising impacts upon them, and assessing whether impacts are significant.

## Assessing the value of receptors

9.3.21 The value of receptors is determined according to a geographical frame of reference, based on the nature conservation importance of a receptor, as defined in Table 9.2 below.

Table 9.2 - Geographic Values for Ecological Receptors

Value	Examples of types of receptor (subject to professional judgement)
International	Internationally designated site (or candidate/proposed international site). Sustainable area (or part of a larger sustainable area) of Annex I habitat. Sustainable internationally-significant population or site supporting one.
National (UK or Scotland)	Nationally designated site (or site considered worthy of such designation). Sustainable area of a national priority habitat which is a significant proportion of the resource. Sustainable nationally-significant population (e.g. 1% of national resource) or site supporting one.
County (Fife)	County site designation (e.g. LNR, LNCS/SINC). Sustainable area of a county priority habitat which is a significant proportion of the resource.
District	Habitats or populations considered intermediate between county value and local value.
Local / Parish	Priority habitat not large enough for higher value, or degraded with low restoration potential. Habitat or population which appreciably enriches the local resource.
Site/Zone of influence	Heavily managed or modified habitat of low ecological value. Common and widespread species.

9.3.22 Valuation of ecological receptors is subject to professional judgement, based on factors such as:

- Rarity, endemism, mobility and geographic range;
- Trends, size/extent and vulnerability;
- Typicalness, diversity, and connectivity/fragmentation;
- Value to other receptors (e.g. buffer habitat or food source);
- Potential for substitution/re-creation; and,
- Sustainability and intrinsic value to stakeholders.

9.3.23 Valuation is not automatically affected by legislative protection or priority listing. For example, badgers are strictly protected but may only be of local value if widespread and common (though legal requirements must still be met). Similarly, species or habitat action plans are aids to conservation and do not imply specific value, since occurrences may be fragmented, atypical or otherwise in unfavourable condition. Thus a habitat may be a national or local priority, but valuation considers the amount and quality so that small areas of poor-quality habitat are not over-valued.

## Assessing Impacts

9.3.24 Likely impacts are characterised using the parameters outlined in Table 9.3 below.

Table 9.3 - Impact Parameters

Parameter	Description
Direction	Whether the impact will have a positive or negative effect.
Magnitude	The 'size', 'amount' or 'severity' of the impact, determined quantitatively as far as possible.
Extent	The area over which the impact occurs.
Duration	The time the impact is expected to last before recovery or replacement (if possible) of the receptor, considered on an ecological rather than human timescale. The duration of an impact can exceed the duration of the activity causing it (e.g. breeding failure after the activity causing it).
Timing and Frequency	Precise timing of an activity is important since the impact might not occur if it avoids critical seasons or life stages. Frequency considers activity repetition, which can cause greater impact.
Reversibility	A reversible (temporary) impact permits recovery in a reasonable timescale or effective mitigation.

9.3.25 Impacts may occur during the construction, operation and decommissioning phases of a development. They may be direct or indirect (also termed secondary). Direct impacts are attributable to an action associated with a development. Indirect impacts are often produced away from a development or as a result of other initial impacts.

9.3.26 Consideration is also given to cumulative impacts, since impacts acting in combination may have a cumulative impact exceeding that of the separate impacts. Cumulative impacts on a receptor may arise from a combination of impacts from the development itself (e.g. impacts at the construction and operation stages), or the combined impacts from different developments.

## Assessing Significance

9.3.27 An impact (positive or negative) is significant at a specified geographical level if it affects the integrity of a site or ecosystem or the conservation status of a species or habitat. If not significant at the level the receptor was valued, an impact could be significant at a lower geographical level.

9.3.28 The integrity of a site or ecosystem is defined as *"the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified"*. Sites or ecosystems achieving this are in favourable condition. Consideration is given to whether site processes will be removed or changed, effects on component habitats or average population size/viability of component species, and whether these effects will move condition away from favourability.

9.3.29 Initially, impact significance does not consider mitigation/enhancement measures. Determination of residual impacts takes this into account, with the aim that, wherever possible, residual impacts are not significant or significant at a lower geographic level than the unmitigated impacts.

## 9.4 Consultation responses

9.4.1 Responses from consultees relevant to ornithology are set out in Table 9.4 below.

Table 9.4 – Consultation Responses

Ref	Description	Stakeholder	Action
Or1	Consideration needs to be given to potential impact on birds from lighting and changes to food supply, as well as barge movements.	Fife Council	Likely effects barge movements and site works on habitat used by birds and birds themselves has been addressed in this Chapter. With regard to lighting, given that the works will be undertaken during the period April-September and not at night, it is unlikely that significant amounts of lighting will be required, and this lighting can be directional to avoid lightspill onto the mudflats.
Or2	Two years' worth of bird survey work is usually required Depending on what data already exists; it may be possible with justification, to present one year's worth of data.	SNH	It has been concluded that one year of data is sufficient, given that: i) the year of data from the combined AMEC & AECOM surveys; ii) the five years of data from the local WeBS surveyor; iii) the minor nature of the proposed works; and iv) the restriction of works to the period April-September only (thus avoiding impacts on wintering birds using the mudflats).
Or3	Data needs to be as clear and easily understood as possible. Sources/reports by AMEC and AECOM should be explained, and how they represent bird use of the site. When considering impacts on the Forth, ensure use of the area by the birds is easy to understand, particularly in relation to areas of habitat being lost.	SNH	Relevant information from the various sources has been collated along with bird distribution maps in this Chapter, and the source documents have been separately appended. The area of habitat directly impacted by the works is extremely small, as explained in this Chapter.
Or4	If imperative reasons of overriding public importance (IROPI) are invoked in relation to the HRA, discussions with SNH should be undertaken regarding compensatory areas of intertidal habitat to manage.	SNH	No action has been taken because IROPI have not been invoked.

## 9.5 Baseline Conditions – Desk Study

### Designations

9.5.1 The following SPAs and pSPAs occur within the 20km Study Area:

- Firth of Forth SPA (also a Ramsar site, and coincident with Firth of Forth SSSI);
- Forth Islands SPA;
- Outer Firth of Forth & St Andrews Bay Complex pSPA;
- Imperial Dock Lock, Leith SPA; and,
- Loch Leven SPA (also a Ramsar site).

9.5.2 Within the 20km Study Area, there are four SSSIs citing ornithological interest:

- Firth of Forth SSS (coincident with Firth of Forth SPA);
- Inchmickery SSSI (located within Forth Islands SPA);
- Long Craig Island SSSI (located approximately 5km west of the site); and,
- Loch Leven SSSI (coincident with Loch Leven SPA).

9.5.3 Given the nature and small scale of the Development, it is not considered credible that significant effects could occur upon the qualifying features of Loch Leven SPA/Ramsar site/SSSI, which is located approximately 16km to the north. Loch Leven SPA/Ramsar/SSSI is therefore not considered further.

9.5.4 Note that the 'Long Craig Island' referred to in Long Craig Island SSSI is located approximately 5km west of the site, and is different to the 'Long Craig' also mentioned in this assessment. 'Long Craig' is a small area of rock near the mouth of Dalgety Bay which is largely submerged at high tide.

9.5.5 Designated sites near the Site are shown in ES Volume 2 - Figure 9.1. Table 9.5 below lists the qualifying features of the majority of these sites, along with last assessed condition (not available for the pSPA) and recent population details.

9.5.6 Two designated sites with one qualifying/notified feature each are not included in the table; these are:

- Imperial Dock Lock, Leith SPA (at Edinburgh Leith Dock; the qualifying feature is a colony of breeding common tern – 558 pairs, in favourable condition);
- Long Craig Island SSSI (; the notified feature is a small breeding colony of roseate tern, condition unfavourable no change).

9.5.7 No non-statutory designations with avian interests were identified within 2km of the site.

Table 9.5 - Qualifying/Notified Bird Species of Nearby Designations (\* = also qualifying species of Firth of Forth Ramsar site).

FoF SPA	FI SPA	OFFSAB pSPA	FoF SSSI	Inchm SSSI	Season	Group	Species	Condition (n/a to pSPA)	SPA/SSSI population	OFFSAB pSPA pop.
									No. (p=pair)	No. (p=pair)
			Y		Breeding	Duck/ Goose	Eider <i>Somateria mollissima</i>	Favourable Recovered	c.4000p	
			Y		Breeding	Duck/ Goose	Shelduck <i>Tadorna tadorna</i>	Favourable Maintained	c.300p	
	Y	Y		Y	Breeding	Gull	Herring gull <i>Larus argentatus</i>	Favourable Maintained	6600p	3044
	Y	Y			Breeding	Gull	Kittiwake <i>Rissa tridactyla</i>	Unfavourable Declining	8400p	12020
	Y			Y	Breeding	Gull	Lesser black-backed gull <i>Larus fuscus</i>	Favourable Maintained	1500p	
	Y			Y	Breeding	Petrel-related	Fulmar <i>Fulmarus glacialis</i>	Favourable Maintained	798p	
		Y			Breeding	Petrel-related	Manx shearwater <i>Puffinus puffinus</i>	-		2885
	Y				Breeding	Seabird	Cormorant <i>Phalacrocorax carbo</i>	Favourable Declining	200p	
	Y	Y			Breeding	Seabird	Gannet <i>Morus bassanus</i>	Favourable Maintained	21600p	10945
	Y	Y			Breeding	Seabird	Guillemot <i>Uria aalge</i>	Favourable Maintained	16000p	28123
	Y	Y			Breeding	Seabird	Puffin <i>Fratercula arctica</i>	Favourable Maintained	14000p	61086

FoF SPA	FI SPA	OFFSAB pSPA	FoF SSSI	Inchm SSSI	Season	Group	Species	Condition (n/a to pSPA)	SPA/SSSI population	OFFSAB pSPA pop.
									No. (p=pair)	No. (p=pair)
	Y				Breeding	Seabird	Razorbill <i>Alca torda</i>	Favourable Maintained	1400p	
	Y	Y			Breeding	Seabird	Seabird assemblage	Unfavourable Declining	90000	>20000
	Y	Y		Y	Breeding	Seabird	Shag <i>Phalacrocorax aristotelis</i>	Unfavourable Recovering	2400p	2400
	Y	Y			Breeding	Tern	Arctic tern <i>Sterna paradisaea</i>	Favourable Declining	540p	540p
	Y	Y			Breeding	Tern	Common tern <i>Sterna hirundo</i>	Favourable Maintained	334p	892p
	Y				Breeding	Tern	Roseate tern <i>Sterna dougallii</i>	Unfavourable Declining	8p (See note below)	
	Y				Breeding	Tern	Sandwich tern <i>Sterna sandvicensis</i>	Unfavourable Declining	440p	
Y*			Y		Passage	Tern	Sandwich tern <i>Sterna sandvicensis</i>	Favourable Declining	614	
Y			Y		Non-breeding	Diver/ Grebe	Great crested grebe <i>Podiceps cristatus</i>	Unfavourable Declining	79	
Y		Y	Y		Non-breeding	Diver/ Grebe	Red-throated diver <i>Gavia stellata</i>	Favourable Maintained	68	851
Y*		Y	Y		Non-breeding	Diver/ Grebe	Slavonian grebe <i>Podiceps auritus</i>	Favourable Declining	31	30
Y		Y	Y		Non-breeding	Duck/ Goose	Common scoter <i>Melanitta nigra</i>	Unfavourable Declining	1669	4677



FoF SPA	FI SPA	OFFSAB pSPA	FoF SSSI	Inchm SSSI	Season	Group	Species	Condition (n/a to pSPA)	SPA/SSSI population	OFFSAB pSPA pop.
									No. (p=pair)	No. (p=pair)
Y		Y	Y		Non-breeding	Duck/Goose	Eider <i>Somateria mollissima</i>	Favourable Declining	5279	21546
Y*		Y	Y		Non-breeding	Duck/Goose	Goldeneye <i>Bucephala clangula</i>	Unfavourable Declining	852	589
Y		Y	Y		Non-breeding	Duck/Goose	Long-tailed duck <i>Clangula hyemalis</i>	Unfavourable Declining	153	1948
Y			Y		Non-breeding	Duck/Goose	Mallard <i>Anas platyrhynchos</i>	Unfavourable Declining	1333	
Y*			Y		Non-breeding	Duck/Goose	Pink-footed goose <i>Anser brachyrhynchus</i>	Favourable Maintained	20808	
Y		Y	Y		Non-breeding	Duck/Goose	Red-breasted merganser <i>Mergus serrator</i>	Favourable Declining	281	431
Y			Y		Non-breeding	Duck/Goose	Scaup <i>Aythya marila</i>	Unfavourable Declining	31	
Y*			Y		Non-breeding	Duck/Goose	Shelduck <i>Tadorna tadorna</i>	Favourable Declining	3575	
Y		Y	Y		Non-breeding	Duck/Goose	Velvet scoter <i>Melanitta fusca</i>	Favourable Maintained	615	579
Y			Y		Non-breeding	Duck/Goose	Wigeon <i>Anas penelope</i>	Favourable Recovered	2008	
		Y			Non-breeding	Gull	Black-headed gull <i>Chroicocephalus ridibundus</i>	-		26835
		Y			Non-	Gull	Common gull	-		14647

FoF SPA	FI SPA	OFFSAB pSPA	FoF SSSI	Inchm SSSI	Season	Group	Species	Condition (n/a to pSPA)	SPA/SSSI population	OFFSAB pSPA pop.
									No. (p=pair)	No. (p=pair)
					breeding		<i>Larus canus</i>			
		Y			Non-breeding	Gull	Herring gull <i>Larus argentatus</i>	-		12313
		Y			Non-breeding	Gull	Kittiwake <i>Rissa tridactyla</i>	-		3191
		Y			Non-breeding	Gull	Little gull <i>Hydrocoloeus minutus</i>	-		126
Y			Y		Non-breeding	Seabird	Cormorant <i>Phalacrocorax carbo</i>	Favourable Maintained	476	
		Y			Non-breeding	Seabird	Guillemot <i>Uria aalge</i>	-		21968
		Y			Non-breeding	Seabird	Razorbill <i>Alca torda</i>	-		5481
		Y			Non-breeding	Seabird	Seabird assemblage	-		>20000
		Y			Non-breeding	Seabird	Shag <i>Phalacrocorax aristotelis</i>	-		2426
Y*					Non-breeding	Wader	Bar-tailed godwit <i>Limosa lapponica</i>	Favourable Declining	1448	
Y			Y		Non-breeding	Wader	Curlew <i>Numenius arquata</i>	Favourable Maintained	3059	
Y			Y		Non-breeding	Wader	Dunlin <i>Calidris alpina alpina</i>	Favourable Declining	6528	
Y			Y		Non-	Wader	Golden plover	Favourable	2949	

FoF SPA	FI SPA	OFFSAB pSPA	FoF SSSI	Inchm SSSI	Season	Group	Species	Condition (n/a to pSPA)	SPA/SSSI population	OFFSAB pSPA pop.
									No. (p=pair)	No. (p=pair)
					breeding		<i>Pluvialis apricaria</i>	Maintained		
Y			Y		Non-breeding	Wader	Grey plover <i>Pluvialis squatarola</i>	Favourable Declining	341	
Y*			Y		Non-breeding	Wader	Knot <i>Calidris canutus</i>	Unfavourable Declining	4854	
Y			Y		Non-breeding	Wader	Lapwing <i>Vanellus vanellus</i>	Favourable Maintained	3183	
Y			Y		Non-breeding	Wader	Oystercatcher <i>Haematopus ostralegus</i>	Favourable Maintained	6727	
Y*			Y		Non-breeding	Wader	Redshank <i>Tringa totanus</i>	Favourable Maintained	6067	
Y			Y		Non-breeding	Wader	Ringed plover <i>Charadrius hiaticula</i>	Favourable Maintained	694	
Y*			Y		Non-breeding	Wader	Turnstone <i>Arenaria interpres</i>	Favourable Maintained	705	
Y*		Y			Non-breeding		Waterfowl assemblage	Favourable Declining	72281	>20000

## Note Regarding Decline of Roseate Tern

- 9.5.8 Despite the nominal quantity of eight breeding pairs of roseate tern within Forth Island SPA and the component SSSIs (Inchmickery SSSI and Long Craig Island SSSI), it is known from management statements for the Inchmickery and Long Craig Island SSSIs that breeding roseate terns have drastically declined in recent years in the Firth of the Forth, such that currently none or very few breed (also reported in Forrester & Andrews 2007).

## Conservation / Management Objectives of Designated Sites

### Firth of Forth SPA, Forth Islands SPA, Imperial Dock Lock Leith SPA

- 9.5.9 These SPAs all state the same conservation objectives, which apply to their specific qualifying features:
- To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
  - To ensure for the qualifying species that the following are maintained in the long term:
    - Population of the species as a viable component of the site;
    - Distribution of the species within site;
    - Distribution and extent of habitats supporting the species;
    - Structure, function and supporting processes of habitats supporting the species;
    - No significant disturbance of the species.

### Firth of Forth SSSI

- 9.5.10 The management objectives relevant to ornithology are as follows:
- To maintain the populations of birds for which the Firth of Forth is internationally and/or nationally important.
  - To maintain the area in a favourable condition to allow for the continued feeding, resting, roosting and breeding of all the key bird species which use the area.
  - Encourage recreational enjoyment around the Firth of Forth whilst recognising the need to protect the nature conservation interest

### Inchmickery SSSI

- 9.5.11 The management objectives are as follows:
- Maintain the breeding seabird populations on Inchmickery and Cow & Calves;
  - Manage the island in a manner which may allow the future return of terns.

### Long Craig Island SSSI

- 9.5.12 The only management objective is to maintain the breeding roseate tern population (which however is now much reduced and frequently absent – see note above regarding decline of roseate terns in the Firth of Forth).

## AMEC Foster Wheeler Desk Study

- 9.5.13 The desk study by AMEC Foster Wheeler (see ES Volume 3 - Appendix 9.3) included a literature review into construction impacts on birds, a search for the locations and interest features of designated ornithological sites, and the results of ornithological data searches.

- 9.5.14 A summary of the literature review into disturbance impacts on birds, supplemented by further inspection of the Waterbird Disturbance Mitigation Toolkit (Cutts et al 2013), is provided in the predicted impact assessment section below. It is best to provide that information in that section because it is critical to understanding the likely predicted impacts on each assessed bird species.
- 9.5.15 With regard to designated sites, information on all relevant SPAs, pSPAs and SSSIs, and their qualifying/notified species, is given above.
- 9.5.16 The ornithological data obtained by AMEC Foster Wheeler, in particular the data from the local WeBS surveyor, is utilised in this assessment. The full data can be found in the desk study document itself (see ES Volume 3 - Appendix 9.3).

## 9.6 Baseline Conditions – Survey Results

- 9.6.1 Information on waterfowl within the Study Area during summer and winter was obtained by AECOM and AMEC Foster Wheeler respectively. Summary information has been extracted from the respective reports below, and the reports themselves are separately appended to this Chapter. It has been concluded that one year of data is sufficient, given that: i) the year of data from the combined AMEC & AECOM surveys; ii) the five years of data from the local WeBS surveyor; iii) the minor nature of the proposed works; and iv) the restriction of works to the period April-September only (thus avoiding impacts on wintering birds). The data from the local WeBS surveyor is set out in detail in the AMEC Foster Wheeler desk study report (ES Volume 3 - Appendix 9.3), and relevant WeBS data is stated where appropriate in the Evaluation Section further below.

### Waterfowl – Summer Season

- 9.6.2 The surveys producing these results were undertaken by AECOM. The full survey report is given in ES Volume 3 - Appendix 9.1. A summary is given below. Maps showing the distribution of all foraging and roosting birds, and other behaviour, are given in ES Volume 2 - Figures 9.7 to 9.9. Maps showing distribution of separate species is given in ES Volume 2 - Figures 9.8 to 9.14. It is important to note that these distribution maps contain all observations during the period April-September 2015; the actual distribution at any one time is much more restricted, and the numbers of birds present at any one time is much smaller than the maps suggest.
- 9.6.3 Maximum numbers recorded at any one time is set out in Table 9.6 below. This shows the maximum counts of each species during the period April-September 2015. In order to show the total numbers of birds that might be affected at different distances from the site, the peak counts for successive distance bands are cumulative (i.e. each peak count column includes all birds from the Site to the distance stated, and the figures in the final column represent the maximum numbers of birds recorded in the survey area).
- 9.6.4 A second table (Table 9.7) provides the same type of information but only for the months of April and September. This is to assist later assessment of impacts on wintering species, because those months are considered to be the only months within the April to September construction period when significant numbers of wintering birds may still be present.

Table 9.6 - Summer Peak Counts During April-September 2015 (\* = not individually designated but constituting part of the designated breeding seabird assemblage).

Species	Peak count 0-200m	Peak count 0-400m	Peak count 0-600m	Peak count 0-1000m
<i>SPA/SSSI species qualifying or notified during the breeding season:</i>				
Arctic Tern	2	5	7	7
Common Tern	2	4	5	5

Species	Peak count 0-200m	Peak count 0-400m	Peak count 0-600m	Peak count 0-1000m
Cormorant	2	2	21	25
Eider	13	15	24	37
Gannet		2	3	3
Guillemot		2	2	7
Herring Gull	28	50	65	95
Lesser Black-backed Gull	8	24	24	24
Puffin		0	0	4
Razorbill		0	1	8
Roseate Tern		3	3	3
Sandwich Tern	7	54	80	120
Shag		1	11	11
Shelduck	6	12	14	14
<i>SPA/SSSI species qualifying or notified during the <u>wintering</u> season:</i>				
Bar-tailed Godwit		1	1	1
Black-headed Gull	33	247	296	307
Common Gull	2	27	70	79
Common Scoter		25	25	46
Curlew	35	100	130	171
Dunlin	9	9	9	9
Great Crested Grebe		0	1	2
Lapwing	8	138	168	168
Long-tailed Duck		0	1	1
Mallard	23	23	23	23
Oystercatcher	5	13	22	49
Red-breasted Merganser	27	27	27	50
Redshank	22	43	75	75
Red-throated Diver		0	1	1
Ringed Plover		2	2	2
Turnstone	18	18	36	36
Velvet Scoter		0	0	1
Wigeon	6	32	32	67
<i>Other (non-designated) species</i>				
Common Sandpiper		2	2	2
Gadwall		0	1	1
Great Black-backed Gull *	1	1	3	3
Great Northern Diver		0	1	1

Species	Peak count 0-200m	Peak count 0-400m	Peak count 0-600m	Peak count 0-1000m
Grey Heron	1	1	1	2
Greylag Goose		1	1	1
Pochard		1	1	1
Teal		0	20	20
Whimbrel		1	1	1

Table 9.7 - Peak counts for April or September 2015 (\* = these species are not individually designated but constitute part of the designated wintering waterfowl assemblage).

Species	Peak count 0-200m	Peak count 0-400m	Peak count 0-600m	Peak count 0-1000m
<i>SPA/SSSI qualifying/notified species:</i>				
Bar-tailed Godwit		1	1	1
Black-headed Gull	19	39	60	85
Common Gull	2	7	13	19
Common Scoter		25	25	46
Cormorant		1	6	13
Curlew	28	100	130	171
Dunlin		0	0	5
Eider	8	9	12	18
Gannet		2	3	3
Great Crested Grebe		0	1	2
Guillemot		2	2	7
Herring Gull	9	28	33	49
Lapwing	8	126	168	168
Lesser Black-backed Gull	2	6	23	23
Long-tailed Duck		0	1	1
Mallard	8	14	14	14
Oystercatcher	3	13	15	49
Red-breasted Merganser	27	27	27	28
Redshank	19	43	75	75
Red-throated Diver		0	1	1
Roseate Tern		2	2	2
Sandwich Tern	3	21	25	54
Shag		1	11	11
Shelduck	2	9	11	11
Turnstone		5	36	36
Velvet Scoter		0	0	1
Wigeon	6	32	32	67



Species	Peak count 0-200m	Peak count 0-400m	Peak count 0-600m	Peak count 0-1000m
<i>Other (non-designated) species *:</i>				
Gadwall		0	1	1
Great Black-backed Gull	1	1	3	3
Great Northern Diver		0	1	1
Grey Heron	1	1	1	1
Greylag Goose		1	1	1
Pochard		1	1	1
Teal		0	20	20
Whimbrel		1	1	1

## Waders

- 9.6.5 The most numerous waders during the period April-September were curlew, lapwing and redshank, and to a lesser extent oystercatcher. Numbers of curlew and lapwing increased significantly in August and September. The vast majority of all these waders occurred over 200m from the site. Roosting predominantly occurred along or near the north edge of Dalgety Bay at high tide, although at low tide (if not foraging) curlew and lapwing also rested in other parts of the bay. During very high tides relatively few curlews roosted within the Study Area, flying in from the east over Braefoot Point as the tide retreated. Foraging of all these species was widely scattered across the bay at low tide, but again the vast majority of sightings were more than 200m from the site.
- 9.6.6 Although many turnstone sightings also occurred in the northern part of Dalgety Bay, occasional roosting and foraging birds occurred at the site, including a maximum of 18 birds in August. Small numbers of oystercatcher (up to 5 foraging) and redshank (up to 22 foraging or roosting) occasionally also occurred within 200m of the site.
- 9.6.7 Observations of other waders (bar-tailed godwit, dunlin and ringed plover) involved only very small numbers of birds, nearly all over 200m from the Site near the north edge of Dalgety Bay.

## Wildfowl

- 9.6.8 Shelduck, eider and mallard were recorded throughout the study period, though sightings of shelduck and eider reduced during August, most likely as a consequence of birds favouring other less open areas whilst moulting. Small numbers (up to 13) roosting and foraging eider rarely occurred at the site, but the majority of eider were seen beyond 200m, with frequent aggregations of roosting birds at Long Craig, Thank Rock and Donibristle Bay, and widely scattered foraging birds, mostly over deeper water. Shelduck and mallard largely occurred beyond 200m in the northern part of Dalgety Bay, both roosting and foraging.
- 9.6.9 Both eider and shelduck were observed with chicks in Dalgety Bay. Eider nests on the ground in undisturbed locations amongst e.g. sand dune vegetation or similar near the sea, whilst shelduck typically utilises rabbit burrows or other cavities. However, no eider or shelduck nests were found in or near the Site, and neither are considered to breed at or near the Site, owing to both a lack of suitable nesting habitat and regular disturbance of the Site by people. The eider and shelduck family groups may have originated from nest sites on the far (east) side of Dalgety Bay where there is less accessible open rough vegetation and trees by the shore (the majority of breeding eider in the Firth of Forth are described in SSSI documentation as occurring at specific sites along the East Lothian coast and on some islands in the Firth of Forth).

- 9.6.10 Teal, wigeon and common scoter were only recorded (during these summer surveys) during September. Numbers of teal were low (peak count within the whole Study Area was 20). Larger numbers of wigeon (peak count 67) were observed both roosting and foraging, but the majority were over 300m from the Site in the northern part of Dalgety Bay. Only three sightings were made of common scoter, one close to 400m from the Site and the others beyond 600m to the south. Only one individual each was recorded for gadwall, pochard, velvet scoter and long-tailed duck.
- 9.6.11 Red-breasted merganser observations were again mostly beyond 300m, and widely scattered through the Study Area, but included up to 27 individuals foraging within 200m, and small numbers (up to 5 birds) roosting at low tide on a sand bank approximately 300m from the Site. Significant roosts elsewhere were on Long Craig and 600-800m from the Site in the north-east part of Dalgety Bay.

## Terns

- 9.6.12 Large numbers of Sandwich tern and very small numbers of common, arctic and roseate terns were recorded from July onwards.
- 9.6.13 Sandwich terns roosted in large quantity near the north edge of Dalgety Bay and in Donibristle Bay (sometimes including juveniles), and occasionally on exposed rocks and (at low tide) on sandbanks in other parts of Dalgety Bay. The vast majority of roosting sandwich terns were 300m or more from the Site, with only very small numbers (up to 5, and once 15) occurring less commonly closer to the Site. The very small recorded numbers of roosting common, arctic and roseate terns occurred south of the Site and within the 200-600m distance band.
- 9.6.14 Foraging for all tern species occurred predominantly over deeper water to the south of the Site, with only rare occurrences of sandwich and common terns foraging in Dalgety Bay itself during high tide, and mostly beyond 200m of the Site particularly in the case of common, arctic and roseate terns.

## Gulls

- 9.6.15 Herring and lesser black-backed gulls were present throughout the survey period, but significantly increased in number from July onwards, often including juveniles, when black-headed gulls also often occurred in quantity, and to a lesser extent common gulls. The vast majority of gulls occurred more than 200m from the Site to the north, and 300m or more from the Site to the east and south. Foraging gulls were widely distributed across the bay, particularly on incoming tides. Roosting occurred in particular in the north-west corner of Dalgety Bay, on Long Craig and on the sandbank exposed at low tide between Long Craig and the Site. The largest quantities by far involved black-headed gull (up to 307 in the Study Area, but a maximum of 33 within 200m of the Site) in August/September, mainly at low tide.

## Seabirds

- 9.6.16 As would be expected, the vast majority of seabird observations involved birds over deeper water to the south and east of the Site, with very few in Dalgety Bay itself. The only seabirds observed in quantity within the Study Area were shag and cormorant, but very few sightings were made of these species within 200m of the Site, and numbers within 400m were low (11 and 15 respectively). Foraging was widely distributed but generally in deeper water. The largest numbers and most regular aggregations of shag and cormorant involved roosting birds on Long Craig and Thank Rock.
- 9.6.17 Other seabirds (gannet, guillemot, puffin and razorbill) were seen rarely in extremely small quantity within the Study Area, mostly to the south and east.

## Divers & Grebes

- 9.6.18 Very few observations were made of divers and grebes. Only one foraging individual each was seen of red-throated diver and great northern diver, both in September and both in deeper more distant water. Only three observations were made of great crested grebe, foraging over 400m from the Site.

## Disturbance Monitoring

- 9.6.19 The AECOM bird survey report (ES Volume 3 - Appendix 9.1) details observed disturbance events, which were of the following types:
- Direct Anthropogenic Disturbance (dog walkers, walkers, joggers, children playing);
  - Indirect Anthropogenic Disturbance (unaccompanied dogs, construction noise, boats) and,
  - Predator Disturbance (birds of prey).
- 9.6.20 A total of 106 disturbance responses were recorded. These were categorised into the five levels of increasing severity set out in section 9.6.19 above. The number of disturbance responses of each type was as follows:
- Level 1 (no response) 77;
  - Level 2 (behaviour change/alert only) 9;
  - Level 3 (flight within 200m) 10;
  - Level 4 (flight further than 200m) 2;
  - Level 5 (flight out of Study Area) 1; and,
  - Unknown events = 7.
- 9.6.21 Given the proximity of the Study Area to the settlement of Dalgety Bay and the presence of a well-used coastal footpath along the coastal edge through the Site, it is not unexpected that direct anthropogenic disturbance events were significantly more frequent than any other category.
- 9.6.22 Generally, disturbance events on the coastal edge resulted in observable responses only when large or noisy groups of people passed by, and birds appeared to be habituated to normal anthropogenic activity on the coastal edge. The only level 5 response thought to have occurred involved three groups of people with a dog on the north shore of the bay, which appeared likely to have displaced 50+ curlew previously recorded in the disturbed area. The two level 4 responses involved people on the shore, but resulted in disturbance of a maximum of three birds at maximum distance of c.50m. Level 3 responses involved maximum numbers of 40 birds (mostly roosting waders) at maximum distances of c.50m, except for one occasion which involved a dog approaching within 20m of a wader/duck roost and resulted in short flight of 100+ birds.
- 9.6.23 Disturbance events that were not observed but were likely to have occurred included radiation monitoring surveyors on the mudflats. These were noted to have caused likely displacement of birds on three occasions, with the area around the surveyors without birds extended to c.60m. Other displacements were thought likely to have occurred during disturbance by people (with and without dog) on two occasions, and 10-12 sailing boats at the mouth of Dalgety Bay was thought to have displaced birds in that area on two other occasions.
- 9.6.24 In contrast, five sailing boats approaching 15 roosting gulls at the mouth of the bay within 40m elicited no response. There was also no response from significant numbers of roosting birds on Long Craig to eight cruise boats passing at closest c.50m from the rock, a large cruise ship passing somewhat over 100m, and two fishing boats passing within 20m.

## Waterfowl – Winter Season

9.6.25 The surveys producing these results were undertaken by AMEC Foster Wheeler, during the period late September 2014 to March 2015. Since the proposed works are to be undertaken in the period April-September, most impacts on wintering birds will be avoided, and the only relevant month within the AMEC data is September. For this reason, in addition to a summary table of peak counts (Table 9.8 below, in the same format as the summer bird data above for direct comparison), a second table (Table 9.9) shows the subset of these species recorded in the September AMEC surveys. Disturbance monitoring information is also given, because this is relevant to all times of year. Further details of the winter surveys are given in the full report in ES Volume 3 - Appendix 9.2

Table 9.8 - Winter Peak Counts During September 2014 – April 2015 (\* = these species are not individually designated but constitute parts of the designated wintering waterfowl assemblage; \*\* = part of breeding seabird assemblage).

Species	Peak count 0-200m	Peak count 0-400m	Peak count 0-600m	Peak count 0-1000
<i>SPA/SSSI qualifying or notified species</i>				
Arctic tern	0	2	2	2
Bar-tailed godwit	5	10	10	10
Black-headed gull	168	339	361	382
Common gull	136	138	142	145
Common tern	0	28	28	28
Cormorant	2	7	12	22
Curlew	116	122	130	163
Dunlin	360	390	390	390
Eider	26	40	58	63
Gannet	0	0	1	14
Goldeneye	9	14	20	20
Great crested grebe	9	13	15	27
Guillemot	0	6	6	7
Herring gull	210	369	449	463
Lapwing	96	156	210	210
Lesser black-backed gull	17	189	189	189
Little gull	0	1	4	4
Long-tailed duck	0	0	0	1
Mallard	26	26	26	26
Oystercatcher	84	86	86	86
Razorbill	1	4	4	4
Red-breasted merganser	7	36	58	110
Redshank	406	406	406	406
Red-throated diver	3	3	4	7

Species	Peak count 0-200m	Peak count 0-400m	Peak count 0-600m	Peak count 0-1000
Ringed plover	32	38	38	38
Sandwich tern	1	19	26	70
Scaup	0	0	6	6
Shag	1	2	11	13
Shelduck	44	98	98	98
Slavonian grebe	2	2	3	5
Turnstone	51	51	51	51
Wigeon	164	213	213	243
Other (non-designated) species *				
Black-tailed godwit	1	2	2	2
Black-throated diver	1	1	1	1
Brent goose	0	1	1	1
Curlew Sandpiper	1	1	1	1
Glaucous Gull **	0	0	1	1
Goosander	0	5	5	5
Great Black-backed Gull **	18	18	18	18
Great northern diver	0	1	1	3
Green Sandpiper	1	1	1	1
Greylag goose	0	0	0	4
Little grebe	2	2	2	2
Mediterranean Gull **	0	1	1	1
Mute swan	0	1	1	1
Purple Sandpiper	4	4	4	4
Red-necked grebe	0	1	1	1
Ring-billed Gull **	1	1	1	1
Snipe	16	16	16	16
Teal	21	21	21	21
Whimbrel	2	2	2	2
Whooper swan	0	0	0	5

Table 9.9 - Peak Counts During Late September 2014 (\* = this species is not individually designated but constitutes part of the designated wintering waterfowl assemblage).

Species	Peak count 0-200m	Peak count 0-400m	Peak count 0-600m	Peak count 0-1000
<i>SPA/SSSI qualifying or notified species</i>				
Arctic tern	0	2	2	2

Species	Peak count 0-200m	Peak count 0-400m	Peak count 0-600m	Peak count 0-1000
Bar-tailed godwit	0	1	1	1
Black-headed gull	115	275	297	300
Common gull	59	135	142	145
Common tern	0	28	28	28
Cormorant	0	1	11	22
Curlew	25	110	130	163
Dunlin	5	5	5	5
Eider	8	8	14	15
Gannet	0	0	0	14
Guillemot	0	0	1	1
Herring gull	8	44	59	91
Lapwing	7	103	103	103
Lesser black-backed gull	8	14	14	14
Mallard	6	16	16	16
Oystercatcher	11	56	84	84
Red-breasted merganser	0	0	3	4
Redshank	31	86	95	95
Sandwich tern	0	19	26	70
Shag	0	2	11	11
Shelduck	11	22	22	22
Turnstone	51	51	51	51
Wigeon	0	1	1	1
Other (non-designated) species *				
Greylag goose	0	0	0	4

9.6.26 Bird distribution remained similar throughout the winter survey period and as expected was primarily dependent upon the tidal state. Wading birds were widely distributed across the survey area on the exposed mud and sand when the tide was low but when the intertidal area was covered they occurred at five main roost sites on the edge of the bay (three separate small roosts on rocks and promontories at the Site, and more significant roosts along the north edge of Dalgety Bay). Foraging gulls and ducks were distributed widely and roosted on a raised rock in the middle of the bay at low-tide retreating to the north-west of the bay at high tide.

### Wintering Disturbance Monitoring

9.6.27 In total 167 disturbance events recorded. The most regularly encountered disturbance events were attributed to dog walkers (74) and uncontrolled dogs (six). Human disturbance was also regularly recorded, with a total of 70 events documented. Predatory disturbance was recorded on two occasions. Helicopter-related disturbance accounted for two disturbance events, with five vehicular disturbance events documented. Other disturbance events included horse riders (five), quarry blasts (one) and two unknown causes.

- 9.6.28 20 disturbance events (including hammering in boat yard, moped in boat yard, dog walkers and bait diggers) resulted in no response.
- 9.6.29 66 events resulted in lower level 2 or 3 responses with birds showing a reaction to the stimuli but not leaving the area they were in. The causes included dog walkers, radiation monitoring, boats in the bay and people working on boats.
- 9.6.30 81 disturbance events resulted in level 4 or 5 responses (flights between zones or out of the Study Area). Level 5 responses mostly resulted from dog walkers, but a small proportion were due to radiation monitoring and horse riding; the largest numbers of disturbed birds (60+) usually resulted from dogs and mostly involved waders (less often gulls and ducks). Level 4 responses were due to a mix of dog walkers, walkers and radiation monitoring, and mostly involved waders and smaller numbers of ducks.

## Designated Habitat

- 9.6.31 Using information from the intertidal survey report undertaken by AMEC Foster Wheeler (see ES Volume 3 - Appendix 8.1), combined with terrestrial Phase 1 Habitat Survey, it has been calculated that the area of the construction footprint within the Firth of Forth SPA/Ramsar/SSSI is largely intertidal, with the addition of extremely small amounts of the peripheral amenity and coastal grassland, amounting to a total area within the designations of 1.6ha (0.025% of the SPA). Habitat equating to mudflat (mainly littoral sands with polychaetes) amounts to just over 0.09ha, representing 0.002% of the designated mudflat. The bulk of the habitat within the construction footprint corresponds to intertidal hard substrates such as rock (including existing rock armour).

## Terrestrial Breeding Birds

- 9.6.32 ES Volume 2 - Figures 9.2-9.5 illustrate the findings of the four breeding bird survey visits. These survey visits indicated a minimum of 14 breeding bird species within or in close proximity to the Management Area. Estimates of the minimum number of breeding territories for each species are given in the table below. Highly accurate territory counts require many more survey visits; however, this is usually regarded as excessive for typical impact assessments which normally employ the adapted method with fewer visits used here, and it is likely that the estimates are close to the true numbers of territories. The table is sorted by BoCC4 Red/Amber conservation status ('R' and 'A') and then by decreasing abundance.

Table 9.10 – Estimated Minimum Numbers of Breeding Bird Territories

Species	BoCC4 Red/Amber	Estimated min. no. territories
House sparrow	R	4
Song thrush	R	1
Tree sparrow	R	1
Starling	R	1
Rook	-	3 rookeries
Wren	-	2
Blackbird	-	1
Chiffchaff	-	1
Wood pigeon	-	1
Goldfinch	-	1
Chaffinch	-	1
Greenfinch	-	1



Species	BoCC4 Red/Amber	Estimated min. no. territories
Magpie	-	1

- 9.6.33 It is also likely that several other common and widespread (i.e. BOCC4 green listed) bird species such as robin and blue tit were breeding in the Survey Area since these species were recorded frequently and suitable breeding habitat exists.
- 9.6.34 As would be expected, the majority of breeding birds are common and widespread, and not of conservation concern (BoCC4 green listed). Of the four Red list species, song thrush, tree sparrow and house sparrow are listed for long term severe UK breeding population declines, and starling is listed for both short and long term severe UK breeding population declines.
- 9.6.35 Eider was observed displaying and with chicks during the terrestrial bird surveys – for discussion on this refer to the section on waterfowl in the breeding season above.
- 9.6.36 Few or no bird territories are likely to be impacted upon because the works footprint will primarily affect the very thin coastal strip of coastal grassland and rock armour, which are subject to frequent disturbance by people and dogs. There could be very minor loss of small immature trees, scrub and grassland by the existing sailing club slipway and at the south-east corner of the Ross Plantation; these small patches are particularly subject to regular disturbance by people and dogs, and only a very small number of common bird species, if any, would be likely to be use these patches during the breeding season.

### Future Baseline

- 9.6.37 There is no reason to expect that the baseline would be significantly different in the medium-term. There may be a slight reduction in numbers of some waterbirds (including some waders) in line with current general trends across the UK.

## 9.7 Assessment

- 9.7.1 The Development is to be undertaken in two six-month summer periods during the period April to September. This will avoid most disturbance effects upon wintering qualifying/notified species of the relevant SPAs, Ramsar sites and SSSIs set out in the desk study above, by avoiding the key wintering period of October to March. However, within the construction period of April to September, wintering birds may still be present in April or September, and for this reason birds which qualify only for wintering are also assessed but for these months only; those species present during the breeding season (or both breeding and wintering) are assessed for the whole April to September period.

### Evaluation – Designated Sites

- 9.7.2 The Firth of Forth SPA and Forth Islands SPA in their entirety are of international value by virtue of their designation. The Outer Firth of Forth & St Andrews Bay Complex pSPA (hereafter 'OFFSAB pSPA') is also of international value because pSPAs are treated in the same way as SPAs.
- 9.7.3 The Firth of Forth SSSI, Inchmickery SSSI and Long Craig Island SSSI in their entirety are of national value by virtue of their designation.

### Evaluation – Breeding Birds

- 9.7.4 This section includes those species which are qualifying or notified species for both wintering and breeding, as well as those qualifying or notified for breeding only.

### Arctic Tern (breeding)

- 9.7.5 During April-September the maximum number of arctic terns within the Study Area at any one time was 7 within 1km of the Site. This is a negligible proportion of the 1080 breeding

individuals (540 pairs) present in the Forth Islands SPA and OFFSAB pSPA. The local WeBS surveyor recorded up to 30 arctic terns within the Dalgety Bay WeBS sector, representing 2.8% of the SPA populations; however, this number is likely to have included birds outside the Study Area since the WeBS sector is larger and this species will forage far into the Firth of Forth, and additionally this observation is unusual being three to 30 times larger than other peak counts in the period 2010-2014. Consequently, and in accordance with CIEEM guidance on EcIA (CIEEM, 2016), the Study Area is not considered an important area for arctic tern, and this receptor is not considered further.

### Common Tern (breeding)

- 9.7.6 During April-September the maximum number of common terns within the Study Area at any one time was 5 within 1km of the Site. This is a negligible proportion of the 668 breeding individuals (334 pairs) present in the Forth Islands SPA, and the 1784 individuals in the OFFSAB pSPA. It is also a negligible proportion of the 1116 breeding individuals (558 pairs) in Imperial Dock Lock Leith SPA. The local WeBS surveyor recorded up to 110 common terns within the Dalgety Bay WeBS sector, representing 16% and 6% of the Forth Islands SPA and OFFSAB pSPA populations respectively; however, the large discrepancy with the small numbers recorded within the Study Area suggests that at least some of these birds were from outside it, since the WeBS sector is larger and this species will forage far into the Firth of Forth. Additionally, although common terns forage and (rarely) roost in very small numbers within the Study Area, they do not nest within it, and are highly mobile and capable of foraging over relatively large distances. It is therefore not considered appropriate to assign national or higher value to the common tern population within the Study Area, but on a precautionary basis and in view of the WeBS counts it is considered to be of local value within 400m and county value within 1km.

### Cormorant (breeding + wintering)

- 9.7.7 During April-September the maximum number of cormorants within the Study Area at any one time was 2 within 400m of the Site (25 within 1km). The numbers within 400m of the Site are considerably less than 1% of the 400 breeding individuals (200 pairs) present in the Forth Islands SPA or the 476 wintering birds in the Firth of Forth SPA. The number of birds within 1km is 6% of the SPA population, which is significant at the scale of the SPA; however, no breeding sites were noted within the Study Area and the majority of these birds were roosting on Long Craig and Thank Rock. The local WeBS surveyor recorded a maximum of 40 cormorants within the Dalgety Bay WeBS sector in September 2013; however, this was exceptional, with counts normally less 30 birds, and moreover is likely to have included birds from outside the Study Area since the WeBS sector is larger. The cormorant population within the Study Area is therefore considered to be of local value within 400m and national value within 1km (in respect of the significant proportion of the Forth Islands SPA population).

### Eider (breeding + wintering)

- 9.7.8 Evidence of eider breeding in or near Dalgety Bay was noted through an observation of young chicks. However, the SSSI citation notes that the important sites for breeding eider within the SSSI occur along the East Lothian coast. The citation does not quote numbers of breeding eider, but Forrester & Andrews (2007) provide an estimate of 4000 pairs in the Firth of Forth. A single pair of eider is not significant on the scale of the SSSI, and would not exceed local value. (Note also that there is no suitable breeding habitat on the east side of Dalgety Bay). During April-September the maximum number of foraging/roosting eider within the Study Area at any one time was 13 within 200m of the Site (15 within 400m, 37 within 1km). The local WeBS surveyor on one occasion in August 2010 observed 161 eider within the Dalgety Bay WeBS sector; however, the WeBS sector is larger than the Study Area and this number is likely to have included birds recorded outside it, and additionally this observation is unusual being around two to four times larger than other peak counts in the period 2010-2014. The

elder population within the Study Area is therefore not considered significant at the scale of the SSSI, but is considered to be of local value.

### *Fulmar (breeding)*

- 9.7.9 This species was not recorded in the AECOM/AMEC surveys, but the WeBS counts recorded a mean of 5 birds April-September. This represents less than 1% of the Forth Islands SPA. Consequently, and in accordance with CIEEM guidance on Ecological Impact Assessment (EcIA, CIEEM, 2016), the Study Area is not considered an important area for fulmar, and this receptor is not considered further.

### *Gannet (breeding)*

- 9.7.10 During April-September the maximum number of gannets within the Study Area at any one time was 2 within 400m of the Site (3 within 1km). This is a negligible proportion of the 43200 breeding individuals (21600 pairs) present in the Forth Islands SPA and the 10945 individuals in the OFFSAB pSPA. The local WeBS surveyor on in September 2012 observed 750 gannets within the Dalgety Bay WeBS sector; however, this number is likely to have included birds outside the Study Area since the WeBS sector is larger and this species commonly forages at sea, and additionally this observation is unusual being around 14 to 250 times larger than most counts in the period 2010-2014. Furthermore, gannets regularly forage over enormous areas and do not breed near the Site or within 20km of it. Consequently, and in accordance with CIEEM guidance on Ecological Impact Assessment (EcIA, CIEEM, 2016), the Study Area is not considered an important area for gannet, and this receptor is not considered further.

### *Guillemot (breeding + wintering)*

- 9.7.11 During April-September the maximum number of guillemots within the Study Area at any one time was 7 within 1km of the Site. This is a negligible proportion of the 32000 breeding individuals (16000 pairs) present in the Forth Islands SPA, and the 28123 individuals in the OFFSAB pSPA (21968 in winter). The local WeBS surveyor recorded up to 80 guillemots within the Dalgety Bay WeBS sector, which is still insignificant in comparison to the SPA populations, and moreover is likely to have included birds outside the Study Area since the WeBS sector is larger and this species commonly forages far from the shore. Consequently, and in accordance with CIEEM guidance on EcIA (CIEEM, 2016), the Study Area is not considered an important area for guillemot, and this receptor is not considered further.

### *Herring Gull (breeding + wintering)*

- 9.7.12 During April-September the maximum number of herring gulls within the Study Area at any one time was 28 within 200m of the Site (50 within 400m, 95 within 1km). These numbers are less than 1% of the 13200 birds (6600 pairs) present in the Forth Islands SPA. In comparison to the OFFSAB pSPA, these numbers represent 1.6% of the pSPA population within 400m (3.1% within 1km). Precise numbers present in Inchmickery SSSI are not given in the SSSI documentation, but it is stated that there are 'considerable' numbers of breeding herring gulls (which have contributed to the loss of breeding terns), but it is possible that the numbers recorded in the Study Area could also be significant compared to this SSSI population. The local WeBS surveyor recorded a maximum of 800 herring gulls within the Dalgety Bay WeBS sector in April 2011; however, this was exceptional, with counts normally similar to the AECOM survey data with less than 100 birds, and moreover is likely to have included birds from outside the Study Area since the WeBS sector is larger. The herring gull population within the Study Area is therefore not considered significant at the scale of any of the designated sites except in the case of the OFFSAB pSPA, and is assigned local value within 400m and national value within 1km (in respect of the significant proportion of the OFFSAB pSPA / Inchmickery SSSI population).

## Kittiwake (breeding + wintering)

- 9.7.13 This species was not recorded in the AECOM/AMEC surveys, but the WeBS counts recorded a mean of 31 birds April-September. This is less than 1% of the relevant designations. The mean of April and September (for the purposes of wintering assessment, these considered to be the months during the April to September construction period when significant numbers of wintering birds may still be present) was 48, representing 1.5% of the OFFSAB pSPA population. However, given the great difference between this figure and the zero count within the Study Area, the larger size of the WeBS sector compared to the Study Area, the habitat within the Study Area and the highly marine nature of this species in winter, it is likely that most or all of these birds were at sea beyond the Study Area. Support for this view is given by long-term data indicating that average density of kittiwakes in the Firth of Forth in winter is only 1-5 birds per km<sup>2</sup> (Forrester & Andrews 2007). Consequently, and in accordance with CIEEM guidance on Ecological Impact Assessment (EcIA, CIEEM, 2016), the Study Area is not considered an important area for kittiwake, and this receptor is not considered further.

## Lesser Black-Backed Gull

- 9.7.14 During April-September the maximum number of herring gulls within the Study Area at any one time was 8 within 200m of the Site (24 within 400m, also 24 within 1km). These numbers are considerably less than 1% of the 3000 breeding individuals (1500 pairs) present in the Forth Islands SPA, although numbers within 1km approach 1%. The precise numbers present in Inchmickery SSSI are not given in the SSSI documentation, but it is stated that there are 'considerable' numbers of breeding lesser black-backed gulls (which have contributed to loss of breeding terns), and it is likely that the numbers recorded in the Study Area are also low compared to the SSSI population. The local WeBS surveyor recorded a maximum of 184 lesser black-backed gulls within the Dalgety Bay WeBS sector in August 2010; however, this was exceptional, with counts normally three or more times smaller, and moreover is likely to have included birds from outside the Study Area since the WeBS sector is larger. The lesser black-backed gull population within the Study Area is therefore not considered significant at the scale of the SPA or SSSI but is considered to be of local value.

## Manx Shearwater (breeding)

- 9.7.15 This species was not recorded in the AECOM/AMEC surveys, but the WeBS counts recorded it infrequently with a mean of 2 birds April-September and a peak of 32. The peak was exceptional, and just exceeds 1% of the OFFSAB pSPA. However, this species is highly pelagic and there are no breeding areas within the Study Area; given also the larger size of the WeBS sector compared to the Study Area and lack of sightings from the latter, it is highly likely that the majority if not all observations were from outside the Study Area. Consequently, and in accordance with CIEEM guidance on Ecological Impact Assessment (EcIA, CIEEM, 2016), the Study Area is not considered an important area for manx shearwater, and this receptor is not considered further.

## Puffin (breeding)

- 9.7.16 During April-September the maximum number of puffins within the Study Area at any one time was 4 within 1km of the Site. This is a negligible proportion of the 28000 breeding individuals (14000 pairs) present in the Forth Islands SPA, and the 61086 individuals in the OFFSAB pSPA. The local WeBS surveyor recorded up to 50 puffins within the Dalgety Bay WeBS sector, which is still insignificant in comparison to the SPA populations, and is likely to have been included birds outside the Study Area since the WeBS sector is larger and this species commonly forages far from the shore. Consequently, and in accordance with CIEEM guidance on EcIA (CIEEM, 2016), the Study Area is not considered an important area for puffin, and this receptor is not considered further.

## Razorbill (breeding+ wintering)

- 9.7.17 During April-September the maximum number of razorbills within the Site at any one time was 8 within 1km of the Site. This is a negligible proportion of the 2800 breeding individuals (1400 pairs) present in the Forth Islands SPA, and the 5481 wintering in the OFFSAB pSPA. The local WeBS surveyor recorded up to 30 razorbills within the Dalgety Bay WeBS sector, which just reaches 1% significance in comparison to the SPA population, but is likely to have included birds outside the Study Area since the WeBS sector is larger and this species commonly forages far from shore. Consequently, and in accordance with CIEEM guidance on EcIA (CIEEM, 2016), the Study Area is not considered an important area for razorbill, and this receptor is not considered further.

## Roseate tern (breeding)

- 9.7.18 During April-September the maximum number of roseate terns within the Study Area at any one time was 3 within 1km of the Site. As noted above (see Section 9.5.8) there are currently believed to be none or very few roseate terns actually breeding in the Firth of Forth, at least in part due to an increase in nesting gulls. The observations were all from August/September, and three of them involved juvenile birds, one waiting to be fed by an adult. This suggests either that the birds successfully bred elsewhere in the Firth of Forth and subsequently spread elsewhere (including the Study Area) after the young had fledged, or possibly that they flew in from another part of the country. The local WeBS recorder did not record any roseate terns in the Dalgety Bay WeBS sector in the period 2010-2014 apart from a single bird in July in 2010. Although there is no nest site for roseate tern within the Study Area or, as far as is known, near it, the presence of a small number of foraging/roosting birds including juveniles represents a significant proportion of the Forth Islands SPA population, and is not insignificant for Scotland as a whole given the current rarity of this species. As such, the small number of roseate terns occurring within the Study Area, even though not nesting within it, is considered to be of national value.

## Sandwich tern (breeding/passage)

- 9.7.19 During April-September the maximum number of sandwich terns within the Study Area at any one time was 7 within 200m of the Site, 54 within 400m and 120 within 1km. The number within 200m is insignificant, but the numbers within 400m and 1km represent 6% and 13.6% respectively of the number of breeding individuals in the Forth Islands SPA. With respect to the Firth of Forth SPA/Ramsar/SSSI, these numbers represent 1.1%, 8.8% and 20% of the qualifying/designated population at 200m, 400m and 1km distances respectively. Of 123 observations, 8% included juveniles. The local WeBS surveyor recorded a similar maximum of 140 sandwich terns within the Dalgety Bay WeBS sector, although some of these may have been from outside the Study Area since the WeBS sector is larger. As such, and despite the lack of actual nest sites within the Study Area, the sandwich tern population within the Study Area is considered to be of national value.

## Shag (breeding + wintering)

- 9.7.20 During April-September the maximum number of shags within the Study Area at any one time was 11 within 1km of the Site. This is a negligible proportion of the 4800 breeding individuals (2400 pairs) present in the Forth Islands SPA, and the 2400 breeding/wintering individuals in the OFFSAB pSPA. The local WeBS surveyor recorded up to 8 shags within the Dalgety Bay WeBS sector, which is also insignificant. Consequently, and in accordance with CIEEM guidance on EcIA (CIEEM, 2016), the Study Area is not considered an important area for shag, and this receptor is not considered further.



## Shelduck (breeding + wintering)

- 9.7.21 During April-September the maximum number of shelduck within the Study Area at any one time was 6 within 200m of the Site (12 within 400m, 14 within 1km). The local WeBS surveyor recorded a maximum count of 5 birds. Forrester & Andrews (2007) indicate a maximum of c.600 breeding individuals (300 pairs) in the Firth of Forth. Although 12-14 birds could represent c.2% of the SSSI breeding individuals, no evidence was recorded of shelduck actually breeding in Dalgety Bay, and the recorded birds were assumed to be non-breeders or (during later months) post-breeders. Since the non-breeding SSSI population typically rises in August/September to several thousand birds (many located much farther west near Grangemouth), the number of birds involved here is not significant at the scale of the SSSI but is considered to be of local value.
- 9.7.22 The mean WeBS count in April or September was 25, which was slightly higher than the AECOM/AMEC surveys. 25 birds represents only 0.7% of the Firth of Forth SPA/Ramsar/SSSI wintering population. Consequently, and in accordance with CIEEM guidance on EclA (CIEEM, 2016), the Study Area is not considered an important area for shelduck during April or September (the months of the April-September construction period during which it is considered that wintering birds may be present), and wintering shelduck is not considered further.

## Breeding Seabird Assemblage

- 9.7.23 The breeding seabird assemblage as a whole is a qualifying feature of both the Forth Islands SPA and OFFSAB pSPA. The breeding seabird assemblage includes all seabirds including any that may be unnamed and not separately designated. The term 'seabird' includes all auks, gannets, cormorants, petrel-related birds, gulls and terns. The only seabirds recorded during April-September that have not already been discussed above are as follows:
- Black-headed gull: mostly late July/August/September, up to 33 within 400m and 307 within 1km (but this latter count exceptional, with most counts three or more times smaller; the local WeBS counts were similar).
  - Common gull: mostly in August/September, up to 27 within 400m and 79 within 1km (but counts generally 40 or less within 1km; the local WeBS counts were similar);
  - Great black-backed gull: mostly in August/September, up to 3 birds within 1km;
  - Little gull: only recorded by WeBS surveyor, with only three sightings and maximum of two birds.
- 9.7.24 Of these figures, the only significant one is black-headed gull. As such, and combined with numbers of other seabirds (principally certain gulls, terns and cormorant), the relevant populations within the Study Area are considered to be a small but significant part of the Forth Islands SPA and OFFSAB pSPA with respect to gulls, terns and cormorant only, and the seabird assemblage within the Study Area is assigned national value.

## Waterfowl Not Designated in Any Way

- 9.7.25 This section concerns other waterfowl species that are not specifically designated in one of the relevant designated sites, and also not part of a designated 'assemblage', which have therefore not been discussed so far but may have other value. Such species are few and involve small or very small numbers of birds only. The peak counts for recorded species falling into this category are included in the lower parts of Tables 9.6 – 9.10 above. Owing to the insignificant numbers of birds involved, and in accordance with CIEEM guidance on EclA (CIEEM, 2016), the Study Area is not considered an important area for these species, which are not considered further.

## Terrestrial Breeding Birds – Tree Sparrow

- 9.7.26 Tree sparrow is the only recorded BOCC4 Red list species that is scarce in Scotland. It is locally common within small isolated patches, the nearest identified being eastern Fife. The small population in the Dalgety Bay area is likely to represent an isolated breeding population. However, records of tree sparrow exist from the opposite side of Dalgety Bay, suggesting that there is more than one tree sparrow territory in the area. Loss of the single territory close to the Site would not therefore be of county significance or higher, but owing to the scarcity of this species it is afforded district value.

## Terrestrial Breeding Birds – Other Species

- 9.7.27 The three other BOCC4 Red list species (house sparrow, song thrush and starling) and all other recorded species of lower or no conservation concern are common and widespread in Scotland, particularly in the central belt, and are therefore considered to have local value.

## Evaluation – Wintering Birds

- 9.7.28 This section concerns only those species which are qualifying or notified species for wintering only. Species which are qualifying or notified for both breeding and wintering are considered under the evaluation of breeding birds above.
- 9.7.29 Since the works are to be undertaken in the period April-September, impacts on wintering birds will be largely avoided, and this is the principle incorporated mitigation measure. However, some wintering birds are frequently present in April and September, and for this reason an evaluation of those wintering bird species recorded in these months is presented below.

## Bar-Tailed Godwit (wintering)

- 9.7.30 The maximum count of bar-tailed godwit recorded by the AECOM/AMEC surveys in April or September within both 400m and 1km was 1 bird. The local WeBS surveyor did not record this species in these months in one out of five years, but recorded a maximum of 130; however, that maximum was exceptional and the mean WeBS count was 27 (1.9% of the SPA population). Since this is just over 1% of the SPA population, the population of bar-tailed godwit in the Study Area in April or September is afforded national value.

## Black-Headed Gull (wintering)

- 9.7.31 The maximum count of black-headed gull recorded by the AECOM/AMEC surveys in April or September was 275 within 400m and 300 within 1km. The local WeBS counts recorded a mean of 46 birds in these months. The peak of 275 within 400m was exceptional and the mean for April and September was 66 birds. Both means are less than 1% of the OFFSAB pSPA wintering population (even the peak counts barely exceed 1%). Consequently, and in accordance with CIEEM guidance on EclA (CIEEM, 2016), the Study Area is not considered an important area for black-headed gull during April or September (the months of the April-September construction period during which it is considered that wintering birds may be present), and this receptor is not considered further.

## Common Scoter (wintering)

- 9.7.32 The maximum count in April or September within 400m was 25, and 46 within 1km, representing up to 2.8% of the SPA population. The local WeBS counts were equal or less. Since this is over 1% of the SPA population, the population of common scoter in the Study Area in April or September is afforded national value.



## Curlew (wintering)

- 9.7.33 The maximum count in April or September within 400m was 110 birds, and 171 within 1km. The local WeBS counts were equal or less. Since this is over 1% of the SPA population, the population of curlew in the Study Area in April or September is afforded national value.

## Dunlin (wintering)

- 9.7.34 The maximum count recorded by AECOM/AMEC in April or September within both 400m and 1km was 5. The local WeBS count recorded a maximum of 165 birds in these months, but this was exceptional and the mean WeBS count for April or September was 31 birds, representing less than 0.5% of the SPA population. Consequently, and in accordance with CIEEM guidance on EcIA (CIEEM, 2016), the Study Area is not considered an important area for dunlin during April or September (the months of the April-September construction period during which it is considered that wintering birds may be present), and this receptor is not considered further.

## Golden Plover (wintering)

- 9.7.35 The species was not recorded by AECOM/AMEC or the local WeBS counts in April or September. Consequently, and in accordance with CIEEM guidance on EcIA (CIEEM, 2016), the Study Area is not considered an important area for golden plover during April or September (the months of the April-September construction period during which it is considered that wintering birds may be present), and this receptor is not considered further.

## Goldeneye (wintering)

- 9.7.36 The species was not recorded by AECOM/AMEC in April or September, and the local WeBS counts (max 6 birds) in these months represent much less than 1% of the SPA population. Consequently, and in accordance with CIEEM guidance on EcIA (CIEEM, 2016), the Study Area is not considered an important area for goldeneye during April or September (the months of the April-September construction period during which it is considered that wintering birds may be present), and this receptor is not considered further.

## Great Crested Grebe (wintering)

- 9.7.37 The maximum count recorded by AECOM/AMEC in April or September within 1km was 2; none were recorded within 400m. The local WeBS count recorded up to 7 birds. Since these figures, small though they are, represent up to 8.9% of the SPA population, the population of great crested grebe in the Study Area in April or September is afforded national value.

## Grey Plover (wintering)

- 9.7.38 The species was not recorded by AECOM/AMEC in April or September, and the local WeBS counts (max 1 birds) in these months represent much less than 1% of the SPA population. Consequently, and in accordance with CIEEM guidance on EcIA (CIEEM, 2016), the Study Area is not considered an important area for grey plover during April or September (the months of the April-September construction period during which it is considered that wintering birds may be present), and this receptor is not considered further.

## Knot (wintering)

- 9.7.39 The species was not recorded by AECOM/AMEC in April or September, and the local WeBS counts (max 11 birds) in these months represent much less than 1% of the SPA population. Consequently, and in accordance with CIEEM guidance on EcIA (CIEEM, 2016), the Study Area is not considered an important area for knot during April or September (the months of

the April-September construction period during which it is considered that wintering birds may be present), and this receptor is not considered further.

### Lapwing (wintering)

- 9.7.40 The maximum count recorded by AECOM/AMEC in April or September within 400m was 138, and 168 within 1km. The local WeBS count recorded up to 268 birds, but the mean WeBS count in April or September was considerably less at 68 birds. However, all these figures exceed 1% of the SPA population, and the population of lapwing within the Study Area in April or September is afforded national value.

### Long-Tailed Duck (wintering)

- 9.7.41 The maximum count in April or September within 1km was 1; none were recorded within 400m. This species was not recorded by the local WeBS surveyor in April or September. This is significantly less than 1% of the designations for which this species is qualified or notified. Consequently, and in accordance with CIEEM guidance on EclA (CIEEM, 2016), the Study Area is not considered an important area for long-tailed duck during April or September (the months of the April-September construction period during which it is considered that wintering birds may be present), and this receptor is not considered further.

### Oystercatcher (wintering)

- 9.7.42 The maximum count recorded by AECOM/AMEC in April or September within 400m was 56, and 86 within 1km. The local WeBS count recorded up to 205, but this was exceptional and the mean WeBS count was 68. Most of these figures are over 1% of the SPA population, therefore the population of oystercatcher within the Study Area in April or September is afforded national value.

### Pink-Footed Goose (wintering)

- 9.7.43 This species was not recorded during the AECOM/AMEC surveys or by the WeBS counts in April or September (and very few in any other month). Consequently, and in accordance with CIEEM guidance on EclA (CIEEM, 2016), the Study Area is not considered an important area for long-tailed duck during April or September (the months of the April-September construction period during which it is considered that wintering birds may be present), and this receptor is not considered further.

### Red-Breasted Merganser (wintering)

- 9.7.44 The maximum count recorded by AECOM/AMEC in April or September within 400m was 27, and 28 within 1km, but the mean within 400m was only 4 birds. The local WeBS count recorded up to 60 birds in April or September, and a mean of 20. Taking the highest mean of 20, this represents 7.1% of the SPA population, thus the population of red-throated diver within the Study Area in April or September is afforded national value.

### Red-Throated Diver (wintering)

- 9.7.45 The maximum count recorded in April or September during the AECOM/AMEC survey within 1km was 1; none were recorded within 400m. The local WeBS count recorded a maximum of 97, but this was exceptional with all other counts in the range 0 to 3 (4.4% of SPA population), which is similar to the AECOM/AMEC result. However, since only one bird represents more than 1% of the SPA population, the red-throated diver population within the Study Area is afforded national value.

## Redshank (wintering)

- 9.7.46 The maximum count recorded by AECOM/AMEC in April or September was 86 within 400m, and 95 within 1km. The mean WeBS count was similar at 111 (1.8%). Since these figures are over 1% of the SPA population, the population of redshank within the Study Area in April or September is afforded national value.

## Ringed Plover (wintering)

- 9.7.47 No ringed plovers were recorded in April or September during the AECOM/AMEC surveys. The local WeBS count recorded up to 15 birds, but this was exceptional and the mean count was 3, representing 0.4% of the SPA population. Consequently, and in accordance with CIEEM guidance on EclA (CIEEM, 2016), the Study Area is not considered an important area for ringed plover during April or September (the months of the April-September construction period during which it is considered that wintering ringed plover may be present), and this receptor is not considered further.

## Scaup (wintering)

- 9.7.48 No scaup were recorded in April or September during the AECOM/AMEC surveys. The local WeBS count recorded none in any year in these months except for a single bird on one occasion, which results in a mean WeBS count of 0.1 representing 0.3% of the SPA population. Consequently, and in accordance with CIEEM guidance on EclA (CIEEM, 2016), the Study Area is not considered an important area for scaup during April or September (the months of the April-September construction period during which it is considered that wintering birds may be present), and this receptor is not considered further.

## Shelduck (wintering)

- 9.7.49 The mean WeBS count in April or September was 25, which was slightly higher than the AECOM/AMEC surveys. 25 birds represents only 0.7% of the SPA wintering population. Consequently, and in accordance with CIEEM guidance on EclA (CIEEM, 2016), the Study Area is not considered an important area for shelduck during April or September (the months of the April-September construction period during which it is considered that wintering birds may be present), and this receptor is not considered further.

## Turnstone (wintering)

- 9.7.50 The maximum count in April or September within both 400m and 1km was 51. The local WeBS count recorded a mean of 33 in April/September. The maximum count of 51 represents 7.2% of the SPA population, therefore the population within the Study Area is afforded national value.

## Velvet Scoter (wintering)

- 9.7.51 The maximum count recorded by AECOM/AMEC in April or September within 1km was 1; none were recorded within 400m. The local WeBS count did not record this species in these months. A single bird represents 0.2% of the SPA wintering population. Consequently, and in accordance with CIEEM guidance on EclA (CIEEM, 2016), the Study Area is not considered an important area for velvet scoter during April or September (the months of the April-September construction period during which it is considered that wintering birds may be present), and this receptor is not considered further.

## Wigeon (wintering)

- 9.7.52 The maximum count recorded by AECOM/AMEC in April or September within 400m was 32, and 67 within 1km. The mean WeBS count was 38 for these months. These figures represent

more than 1% of the SPA population, therefore the wigeon population in the Study Area in April or September is afforded national value.

## Predicted Impacts – Habitat Used by Birds Within Firth of Forth SPA/Ramsar/SSSI

- 9.7.53 Mudflat is a critical part of the Firth of Forth SPA/Ramsar/SSSI for the qualifying/notified bird species at all times of year. The SPA citation states that 75% of the SPA is 'Tidal river/estuary/mudflat/sandflat' which amounts to 4735ha. As can be seen from the table above, the area of intertidal habitat within the construction footprint corresponding to mudflat (i.e. littoral sands/muddy sands and polychaetes in littoral fine sands) amounts to just over 0.09ha, representing 0.002% of the designated mudflat. The construction footprint as a whole covers 1.6ha which represents 0.025% of the whole designated site area. These percentages are likely over-estimations because the construction footprint includes a 10m seaward buffer. Effects on mudflats beyond the construction footprint through coastal process changes are unlikely to occur because the Coastal Processes Report (AECOM, February 2017) concluded that the proposals will not adversely affect sediment transport.
- 9.7.54 Given the extremely small amount of mudflat affected, there is not anticipated to be any significant impact on the mudflat foraging resource itself. Note also that the intertidal area in the construction footprint was not found to be used by significant numbers of birds (see evaluations above and impact assessments below for bird species) and therefore does not significantly contribute to the carry capacity of the SPA/Ramsar site/SSSI.
- 9.7.55 The hard substrate intertidal habitats (both natural and rock armour) within the construction footprint also have a small amount of ornithological value because the surveys recorded small numbers of waders (such as turnstone and oystercatcher) using them for roosting and foraging. However, roosting capacity would continue to exist with the new rock armour, which is also likely to become suitable for foraging during the process of colonisation by marine communities (most likely similar to the existing barnacle and seaweed communities).
- 9.7.56 Extremely small amounts of coastal grassland (0.003ha) and amenity grassland (0.007ha) within the designated sites are within the construction footprint, but neither of these are used by qualifying/notified birds for roosting or foraging, and they are of negligible value for other birds.
- 9.7.57 In comparison, it is of note that the HRA for the Fife Shoreline Management Plan (which included the area of the proposed works) concluded that impacts on a much greater area of habitat within the Firth of Forth SPA/Ramsar/SSSI would not result in adverse effects on the integrity of these designated sites.
- 9.7.58 Given the extremely small percentages of the Firth of Forth SPA/Ramsar/SSSI mudflat and general intertidal habitats affected, and the expectation that new rock armour would develop similar marine communities to those on existing rock armour/hard substrate, there is considered to be no significant impact on designated habitat used by birds in the Firth of Forth SPA/Ramsar/SSSI.

## Predicted impacts – Likely Extent of Visual & Noise Disturbance to Birds

- 9.7.59 The literature review conducted by AMEC Foster Wheeler (see ES Volume 3 - Appendix 9.3), supplemented by a further inspection of the Waterbird Disturbance Mitigation Toolkit (Cutts et al 2013) referenced in that review, provides useful information on the likely extent of visual and noise disturbance on birds. The following summary points are pertinent:
- Visual disturbance tends to have a greater impact than noise disturbance.
  - Visual disturbance is greater from people than from machinery (including machinery containing operatives). People on the foreshore can cause high level disturbance responses, but some habituation is possible. People on mudflats are particularly disturbing to birds. High level disturbance responses (such as long flights) tend to occur when people are within 100-150m of birds. Moderate to low level disturbance

responses can extend to 300m or sometimes further for more sensitive birds (including curlew, lapwing, redshank and shelduck) where unhabituated and particularly when roosting, but tends to reduce with habituation including in estuarine locations where people regularly occur. Less sensitive species include turnstone, oystercatcher and dunlin.

- High level disturbance responses to noise can occur with continuous noise over 70dB (at the bird), or with sudden noise over 60dB (at the bird). Habituation can occur to continuous noise, and where works are screened from view birds can exhibit tolerance to high noise levels. Noise levels rapidly attenuate from source, such that most screened construction works will have little effect on birds beyond a distance of c.50m.
- Notable findings of case studies included: i) observations at South Humber Bank Power Station of highly disturbing piling operations causing bird displacement up to 200m, and workmen on the foreshore causing bird displacement up to 100m; ii) observations by the Environment Agency of greater disturbances by people in previously undisturbed intertidal areas, greater tolerance of birds when pre-disposed to disturbance such as people on foot, and limited disturbance caused by construction noise; iii) observations at Humber International Terminal of most construction work causing birds to move only short distances, and greater disturbance from walkers; iv) observations that boat disturbance caused birds to leave the area if approached within 100m.

9.7.60 The disturbance monitoring undertaken by AECOM and AMEC Foster Wheeler tends to support the above summary. For example:

- Higher level disturbance responses resulted from people especially when on the foreshore (in particular dog walkers), and also horse riders and radiation monitoring personnel on the mudflats. In the latter case, the extent of bird displacement around the monitoring personnel was noted on two occasions to be c.60m, though the above desk study information suggests that birds could be severely disturbed up to 150m away, and to a lesser degree beyond this.
- Other events involving people (including radiation monitoring personnel) on the mudflats, dogs, pneumatic drilling within 100m of the mudflats and work on boats elicited only moderate, low or no response.
- Passage of boats, some of moderate size, within 100m of Long Craig did not result in observable responses by aggregations of roosting birds.

9.7.61 The main reason that dogs frequently cause high level disturbance responses is that they are instinctively recognised as predators by birds, and (if loose) will chase and attempt to catch them. In contrast, people do not generally chase or attempt to catch birds; consequently people without dogs tend to be tolerated to a greater degree than those with dogs, and considerable habituation is possible to the people alone. Similarly, plant machinery and boats also tend not to incite instinctive predator reactions, leading to greater toleration and habituation by birds. Thus construction activities can be less disturbing to birds than disturbance by people with dogs. Various bird disturbance studies exist that have found dogs to be a major cause of significant disturbance (e.g. Clarke *et al* 2012; Linaker 2012; Webb 2002; Liley & Fearnley 2011).

9.7.62 Given that the Site is located in part of the Dalgety Bay shoreline that is regularly disturbed by walkers (often including dogs), and to a lesser extent by boats from the sailing club and people working on boats, it is highly likely that birds are already habituated to a degree of disturbance. Birds are also likely to habituate to the works themselves because they will not be irregular but will proceed for several hours at a time and be repeated on successive work days through the proposed summer work period.

9.7.63 As such, the presence of workers on the foreshore at the Site (which from the above evidence would be more disturbing than workers in plant machinery, or machinery alone) is considered



highly unlikely to cause visual disturbance beyond 300m for the more sensitive species (curlew, lapwing, shelduck and redshank), and in many cases considerably less than this for other species.

- 9.7.64 With regard to noise disturbance, which the above information suggests is likely to be less important than visual disturbance, the noise analysis (see ES Volume 1 – Chapter 11, and Figures 9.15 to 9.17) indicates that construction sound greater than 70dB (in all scenarios) is likely to extend only short distances from the works. Using a precautionary figure of 60dB (above which, according to the above information, a sudden sound could result in higher level disturbance responses), the extent of this sound level (in all scenarios) is a maximum of c.175m northwards and c.275m east and south of the works. Therefore it is unlikely that noise disturbance would have significant effects on birds more than 275m from the Site.
- 9.7.65 With regard to possible disturbance by barges importing rock armour, and taking a highly precautionary approach, the above information suggests that birds are very unlikely to be disturbed by barges if they similarly maintain a minimum distance of 300m from islands and rocks such as Long Craig, Thank Rock and Haystack (and other islands elsewhere in the Firth of Forth, especially within designated sites including Forth Islands SPA). It is considered that there is ample leeway around Thank Rock, Long Craig, Haystack, Inchcolm and the islands of Forth Islands SPA (which includes Inchmickery SSSI and Long Craig Island SSSI) to maintain this minimum.
- 9.7.66 With regard to lighting of the proposed works, the works will be undertaken at night and no lighting will be used.
- 9.7.67 In summary, the combination of evidence above on visual and noise disturbance indicates that there are unlikely to be significant disturbance effects on birds more than 300m from the Site or the barge.

### Predicted Impacts – breeding birds

- 9.7.68 Impacts on the ornithological receptors not screened out of further assessment in the previous evaluation section are discussed here. There is considered to be no significant impact on receptors screened out above, through insignificant numbers of birds. This section includes birds that are qualifying or notified species for both breeding and wintering, as well as those qualifying or notified for breeding only.

### Impacts on CommonTern (breeding)

- 9.7.69 As noted in the evaluation above, the population of common tern during April to September within the Study Area could (on rare occasions) be significant at the scale of the Forth Islands/Imperial Dock Lock Leith SPAs and OFFSAB pSPA. However, following the conclusions above on the likely limited extent of visual and noise disturbance, and the observed distribution of this species (see ES Volume 2 - Figure 9.13), a maximum of 5 birds are likely to be disturbed by the works at the Site at any time.
- 9.7.70 The observed distribution within the Study Area indicates that barge movements could disturb foraging (and occasionally roosting) common terns to the south and east of the Site, generally small numbers but rarely (according to the WeBS count) larger numbers of SPA significance; however, disturbance of common terns (mostly foraging) by the barge is only likely within 300m at most, and such birds can easily disperse in the same way that they must avoid other boats. No nest sites will be affected since there are none in the Study Area, and no nest sites elsewhere will be affected as long as the barge maintains 300m distance from islands elsewhere in the Firth of Forth. Furthermore, there will be only 15-16 barge movements during each of the two summer periods proposed for the works, so there will be no barge activity on 97% of days during April-September, and all impacts will be temporary during construction only over two summer periods only.
- 9.7.71 For these reasons, there is considered to be no significant impact on breeding common tern.

## Impacts on Cormorant (breeding + wintering)

- 9.7.72 As noted in the evaluation above, the population of cormorant during April to September within the Study Area is significant at the scale of the Forth Islands SPA. However, following the conclusions above on the likely limited extent of visual and noise disturbance, and the observed distribution of this species (see ES Volume 2 - Figure 9.10), the number of birds likely to be disturbed by the works at the Site at any time is likely to be only two birds.
- 9.7.73 The observed distribution within the Study Area also indicates that barge movements are unlikely to disturb larger aggregations of roosting cormorants as long as the barge maintains the 300m distance from rocks/islands in the Firth of Forth and mouth of Dalgety Bay. No nest sites will be affected since there are none in the Study Area, and no nest sites elsewhere will be affected as long as the barge maintains 300m distance from islands elsewhere in the Firth of Forth. Furthermore, there will be only 15-16 barge movements during each of the two summer periods proposed for the works, so there will be no barge activity on 97% of days during April-September, and all impacts will be temporary during construction only over two summer periods only.
- 9.7.74 For these reasons, there is considered to be no significant impact on breeding cormorant.

## Impacts on Eider (breeding + wintering)

- 9.7.75 As noted in the evaluation above, the population of eider during the breeding season within the Study Area is not considered significant at the scale of the Firth of Forth SSSI. Therefore there can be no significant impact on the Firth of Forth SPA/Ramsar/SSSI population.
- 9.7.76 The evaluation concluded that the population of eider in the Study Area during April to September was of local value. However, following the conclusions above on the likely limited extent of visual and noise disturbance, and the observed distribution of this species (see ES Volume 2 - Figure 9.11), a maximum of 15 birds are likely to be disturbed by the works at the Site at any time.
- 9.7.77 Barge movements could disturb more birds but by maintaining 300m from rocks/islands in the Firth of Forth and mouth of Dalgety Bay, no impacts are likely on roosting birds; any foraging birds on the sea are only likely to be disturbed within 300m, within which eider can easily disperse in the same way that they must avoid other boats. No nest sites will be affected since there are none in the Study Area, and no nest sites elsewhere will be affected as long as the barge maintains 300m distance from islands elsewhere in the Firth of Forth. Furthermore, there will be only 15-16 barge movements during each of the two summer periods proposed for the works, so there will be no barge activity on 97% of days during April-September, and all impacts will be temporary during construction only over two summer periods only.
- 9.7.78 For these reasons, there is considered to be no significant impact on breeding eider.

## Impacts on Herring Gull (breeding + wintering)

- 9.7.79 As noted in the evaluation above, the population of herring gull during April to September within the Study Area is significant (during August/September) at the scale of the OFFSAB pSPA and potentially also Inchmickery SSSI. However, following the conclusions above on the likely limited extent of visual and noise disturbance, and the observed distribution of this species (see ES Volume 2 - Figure 9.12), the number of birds likely to be disturbed by the works at the Site at any time is likely to be less than 1% of the qualifying/notified populations.
- 9.7.80 The observed distribution within the Study Area also indicates that barge movements are likely to disturb only limited numbers of herring gull as long as the barge maintains the 300m distance from rocks/islands in the Firth of Forth and mouth of Dalgety Bay. No disturbance by the barge is possible on the sandbank roost site because this is only exposed at lowest tide, and the barge will only operate at high tide. No nest sites will be affected since there are none in the Study Area, and no nest sites elsewhere will be affected as long as the barge maintains



300m distance from islands elsewhere in the Firth of Forth. Furthermore, there will be only 15-16 barge movements during each of the two summer periods proposed for the works, so there will be no barge activity on 97% of days during April-September, and all impacts will be temporary during construction only over two summer periods only.

9.7.81 For these reasons, there is considered to be no significant impact on breeding herring gull.

### Impacts on Lesser Black-Backed Gull (breeding)

9.7.82 As noted in the evaluation above, the population of lesser black-backed gull during the breeding season within the Study Area is not considered significant at the scale of the Forth Islands SPA or Inchmickery SSSI. Therefore there can be no significant impact on the Forth Islands SPA or Inchmickery SSSI breeding lesser black-backed gull population.

9.7.83 The evaluation concluded that the population of lesser black-backed gull in the Study Area during April to September was of local value. However, following the conclusions above on the likely limited extent of visual and noise disturbance, and the observed distribution of this species (see ES Volume 2 - Figure 9.12), a maximum of 24 birds are likely to be disturbed by the works at the Site at any time.

9.7.84 The observed distribution within the Study Area also indicates that barge movements are likely to disturb only limited numbers of lesser black-backed gull as long as the barge maintains the 300m distance from rocks/islands in the Firth of Forth and mouth of Dalgety Bay. No disturbance by the barge is possible on the sandbank roost site because this is only exposed at lowest tide, and the barge will only operate at high tide. No nest sites will be affected since there are none in the Study Area, and no nest sites elsewhere will be affected as long as the barge maintains 300m distance from islands elsewhere in the Firth of Forth. Furthermore, there will be only 15-16 barge movements during each of the two summer periods proposed for the works, so there will be no barge activity on 97% of days during April-September, and all impacts will be temporary during construction only over two summer periods only.

9.7.85 For these reasons, there is considered to be no significant impact on breeding lesser black-backed gull.

### Impacts on Roseate Tern (breeding)

9.7.86 As noted in the evaluation above, the population of roseate tern during April to September within the Study Area is significant at the scale of the Forth Islands SPA and Long Craig Island SSSI, and potentially of national value. However, following the conclusions above on the likely limited extent of visual and noise disturbance, and the observed distribution of this species (see ES Volume 2 - Figure 9.13), one or two birds might be subject to low levels of disturbance by the works at the Site, and would have to move a very short distance (c.100m) south/east to move beyond all likely disturbance from the Site.

9.7.87 The observed distribution within the Study Area indicates that barge movements could disturb foraging (and occasionally roosting) roseate terns to the south and east of the Site; however, disturbance of roseate terns (mostly foraging) by the barge is only likely within 300m at most, and such birds can easily disperse in the same way that they must avoid other boats. No nest sites will be affected since there are none in the Study Area, and no nest sites elsewhere will be affected as long as the barge maintains 300m distance from islands elsewhere in the Firth of Forth. Furthermore, there will be only 15-16 barge movements during each of the two summer periods proposed for the works, so there will be no barge activity on 97% of days during April-September, and all impacts will be temporary during construction only over two summer periods only.

9.7.88 For these reasons, there is considered to be no significant impact on breeding roseate tern.

## Impacts on Sandwich Tern (breeding/passage)

- 9.7.89 As noted in the evaluation above, the population of sandwich tern during April to September within the Study Area is could (rarely) be significant at the scale of the Forth Islands SPA or Firth of Forth SPA/Ramsar/SSSI. However, following the conclusions above on the likely limited extent of visual and noise disturbance, and the observed distribution of this species (see ES Volume 2 - Figure 9.13), it is not likely that numbers of birds disturbed by works at the Site at any time would be significant at the scale of the designated sites.
- 9.7.90 The observed distribution within the Study Area indicates that barge movements could disturb foraging (and occasionally roosting) sandwich terns to the south and east of the Site, but only in small numbers; furthermore, disturbance of sandwich terns (mostly foraging) by the barge is only likely within 300m at most, and such birds can easily disperse in the same way that they must avoid other boats. No disturbance by the barge is possible on the sandbank roost site because this is only exposed at lowest tide, and the barge will only operate at high tide. No nest sites will be affected since there are none in the Study Area, and no nest sites elsewhere will be affected as long as the barge maintains 300m distance from islands elsewhere in the Firth of Forth. Furthermore, there will be only 15-16 barge movements during each of the two summer periods proposed for the works, so there will be no barge activity on 97% of days during April-September, and all impacts will be temporary during construction only over two summer periods only.
- 9.7.91 For these reasons, there is considered to be no significant impact on breeding/passage sandwich tern.

## Impacts on Shelduck (breeding)

- 9.7.92 As noted in the evaluation above, the population of shelduck during the breeding season within the Study Area is not considered significant at the scale of the Firth of Forth SPA/Ramsar/SSSI. Therefore there can be no significant impact on the Firth of Forth SPA/Ramsar/SSSI shelduck population.
- 9.7.93 The evaluation concluded that the population of shelduck in the Study Area during April to September was of local value. However, following the conclusions above on the likely limited extent of visual and noise disturbance, and the observed distribution of this species (see ES Volume 2 - Figure 9.11), a maximum of 12 birds are likely to be disturbed by the works at the Site at any time.
- 9.7.94 The observed distribution within the Study Area (largely within the bay itself) also indicates that barge movements are likely to disturb few or no shelduck. No nest sites will be affected since there are none in the Study Area, and no nest sites elsewhere will be affected as long as the barge maintains 300m distance from islands elsewhere in the Firth of Forth. Furthermore, there will be only 15-16 barge movements during each of the two summer periods proposed for the works, so there will be no barge activity on 97% of days during April-September, and all impacts will be temporary during construction only over two summer periods only.
- 9.7.95 For these reasons, there is considered to be no significant impact on breeding shelduck.

## Impacts on Breeding Seabird Assemblage

- 9.7.96 As noted in the evaluation above, the breeding seabird assemblage as a whole within the Study Area was afforded national value, representing (with respect to gulls, terns and cormorant) generally small but significant parts of the Forth Islands SPA and OFFSAB pSPA. However, there is considered to be no significant impact on the seabirds already discussed above (either screened out during the evaluation or with no significant impact in subsequent impact assessment), and the only additional seabird assemblage species not already discussed with significant numbers is black-headed gull.

- 9.7.97 Although black-headed gull was recorded in occasional large numbers, the reported locations for this species were with the other gulls (principally herring and lesser black-backed gulls), and following the conclusions above on the likely limited extent of visual and noise disturbance it is very unlikely (as for herring and lesser black-backed gull) that numbers of black-head gulls disturbed by works at the Site at any time would be significant at the scale of the designated sites. Again (as for herring and lesser black-backed gull), barge movements are likely to disturb only limited numbers of black-headed gull because the barge will maintain 300m from rocks/islands in the Firth of Forth and mouth of Dalgety Bay. No disturbance by the barge is possible on the sandbank roost site because this is only exposed at lowest tide, and the barge will only operate at high tide. No nest sites will be affected since there are none in the Study Area, and no nest sites elsewhere will be affected as long as the barge maintains 300m distance from islands elsewhere in the Firth of Forth. Furthermore, there will be only 15-16 barge movements during each of the two summer periods proposed for the works, so there will be no barge activity on 97% of days during April-September, and all impacts will be temporary during construction only over two summer periods only. For these reasons, there is considered to be no significant impact on black-headed gull.
- 9.7.98 Consequently, and in combination with the assessments of other seabirds above, there is considered to be no significant impact on the breeding seabird assemblage.

### **Predicted Impacts – Wintering Birds**

- 9.7.99 Species which are qualifying or notified for both wintering and breeding are discussed above under impacts on breeding birds. As noted above, these assessments of impacts on birds which are just wintering and not breeding uses data from April and September only, because these are the only months during the April to September construction period in which it is considered likely that significant numbers of wintering birds may still occur.

#### **Bar-tailed Godwit (wintering)**

- 9.7.100 Given the habitats within the WeBS sector, the birds contributing to the WeBS count (the largest available count, with mean peak of 27 birds in April or September representing 1.9% of SPA population) are highly likely to have been on the Dalgety Bay mudflats, either foraging or roosting. However, given the recorded distributions of commonly-associated waders (such as curlew and redshank – see Figures 9.8-9.14), and of the birds recorded during the AECOM/AMEC surveys, is likely that less than 1% of the SPA population would be within 300m of the Site. Given also the maximum likely extent of visual/noise disturbance of 300m (see above), likely habituation to current disturbance on the coastal path and foreshore (see above), the likelihood that disturbance at 300m would not invoke high level disturbance responses (see above), and likely occurrence of habituation to the Site works themselves (which will be for continuous daylight periods on successive days), there is not likely to be a significant impact on bar-tailed godwit from the site works.
- 9.7.101 Given also that barge movements will only occur at high tide, when bar-tailed godwit occur at the north edge of Dalgety Bay or further afield, it is also unlikely that barge movements will cause significant disturbance. Additionally, bar-tailed godwit qualifies for the SPA as a wintering species only, and the key wintering period of Oct-Mar will not be affected because the works will be confined to April-September.
- 9.7.102 It is concluded that there will be no significant impact on bar-tailed godwit.

#### **Common Scoter (wintering)**

- 9.7.103 Considering the maximum likely extent of disturbance from the works of 300m and the recorded distribution (in deeper waters over 400m from the Site) of common scoter on deep water close to and well beyond 400m on one occasion in September, it is unlikely that any birds will be disturbed by the works at the Site. Given also likely habituation to current disturbance on the coastal path and foreshore, and likely occurrence of habituation to the Site

works themselves (which will be for continuous daylight periods on successive days), there is not likely to be a significant effect on common scoter from the Site works.

9.7.104 Disturbance of foraging common scoter by the barge is only likely within 300m at most, is likely to occur only rarely in September only, and such birds can easily disperse in the same way that they will currently avoid existing boats and ships. Furthermore, given there will be only 15-16 barge movements during each April-September construction period, the likely maximum of 6 barge movements in April and September leaves 98% of days in those months free of barge disturbance. Common scoter qualifies for the SPA as a wintering species only, and the key wintering period of Oct-Mar will not be affected because the works will be confined to April-September.

9.7.105 It is concluded that there will be no significant impact on common scoter.

### Curlew (wintering)

9.7.106 There were very few birds within 200m and the distribution of observations within the 200m-400m band is even such that the number of birds within 300m is likely to be a maximum of 1.5% of the SPA population. However, the peak count within 400m is atypical, with 85% of observations involving 50 or less birds, such that typically the number of birds involved represented 0.75% or less of the SPA population. Given also likely habituation to current disturbance on the coastal path and foreshore, the likelihood that disturbance at 300m would not invoke high level disturbance responses (see above), and likely occurrence of habituation to the Site works themselves (which will be for continuous daylight periods on successive days), there is not likely to be a significant effect on curlew from the Site works.

9.7.107 Barge movements are unlikely to disturb curlew because the barge will operate at high tide when curlew occur at the north edge of Dalgety Bay or further afield. Birds on exposed rocks/islands are unlikely to be affected because the barge will maintain 300m distance from rocks/islands. Curlew qualifies for the SPA as a wintering species only, and the key wintering period of Oct-Mar will not be affected because the works will be confined to April-September.

9.7.108 It is concluded that there will be no significant effect on curlew.

### Great Crested Grebe (wintering)

9.7.109 Considering the maximum likely extent of disturbance from the works of 300m and the recorded distribution (in deeper waters over 400m from the Site) of great crested grebe, it is unlikely that any birds will be disturbed by the works at the Site. Given also likely habituation to current disturbance on the coastal path and foreshore (see above), the likelihood that disturbance at 300m would not invoke high level disturbance responses (see above), and likely occurrence of habituation to the Site works themselves (which will be for continuous daylight periods on successive days), there is not likely to be a significant effect on great crested grebe from the Site works.

9.7.110 Disturbance of foraging great crested grebe by barge movements is only likely within 300m at most, and such birds can easily disperse in the same way that they will currently avoid existing boats and ships. Furthermore, given there will be only 15-16 barge movements during each April-September construction period, the likely maximum of 6 barge movements in April and September leaves 98% of days in those months free of barge disturbance. Additionally, great crested grebe qualifies for the SPA as a wintering species only, and the key wintering period of Oct-Mar will not be affected because the works will be confined to April-September.

9.7.111 It is concluded that there will be no significant impact on great crested grebe.

### Lapwing (wintering)

9.7.112 The likely extent of disturbance from the works (see above) is 300m. There were almost no birds within 200m and the distribution of observations within the 200m-400m band is such that the average number of birds within 300m is likely to be 34 birds representing 1% of the SPA

population. Given also likely habituation to current disturbance on the coastal path and foreshore (see above), the likelihood that disturbance at 300m would not invoke high level disturbance responses (see above), and likely occurrence of habituation to the Site works themselves (which will be for continuous daylight periods on successive days), there is not likely to be a significant effect on lapwing from the Site works.

9.7.113 Barge movements are unlikely to disturb lapwing because the barge will operate at high tide when lapwing occur at the north edge of Dalgety Bay or further afield. Lapwing qualifies for the SPA as a wintering species only, and the key wintering period of Oct-Mar will not be affected because the works will be confined to April-September.

9.7.114 It is concluded that there will be no significant impact on lapwing.

### Oystercatcher (wintering)

9.7.115 The likely extent of disturbance from the works is 300m (see above). There were few birds within 200m and the distribution of observations within the 200m-400m band is such that the average number of birds within 300m is likely to be approximately 0.5% of SPA population. Given also likely habituation to current disturbance on the coastal path and foreshore (see above), the likelihood that disturbance at 300m would not invoke high level disturbance responses (see above), and likely occurrence of habituation to the Site works themselves (which will be for continuous daylight periods on successive days), there is not likely to be a significant effect on oystercatcher from the Site works.

9.7.116 Barge movements are unlikely to disturb oystercatcher because the barge will operate at high tide when most oystercatcher will be forced to the north edge of Dalgety Bay or further afield. Oystercatcher qualifies as a wintering species only, and the key wintering period of Oct-Mar will not be affected because the works will be confined to April-September.

9.7.117 It is concluded that there will be no significant effect on oystercatcher.

### Red-Breasted Merganser (wintering)

9.7.118 The proportion of birds in the WeBS sector was 7.1% of the SPA population. However, the distribution of observations during the AECOM/AMEC surveys suggests that 80% were in deeper waters beyond 300m from the site. Considering also the maximum likely extent of disturbance from the works of 300m, the numbers of birds within 300m is unlikely to exceed 1.4% of the SPA population. The majority of birds within 300m were also foraging, and these birds are easily able to disperse to adjacent areas of open water. Given also likely habituation to current disturbance on the coastal path and foreshore (see above), the likelihood that disturbance at 300m would not invoke high level disturbance responses (see above), and likely occurrence of habituation to the Site works themselves (which will be for continuous daylight periods on successive days), there is not likely to be a significant effect on red-breasted merganser from the Site works.

9.7.119 Disturbance of foraging red-breasted merganser by barge movements is only likely within 300m at most, and such birds can easily disperse in the same way that they will currently avoid existing boats and ships. Birds roosting on rocks are unlikely to be disturbed because the barge will maintain 300m from rocks/islands. Furthermore, given there will be only 15-16 barge movements during each April-September construction period, the likely maximum of 6 barge movements in April and September leaves 98% of days in those months free of barge disturbance. Red-breasted merganser qualifies for the SPA as a wintering species only, and the key wintering period of Oct-Mar will not be affected because the works will be confined to April-September.

9.7.120 It is concluded that there will be no significant impact on red-breasted merganser.



## Red-Throated Diver (wintering)

- 9.7.121 Given the behaviour of this species, and the likelihood that birds would normally be located over 300m from the site in common with the AECOM/AMEC sighting and observations elsewhere in the Firth of the Forth, the highly exceptional WeBS count of 97 is considered likely to involve a high proportion in deeper water over 300m from the Site and in part outside the Study Area (since the WeBS sector is larger and includes more sea). It is much more likely that the typical number of birds within the Study Area will not exceed 3 birds (as per all the other WeBS counts and AECOM/AMEC surveys), and these birds are likely to be foraging in deeper water more than 300m from the site. Foraging birds are easily able to disperse to adjacent areas of open water. Given also likely habituation to current disturbance on the coastal path and foreshore (see above), the likelihood that disturbance at 300m would not invoke high level disturbance responses (see above), and likely occurrence of habituation to the Site works themselves (which will be for continuous daylight periods on successive days), there is not likely to be a significant effect on red-throated diver from the Site works.
- 9.7.122 Disturbance of foraging red-throated diver by barge movements is only likely within 300m at most, and such birds can easily disperse in the same way that they will currently avoid existing boats and ships. Furthermore, given there will be only 15-16 barge movements during each April-September construction period, the likely maximum of 6 barge movements in April and September leaves 98% of days in those months free of barge disturbance. Red-throated diver qualifies for the SPA as a wintering species only, and the key wintering period of Oct-Mar will not be affected because the works will be confined to April-September.
- 9.7.123 It is concluded that there will be no significant impact on red-throated diver.

## Redshank (wintering)

- 9.7.124 The distribution of observations shows that whilst small numbers (groups of up to 24 birds) foraged and occasionally roosted close to the Site, the majority of birds were more than 200m away, and over half were beyond 300m. Since the mean WeBS count (which was slightly higher than the AECOM/AMEC surveys) represents 1.8% of the SPA population, and the likely extent of disturbance from the works is 300m (see above), it is unlikely that the numbers of birds disturbed by the Site works would exceed 0.9% of the SPA population. Given also likely habituation to current disturbance on the coastal path and foreshore (see above), the likelihood that disturbance at 300m would not invoke high level disturbance responses (see above), and likely occurrence of habituation to the Site works themselves (which will be for continuous daylight periods on successive days), there is not likely to be a significant effect on redshank from the Site works.
- 9.7.125 Barge movements are unlikely to disturb redshank because the barge will operate at high tide when most oystercatcher will occur at the north edge of Dalgety Bay or further afield. Redshank qualifies as a wintering species only, and the key wintering period of Oct-Mar will not be affected because the works will be confined to April-September.
- 9.7.126 It is concluded that there will be no significant impact on redshank.

## Turnstone (wintering)

- 9.7.127 The peak count of turnstone within 400m was 51 in April or September, recorded during the AMEC surveys, but the mean count of combined AECOM/AMEC observations in those months was 14 birds, representing 2.0% of the SPA population. The distribution of observations shows that whilst small numbers (groups of up to 21 birds) roosted (and to lesser extent foraged) at or close to the Site, over half of the observed birds were over 300m from the Site, in particular on the north edge of Dalgety Bay near St Bridget's Church. As such, it is unlikely that the number of birds within 300m of the Site would normally exceed 1% of the SPA population. Given the likely extent of disturbance from the works of 300m (see above), likely habituation to current disturbance on the coastal path and foreshore (see

above), the likelihood that disturbance at 300m would not invoke high level disturbance responses (see above), the low level of sensitivity to disturbance of turnstone (see above), and likely occurrence of habituation to the Site works themselves (which will be for continuous daylight periods on successive days), there is not likely to be a significant effect on turnstone from the Site works.

9.7.128 Barge movements may disturb turnstone because the surveys indicate that turnstones are sometimes roosting at the site at high tide when the barge will operate. However, the proportion of the SPA population potentially affected is, for the same reasons set out in the previous paragraph, unlikely to exceed 1%. Turnstone qualifies as a wintering species only, and the key wintering period of Oct-Mar will not be affected because the works will be confined to April-September.

9.7.129 There will be no permanent loss of the small turnstone roost areas at the Site, because the new rock armour will replace the existing rocks used for roosting.

9.7.130 It is concluded that there will be no significant impact on turnstone.

### Wigeon (wintering)

9.7.131 The maximum likely extent of disturbance from the works is 300m (see above). The mean WeBS count of 38 (slightly higher than the AECOM/AMEC surveys) for April/September represents 1.9% of the SPA population. The observed distribution of this species (see above) indicates that the majority of birds were beyond 300m from the site, such that it is unlikely that the numbers of birds disturbed by works at the Site would exceed 1% of the SPA population. Given also likely habituation to current disturbance on the coastal path and foreshore (see above), the likelihood that disturbance at 300m would not invoke high level disturbance responses (see above), and likely occurrence of habituation to the Site works themselves (which will be for continuous daylight periods on successive days), there is not likely to be a significant effect on wigeon from the Site works.

9.7.132 Barge movements are unlikely to disturb wigeon because the barge will operate at high tide when wigeon will largely be at the north edge of Dalgety Bay or further afield. Wigeon qualifies as a wintering species only, and the key wintering period of Oct-Mar will not be affected because the works will be confined to April-September.

9.7.133 It is concluded that there will be no significant impact on wigeon.

### Wintering Assemblages

9.7.134 The wintering waterfowl assemblage as a whole is a qualifying/notified feature of the Firth of Forth SPA/Ramsar/SSSI and OFFSAB pSPA. This assemblage includes all waterfowl including any that may be unnamed and not separately designated. The only waterfowl recorded during April or September in the Study Area that have not already been discussed above are as follows:

- Gadwall: 1 bird recorded once in September during AECOM surveys, beyond 400m from the Site; not recorded in WeBS counts.
- Greenshank: not recorded in AECOM/AMEC surveys but WeBS counts recorded 1 bird once in September.
- Great northern diver: 1 bird recorded once in September during AECOM surveys, beyond 400m from the Site; not recorded in WeBS counts.
- Greylag goose: 1 bird recorded once in April during AECOM surveys, between 200m and 400m; also 4 birds recorded once in September during AMEC surveys but over 600m from the Site; not recorded in WeBS counts.
- Pochard: 1 bird recorded once in September during AECOM surveys, between 200m and 400m from the Site; not recorded in WeBS counts.



- Teal: 20 recorded once in September during AECOM surveys, between 200m and 400m from the Site; not recorded in WeBS counts.
- Whimbrel: 1 bird recorded once in April during AECOM surveys, between 200m and 400m from the Site; not recorded in WeBS counts.

9.7.135 The numbers of these species are all insignificant. Consequently, and in combination with the lack of significant impacts on individually-assessed species above, it is concluded that there will be no significant impact on the wintering waterfowl assemblage.

9.7.136 The wintering seabird assemblage as a whole is a qualifying feature of the OFFSAB pSPA. This assemblage includes all seabirds including any that may be unnamed and not separately designated. All wintering seabirds have been discussed under the evaluations and impact assessments for breeding seabirds and seabird assemblage above; those assessments cover the construction period of April-September and thereby include the two months of that period of possible concern for wintering birds (April and September). Consequently, given the lack of significant impacts on the individually-assessed seabirds, there is expected to be no significant impact on the wintering seabird assemblage.

### Impacts on Designated Sites in their Entirety

9.7.137 Given the above assessments of ornithological receptors and habitat likely to be affected, and the conclusions in all cases of no significant impact, it can be concluded that there will be no significant impact on any of the designated sites.

### Summary of Impacts on Waterfowl & Seabirds

9.7.138 The following birds which are qualified or notified for breeding (or both breeding and wintering) were screened out during the evaluation, because of the insignificant number of birds involved or complete absence:

- Kittiwake
- Manx shearwater
- Fulmar
- Gannet
- Guillemot
- Puffin
- Razorbill
- Shag
- Arctic tern

9.7.139 The following birds which are qualified or notified for breeding (or both breeding and wintering) were not screened out during the evaluation, but in all cases there was considered to be no significant impact:

- Eider
- Shelduck
- Herring gull
- Lesser black-backed gull
- Cormorant
- Common tern
- Roseate tern
- Sandwich tern

9.7.140 The following birds which are qualified or notified for wintering only were screened out during the evaluation, because of the insignificant number of birds involved or complete absence:

- Black-headed gull
- Dunlin
- Golden plover
- Goldeneye
- Grey plover
- Knot
- Long-tailed duck
- Pink-footed goose
- Ringed plover
- Scaup
- Shelduck
- Velvet scoter

9.7.141 The following birds which are qualified or notified for wintering only were not screened out during the evaluation, but in all cases there was considered to be no significant impact:

- Bar-tailed godwit
- Common scoter
- Curlew
- Great crested grebe
- Lapwing
- Oystercatcher
- Red-breasted merganser
- Red-throated diver
- Redshank
- Turnstone
- Wigeon

9.7.142 All non-designated waterfowl/seabirds were found to involve insignificant numbers of birds, or there was found to be no significant impact. Consequently, and in combination with the lack of significance for individually-assessed species, there is considered to be no significant impact on the breeding and wintering assemblages of waterfowl/seabirds.

## Impacts on Terrestrial Breeding Birds

### Tree Sparrow

9.7.143 The tree sparrows were recorded at the edge of the sailing club and the adjacent suburban gardens/houses. This is not close to the proposed works. Although a temporary compound is likely to be placed on amenity grassland near the tree sparrow observations, the tree sparrows will be habituated to a reasonable degree of disturbance from a) users of the sailing club entering and leaving close to the tree sparrows, b) people moving and working on boats, c) boats being moved on/off and stored on part of the amenity grassland, and d) regular walkers and other users of the coastal path which passes through the sailing club. Given also that the amenity grassland itself is not a significant foraging resource for tree sparrows, and that they will nest in trees and shrubs and not on the amenity grassland, it is highly unlikely that the proposed works including temporary compound would have a significant effect on the tree sparrows. Consequently, it is concluded that there will be no significant impact on tree sparrows.

## Other Species

9.7.144 As explained in the Nature Conservation Chapter, there will be no significant impact on trees and shrubs at the Site, with terrestrial habitat impacts largely limited to a small amount of amenity grassland and extremely small area of coastal grassland. These affected habitats do not represent nesting habitat for terrestrial breeding birds, and of negligible consequence as foraging habitat because of a) the small affected extent, and b) the very large extent of amenity grassland beyond the affected area. There is a possibility of a very small number of thin, immature sycamore trees being removed at the top of the existing slipway, but these would support very few or no birds (likely to be common and widespread) owing to their size and regular disturbance. Additionally, breeding birds in the trees and shrubs around the sailing club will be habituated to regular disturbance by people. For these reasons, it is likely that very few or no terrestrial breeding birds will be affected by the works. Furthermore, should a small number of terrestrial breeding birds be affected, the terrestrial breeding bird surveys indicate that only common and widespread species would be affected. Consequently, it is concluded that there will no significant impact on other terrestrial breeding birds.

## 9.8 Mitigation and Monitoring

9.8.1 Four key mitigation measures have been identified, and a fifth to meet legal obligations regarding active nests of terrestrial breeding birds. These are outlined below:

- The principle mitigation measure is to undertake the works during the summer period (April-September) to avoid impacts on wintering birds.
- Barge movements will be restricted such that barges maintain a minimum distance of 300m from all exposed rocks/islands in the Firth of Forth and mouth of Dalgety Bay, in order to avoid potentially significant disturbance of qualifying/notified waterfowl bird species.
- An Ecological Clerk of Works (ECoW) will be employed to determine whether the disturbance responses by waterfowl during the works are greater than those predicted. In the unlikely event that greater disturbance responses occur, and that these are considered significant at the scale of the relevant designated sites and therefore require mitigation, the ECoW will consult with SNH and seek to reduce disturbance using proven methods such as use of screens to reduce visual disturbance, or alteration of barge route.
- The works will not be undertaken at night, and there will be no lighting requirements.
- Any trees/shrubs needing to be cleared (the amount of which is anticipated to be very small or zero, and involving only small/immature trees/shrubs) will preferably be cleared in the period September-February inclusive to avoid possible illegal destruction or damage of active terrestrial bird nests. If this is not possible, an ECoW will monitor the relevant trees/shrubs prior to clearance to check for active terrestrial bird nests; should active terrestrial bird nests be found, the ECoW will halt works in that area until the breeding attempts have finished.
- CEMP (Construction Environmental Management Document) and Construction Method Statements will contain embedded approved pollution control measures, which will greatly minimise risk of pollution during construction works and barge rock delivery. The project will itself also remediate radium contamination.

9.8.2 Monitoring of waterfowl will effectively be undertaken by the local WeBS surveyor, who will continue to carry out WeBS counts for the BTO in the Dalgety Bay recording sector. WeBS data obtained during the works, and for one year after the works, is to be compared with previous WeBS data for the same sector from the same surveyor (taking into account national and regional trends as indicated by the BTO) to determine whether the use of the area by birds changes significantly during or after construction. Given the high degree of competence of the local WeBS surveyor, it will not be necessary to carry out any other monitoring surveys.

- 9.8.3 Note that in Chapter 14 (Schedule of Mitigation), the ornithology mitigation measures only include restriction to barge movements, ECoW monitoring of disturbance levels and mitigation for terrestrial breeding birds (items O1, O3 and O2 respectively). This is because the other mitigation measures described above (works confined to period April-September, no night working/lighting and pollution controls) are already set out elsewhere in Chapter 14.

## 9.9 Residual Effects

- 9.9.1 The assessment of predicted impacts above concludes that there will not be any significant ornithological impacts of any kind. Consequently there will not be any significant ornithological residual impacts.

## 9.10 References

- Clarke, R., Fearnley, H., Liley, D., Stillman, R. & West, A. (2012). *The Solent Mitigation and Disturbance Project*. Footprint Ecology & Bournemouth University.
- Cutts, N., Hemingway, K. & Spencer, J. (2013). *Waterbirds Disturbance Mitigation Toolkit: Informing Estuarine Planning & Construction Projects*. Institute of Estuarine and Coastal Studies, University of Hull.
- Eaton, M.A., Aebischer, N.J., Brown, A.F., Hearn, R.D., Lock, L., Musgrove, A.J., Noble, D.G., Stroud, D.A. & Gregory, R.D. (2015). *Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and Isle of Man*. *British Birds* 108, 708–746.
- Forrester, R. & Andrews, I. (eds) (2007). *The Birds of Scotland*. Scottish Ornithologists' Club, Aberlady.
- Gilbert, G., Gibbons, D.W., and Evans, J. (1998). *Bird Monitoring Methods*. RSPB.
- Liley, D. & Fearnley, H. (2011). *Bird Disturbance Study, North Kent 2010/11*. Footprint Ecology.
- Linaker, R. (2012). *Recreational Disturbance at the Teesmouth and Cleveland Coast European Marine Site*. Report to Natural England.
- Webb, K. (2002). *The effects of human activity on turnstones and other wading birds within the Thanet and Sandwich Bay Special Protection Area (SPA)*. Report to English Nature.

## 10. TRAFFIC AND TRANSPORT

### 10.1 Introduction

10.1.1 This Chapter of the Environmental Statement (ES) provides an assessment of the potential environmental effects resulting from the traffic associated with the construction phase of the Development. This Chapter also identifies the mitigation measures that will be implemented to prevent or reduce any adverse effects. The specific objectives of the Chapter are to:

- Describe the legislative and planning policy context;
- Describe the transport and traffic baseline;
- Describe the assessment methodology and significance criteria used in completing the impact assessment;
- Describe the potential effects, including direct and indirect;
- Describe the mitigation measures proposed to address likely significant effects; and,
- Assess the potential residual effects remaining following the implementation of mitigation.

10.1.2 A full description of the development is provided in ES Volume 1 - Chapter 2 and this includes the anticipated construction period and a full description of the works involved. It should also be noted that Noise and Vibration issues caused by construction traffic is fully addressed within ES Volume 1 - Chapter 11.

### 10.2 Embedded Mitigation

10.2.1 It has been assumed that, where possible, deliveries to the Site will be made by barge in order to minimise the potential impact of construction traffic on local receptors.

10.2.2 For comparative purposes only, ES Volume 3 – Appendix 10.1 demonstrates that on-road delivery routes have been assessed and considered as a worst case scenario. However, it was identified early in the project development that, whilst this impact could potentially be managed during the construction period, it would be undesirable to the local community. As such, it has been assumed that construction material will be transported to Site by barge as the preferred method.

10.2.3 On the basis of this assumption, it is considered that only a small proportion of construction materials will be delivered to the Site via the local road network. The impact of this has therefore been assessed in this Chapter, with further details of the anticipated quantities of vehicles provided in Section 10.5. As previously discussed, a second assessment is also included in ES Volume 3 – Appendix 10.1 which demonstrates the impact of transporting all construction materials to the Site by road.

### 10.3 Legislative and Planning Policy Context

#### Scottish Planning Policy (2014)

10.3.2 The most recent iteration of Scottish Planning Policy (SPP) was published in June 2014; the purpose of which is to set out national planning policies that reflect Scottish Ministers' priorities for planning new developments and the use of land. It sits in a suite of documents that includes the National Planning Framework 3, Creating Places, Designing Streets and various circulars, which cumulatively set out the requirements for creating successful places in Scotland. Although it is a non-statutory document, the Town and County Planning (Scotland) 1997 Act dictates that the content of SPP should be regarded as a material consideration that carries significant weight within the planning process.

10.3.3 The two fundamental principles of SPP are concerned with ensuring sustainability and the creation of high quality places. A key aspect of facilitating sustainable and high quality places

is concerned with ensuring that new development optimises the use of existing resource capacities including transport infrastructure.

- 10.3.4 Where a development is likely to generate a significant amount of vehicular trips, SPP specifies that transport assessments should assess the surrounding transport network in order to ensure that it will not be detrimentally affected in terms of capacity or safety as a result.

## Transport Assessment Guidance (2012)

- 10.3.5 Transport Scotland published the document Transport Assessment Guidance (TAG) in 2012. It sets out the approach that should be taken for the preparation of Transport Assessments.
- 10.3.6 A Transport Assessment should identify the main transport issues related to a proposed development and provide information on the existing transport infrastructure and travel characteristics associated with the site.

## 10.4 Assessment Methodology

### Assessment Guidance and Methods

- 10.4.1 The methodology detailed in the Chartered Institution of Highways and Transportation (IHT) 'Guidelines for Traffic Impact Assessments' (1994), recommends that the environmental impact of the traffic generated by a proposed development should be assessed taking cognisance of the Institute of Environmental Management and Assessment (IEMA) 'Guidelines for the Environmental Assessment of Road Traffic, 1993'. The assessment methods employed in this chapter conform to those set out in the guidelines (hereafter referred to as '**the IEMA Guidelines**') and therefore focus on:
- Potential impacts on local roads and the users of those roads; and,
  - Potential impacts on land uses and environmental resources fronting those roads, including the relevant occupiers and users.
- 10.4.2 The IEMA Guidelines state that the perceptible impact of changes in traffic flow on the environment is less sensitive than changes in traffic flow at junctions on the surrounding network. They go on to suggest that the following criteria are adopted to assess whether particular links on the network are to be the subject of environmental assessment. That is, to:
- Include highway links where traffic flows will increase by more than 30% (or the number of heavy goods vehicles will increase by more than 30%) in the opening year as a result of development traffic; and,
  - Include any other sensitive areas affected by traffic increases of 10% or more.
- 10.4.3 The IEMA Guidelines acknowledge that day-to-day variations of traffic on a road can frequently be at least plus or minus 10% and at a basic level, it should therefore be assumed that projected changes in traffic of less than 10% create no discernible environmental impact. Absolute changes (number of vehicles) are equally relevant since percentages alone could be misleading.
- 10.4.4 The IEMA Guidelines distinguish between the significance of operational and capacity criteria for highways with that which is more relevant to assessing environmental impact. It is advised that a 30% change in traffic flows represents a reasonable threshold for including a highway link in an assessment of potential significance.
- 10.4.5 Although the construction traffic movements will only be temporary in duration, an increase in traffic during that period could adversely affect the users of those roads, and the land uses that front them, including the relevant occupiers and users. Consequently, the receptors that have been assessed are those roads that would potentially be used by construction traffic. It should be noted that a traffic impact would only be caused during the two summer periods anticipated for construction work at Dalgety Bay.



- 10.4.6 Radium contaminated material being removed off-site each day is expected to be minimal, necessitating no more than one vehicle movement. Non-contaminated arisings will be re-used on site, minimising the material required to be removed off site. Non-radioactive waste being moved off site will utilise HGV's already delivering materials to the Site, negating the need for additional vehicles.
- 10.4.7 A workforce of approximately 10 persons is envisaged across the construction programme, resulting in a negligible level of vehicle movements delivering staff to the Site each day.
- 10.4.8 Upon completion, the Development itself will not result in any increase in traffic movements.
- 10.4.9 Given the minimal construction worker movements expected and the small amounts of radium being removed off site each day, these activities have been scoped out of detailed assessment. Similarly, no assessment of operational traffic has been undertaken.

### Sensitivity and Magnitude of Change

- 10.4.10 Receptors are locations or land uses categorised by their degree of sensitivity (or environmental value) with guidance provided in the Design Manual for Roads and Bridges (DMRB), Volume 11, Section 2 (Part 5, HA 205/08). Accordingly, Table 10.1 below is considered to be an appropriate characterisation of receptor sensitivity.

Table 10.1 – Sensitivity Receptors

Sensitivity	Receptor Description
Very High	Nationally or internationally important site with special sensitivity to increases in road traffic.
High	Regionally important site with special sensitivity to increases in road traffic.
Medium	Residential (with frontage onto road under consideration), educational, healthcare, leisure, public open space or town centre/local centre land use.
Low	Employment or out of town retail land use, such as retail park.
Very Low.	Users not sensitive to transport effects. No adjacent settlements.

- 10.4.11 In terms of magnitude of impact, the IEMA Guidelines point to changes in traffic in excess of 30%, 60% and 90% as being representative of "slight", "moderate" and "substantial" impacts respectively. Table 10.2 below reflects the IEMA guidance and has been used to quantify the magnitude of potential impact of the Development on traffic.

Table 10.2 – Magnitude of Change

Magnitude	Description
High	Considerable deterioration/improvement in local conditions or circumstances (+90% increase in traffic)
Medium	Readily apparent change in conditions or circumstances (60 – 90% increase in traffic)
Low	Perceptible change in conditions or circumstances (30 – 60% increase in traffic)
Very Low	Very small change in conditions or circumstances (10 – 30% increase in traffic)

10.4.12 Where existing traffic levels are exceptionally low (e.g. on unclassified roads), any increase in traffic flow is likely to result in a predicted increase in traffic levels which exceeds these thresholds. Where this situation presents itself, it is important to consider any increase both in terms of its relative increase in respect of existing traffic flows as well as the overall total flow in respect to the available capacity of the section of road being considered.

## Significance Criteria

10.4.13 The significance of each effect is considered against the criteria within IEMA Guidelines, where possible, and also the DMRB Volume 11, Section 2 (Part 5, HA 205/08). However, the IEMA 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.”*

10.4.14 The assessment of the significance of the effect of traffic changes along these routes should have regard to both the magnitude of the development related traffic (impact) and the receptor's environmental value (sensitivity). The level of significance can be determined from the matrix in Table 10.4 (while this has been adapted to ensure consistency with the other assessments within this ES, it accords with the guidance given in the DMRB (Table 2.4 of Part 5 HA 205/08)). Significance levels of moderate and above (coloured blue in Table 10.4) are generally regarded as 'significant' and therefore require further consideration.

Table 10.4 – Approach to Assessment of Effects

Sensitivity or Value of Resource/Receptor	Magnitude of Impact			
	High	Medium	Low	Very Low
Very High	Major	Major	Moderate	Minor
High	Major	Moderate	Moderate	Minor
Medium	Moderate	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Very Low	Minor	Negligible	Negligible	Negligible

## Approach to the Assessment

10.4.15 The Travel and Transport assessment will include the following steps to ensure that the effects on road users due to the construction of the Development are adequately considered and mitigated where necessary:

- An assessment of the existing baseline conditions based on Department for Transport (DfT) traffic data and recorded data;
- An assessment of the surrounding highway network to determine its ability to accommodate the expected volume of construction traffic;
- An assessment of the increase in traffic compared to the baseline traffic flows along roads used by construction traffic;

- Consultation with Fife Council, SEPA and Transport Scotland (as necessary) in relation to the transportation of hazardous material and other non-hazardous construction materials between the licensed waste sites and material suppliers respectively and the Site;
- An assessment of the significance of potential effects when considering both the degree of impact and sensitivity of receptor; and,
- Identification of any mitigation measures required and a summary of significant residual effects.

10.4.16 Forecast traffic levels will be determined based on detailed estimates, volume and nature of the construction traffic that may be generated by the Development. The results of the EIA will inform a Traffic Management Plan (TMP) to ensure a link between the principles of development which need to be outlined at the early stages of the project and the method statements which are produced following award of contract.

## Traffic Surveys

10.4.17 Surveys commissioned by AECOM took place during the two weeks commencing on the 24<sup>th</sup> of September 2016 and the two weeks commencing on the 29<sup>th</sup> of October 2016, avoiding the period of school holidays. Classified directional vehicle link counts were recorded every 60 minutes with the 85 percentile speed identified.

10.4.18 The location of the traffic counters is shown in ES Volume 2 – Figures 10.1 and 10.2.

## Consultation

10.4.19 Consultation took place with Transport Scotland, Fife Council and other relevant stakeholders through the EIA scoping process. A summary of the consultation is provided in Table 10.5 below.

Table 10.5 – Transport Consultation

Consultee	Response
Transport Scotland	<p>Assumption that vehicles associated with the development using the A921 will use the A90(T). Request for an indication of whether the requirement for further assessment of the predicted environmental impacts to the trunk road and/or adjacent receptors is triggered in accordance with the IEMA Guidance (1993). Confirmation that IEMA Guidance should be used for the trunk road.</p> <ul style="list-style-type: none"> <li>• Methods adopted to assess the likely traffic and transport impacts on traffic flows and infrastructure should include:</li> <li>• Determination of baseline traffic and transport conditions and sensitivity of receptors;</li> <li>• Determination of predicted construction and operational requirements; and,</li> <li>• Assessment of significance of predicted impacts taking into account magnitude (before / after mitigation) and baseline sensitivity.</li> </ul> <p>It is confirmed that negative impacts on the trunk road in relation to air quality, noise or vibration associated with the development are not expected.</p>

Consultee	Response
Fife Council	<p>Scoping Report is fairly comprehensive with regard to the information that will be submitted. Suggested that scope of TA be agreed with Transportation Development Management Officers in advance.</p> <p>Officer's also note that the use of The Wynd as the vehicular access route for construction traffic is noted and "not ideal" as is primarily a housing street but no alternative existing routes are available.</p> <p>Possible to form a temporary construction vehicle access route from Moray Way South using existing open-space area but may lead to local objections.</p> <p>Critical that all transport options considered (for both pre-construction and construction stages) have been fully evaluated through the EIA process and the rational reached as to the selection of the chosen mode(s) clearly defined/justified.</p> <p>Access Officer advised that the submitted report appears to adequately cover the level of detail expected/assessments required for such a proposal at this location for any future EIA application consultation.</p>
Local Community Council	<p>It was suggested that the commentary for Regents Way should also highlight the fact that other notable public buildings access this route and other residential properties on other streets actually back onto the Way and potential impacts on them and any current access arrangements serving them should be noted and considered."</p>

## 10.5 Baseline Conditions

### Study Area

- 10.5.1 Details of the location of the Development are provided in the ES Volume 1 – Chapter 2 and on the associated Figures 1.1 and 1.2 in ES Volume 2. A Study Area for transport movements was identified through the Scoping Report (July 2016) which assumes the local delivery route to Site from local quarries ES Volume 2 – Figure 10.4 identifies the preferred routes from local suppliers, however it should be noted that this an assumption to inform the EIA and the Contractor may source materials from elsewhere.
- 10.5.2 Consultation with Transport Scotland highlighted the requirement to include the A90 (T) as part of the assessment.
- 10.5.3 In respect to vehicular access to the Site, the following roads have been included in the Study Area:
- **Access to the Site** is taken from the access to the Dalgety Bay Sailing Club (DBSC). It is a paved road and the width varies between 5.4 metres (m) in the proximity to The Wynd to 3.4m to the eastern part of the road. The access road is subject to a 5 miles per hour (mph) speed limit and is privately owned.



*Image 10-1 Access to the Site*

- **The Wynd** which is a residential core road approximately 6m in width and provides access to residential properties with driveway accesses. A destination in itself it also serves as access to the former stable block to Donibristle House (now converted for residential use), Dalgety Bay Sailing Club (DBSC) and a number of other residential streets e.g. The Spinneys and Glamis Place. It is subject to a 20mph speed limit and no connecting roads are through routes. The Wynd itself also ends in a cul-de-sac at its southern end.



*Image 10-2 The Wynd*

- **Regents Way** is a traffic distributor road approximately 9.5m in width with verges, and segregated foot and cycleways adjacent. It serves as one of the key routes in/out of Dalgety Bay and provides access to The Wynd, Moray Way and Moray Way South via a large roundabout junction. It has no frontage access to properties along its length but there are residential properties which back onto the road at Inchview Gardens, public parkland, a small retail park which forms Dalgety Bay Town Centre, and medical centre adjacent. There are traffic signal controlled pedestrian crossing points on approach to roundabout junctions with Moray Way North and Moray Way South. A further two uncontrolled pedestrian crossing points with refuge islands are located to either side of the junction of Regents Way. Bus stops are provided at several locations; two northbound and two southbound. It is subject to a 30mph speed limit.





*Image 10-3 Regents Way*

- Western Access Road** forms a continuation of Regents Way from its junction with Moray Way North northwards towards the A921 Kirkcaldy Road. It is of equal stature and nature with some residential properties backing onto it at its southern end but it is predominantly bounded by industrial and retail properties. There is a traffic signal controlled pedestrian crossing located on the southern approach to the Ridge Way roundabout. Bus stops are provided at several locations; two northbound and one southbound. A speed limit of 40mph applies between its roundabout junction with the A921 Kirkcaldy Road and further roundabout junction with Ridge Way, which provides access to Hillend/Donibristle Industrial Park, reverting to 30mph south of this point.



*Image 10-4 Western Access*

- Moray Way South** is a traffic distributor road approximately 8m in width. Pedestrian footpaths exist along both sides of the road. Bus stops are provided at several locations; three westbound, two eastbound. The nature of the land uses along Moray Way South is mainly residential. There is no frontage access however there are several road accesses to the residential developments along the road. A speed limit of 30mph applies.





*Image 10-5 Moray Way*

- **Eastern Access Road** forms a continuation of Moray Way South from its junction with Moray Way North towards its junction with the A921. Its width is approximately 6.5m. Pedestrian footpaths exist to the western side of the road. There are only few residential properties located to the west of the road with no frontage access and the land to the east is arable in nature. Bus stops are provided at several locations; two northbound and three southbound. This road is subject to 30mph speed limit.



*Image 10-6 Eastern Access*

## Baseline Conditions

- 10.5.4 Traffic data for the A921 west of the Western Access Road, The Western Access Road, Regents Way, Moray Way and The Wynd have been gathered using automatic traffic counters (ATC) and represent Average Daily Traffic (ADT) for a neutral month. Furthermore, flows on the A90 at Inverkeithing have been extracted (Counter Number 30851) to account for any construction delivery impact which may be encountered on the Trunk Road. Table 10.6 below indicates the current (2016) and future (2017) baseline flows for the road links identified in the Study Area from the surveyed data.
- 10.5.5 It is assumed that background traffic flows would increase on the local road network regardless of the Development. This assumption is based on the forecast growth in the volume of traffic as described in the Department of the Environment, Transport and the Regions (DETR) publication 'National Road Traffic Forecasts (Great Britain) (NRTF)'. Therefore, future design year traffic flows have been forecast utilising National Road Traffic Forecast (NRTF) 'low' growth assumptions for 2017, the earliest date at which works could commence. The results can be seen in Table 10.6 below.

Table 10.6 – Baseline Traffic Flows

Link	M/C	Car	Bus/LGV	HGV	Total
Average Daily Traffic flows 2016					
A90 Mainline	178	51185	9686	3816	64865
A921 Kirkcaldy Road West	96	17017	933	191	18236
A921 Kirkcaldy Road East	87	9015	486	101	9689
Western Access Road	41	9849	420	26	5917
Regents Way	23	4908	292	25	5248
Moray Way S	20	1199	92	2	1313
The Wynd	16	1122	49	2	1189
Average Daily Traffic flows 2017 (1.008)					
A90 Mainline	179	51594	9928	3847	65384
A921 Kirkcaldy Road West	117	18424	1008	194	19743
A921 Kirkcaldy Road East	91	9487	562	84	10224
Western Access Road	50	9881	424	40	10396
Regents Way	23	4947	294	25	5290
Moray Way S	20	1209	93	2	1323
The Wynd	16	1131	49	2	1199

### Preferred Route Options

- 10.5.6 It will ultimately be up to the contractor, once appointed, to source the materials required for construction and develop a preferred route to the Site for any materials not brought to site by barge. However, for the purposes of this assessment, it is assumed they would be delivered via the A921 with Western Access Road, Regents Way and The Wynd used for local access to the Application Site.

### Determination of Forecast Traffic Levels and Characteristics

- 10.5.7 Forecast traffic levels have been determined based on detailed estimates of construction material volume and nature of the construction traffic that may be generated by the Development. This is described in greater detail in the following sections.

## Identification of Impacts

10.5.8 The IEMA Guidelines list the following potential impacts during the construction phase:

- Severance (for motorists or pedestrians);
- Pedestrian delay, loss of amenity;
- Air pollution;
- Road accidents and safety;
- Increased journey times for non-construction traffic;
- Traffic noise and vibration;
- Dust and dirt;
- Visual impact;
- Hazardous loads;
- Ecological impact; and,
- Heritage and conservation areas.

10.5.9 Heritage and air quality effects have been scoped out of detailed consideration and are discussed further in Chapters 8 and 11 respectively of the Scoping Report (July 2016).

10.5.10 Landscape and visual impacts are discussed further in ES Volume 1 – Chapter 6, nature conservation in ES Volume 1 – Chapter 8 and noise and vibration in ES Volume 1 – Chapter 11. These topics are not therefore considered further within this Chapter.

10.5.11 The following impacts will therefore be considered further in this Chapter of the ES:

- Severance;
- Pedestrian delay, loss of amenity;
- Road accidents and safety;
- Increased journey times for non-construction traffic; and,
- Dust and dirt.

## Forecast Traffic Flows

10.5.12 The works on the site will be carried out over two consecutive summer periods which would last approximately six months each.

10.5.13 The transport by sea of stone material quantities noted in ES Volume 1 - Chapter 2 would require the barge to make 19 deliveries, each with approximately 1,500 tonnes, to transport the primary armour and secondary armour plus 7 deliveries to transport the bedding material. In addition to this 5 barges each loaded with 600m<sup>3</sup> would be required to transport the concrete. The majority of the concrete for the works could be precast in elements and brought to the Site on the barge. Therefore in total 31 barge loads would be required to carry these materials.

10.5.14 In practice the bulk of the stone materials could be delivered to the Site by sea. However, there would be a limit to the amount of concrete which could be precast as a small percentage of the concrete volume, say 5%, would need to be placed in-situ and therefore delivered to the Site by road. Also, whilst it would be possible to deliver the geotextile to site by barge, it may be more realistic to assume at this stage that this material would be transported to the Site by road.

10.5.15 Therefore, a total of 30 HGV loads and 31 barge loads are estimated to be required to deliver the materials to the Site.

10.5.16 This assumption would significantly limit the quantity of HGV traffic and distance required to travel to the Site. It is noted that route length is not specifically mentioned in terms of the impacts detailed in the Assessment of Effects Section above. However, it is considered that a shorter route length would also have a positive influence on the significance of each effect.

## Assessment of Effects

10.5.17 The following subsections evaluate the potential impacts, in traffic and transportation terms, of the construction phase of the Development. It should be noted that all the effects associated with the construction traffic will be temporary and last for the duration of the construction programme.

### Severance

10.5.18 According to the IEMA Guidelines, severance is “*the perceived division that can occur within a community when it becomes separated by a major traffic artery severance could equally be applied to residents, motorists or pedestrians*”.

10.5.19 An increase in construction traffic can make it more difficult for pedestrians to cross a road or for traffic to enter a carriageway. For there to be a perceived division a significant increase in traffic is required.

10.5.20 The routes to be utilised are well established roads with established traffic flows.

10.5.21 The levels of HGV traffic associated with the Development equates to approximately 30 HGV movements each way during the construction period, which is equivalent to 1 HGV two-way trip per day assuming a 5 day working week over the construction period.

10.5.22 The residential areas located along the route are considered as medium sensitivity. In terms of magnitude of impact of severance is considered to be in general very low. Results for both Moray Way South and The Wynd indicate a high magnitude of impact in relative terms given the existing low level of HGV traffic flows. By comparing the same increase in HGV flow but in relation to total traffic flow for the same links yields a change of <1% in both instances, and therefore a magnitude of impact of very low. Notwithstanding this, this effect is considered to be of generally negligible significance but moderate for Moray Way South and The Wynd. Further consideration of the impact on the latter sections of the road network is detailed below.

Table 10.7 - Magnitude of Change (Severance)

Road Link	HGV Movements / HGV Movements incl. Development 2017	Development Impact	Magnitude of Impact	Sensitive Receptors	Significance
A90 Mainline	3847 / 3849	1.0%	Very Low	Medium/High	Negligible/Minor
A921 Kirkcaldy Road West	194 / 196	1.0%	Very Low	Medium	Negligible
A921 Kirkcaldy Road East	84 / 86	2.0%	Very Low	Medium	Negligible
Western Access Road	40 / 42	5.0%	Very Low	Medium	Negligible
Regents Way	25 / 27	8.0%	Very Low	Medium	Negligible
Moray Way S	2 / 4	100%	High	Medium	Moderate

Road Link	HGV Movements / HGV Movements incl. Development 2017	Development Impact	Magnitude of Impact	Sensitive Receptors	Significance
The Wynd	2 / 4	100%	High	Medium	Moderate
*Development Impact assumed to be 1 HGV per day (two way). In reality the impact would actually be much less than this on average.					

10.5.23 A typical urban single carriageway road is capable of carrying anything between 38,400 - 43,200 two-way vehicle movements per day. This is in accordance with thresholds contained in DMRB Volume 15, 'Economic Assessment of Road Schemes in Scotland; Section 1 The NESMA Manual'. Given that total traffic on Moray Way South and The Wynd is 1,323 and 1,199 respectively (as shown in Table 10.6) it is considered that the addition of 1 two way HGV movement per day would not have any significant effect on capacity, operation or severance. As such, despite the level of significance being interpreted as moderate in accordance with the IEMA guidance, in reality there would be no perceivable effect on severance.

### Pedestrian Delay, Intimidation, Loss of Amenity

10.5.24 An increase in construction traffic can make it more difficult for pedestrians to cross a road. Pedestrians can also experience intimidation and the degree to which this occurs is affected by the volumes of traffic, the proportion of HGV traffic and its proximity to pedestrians.

10.5.25 As it is shown in Image 10-3 footways and cycle paths exist on Western Access Road and Regents Way which are segregated from the traffic.

10.5.26 There are several pedestrian crossings present on Western Access Road and Regents Way which include three signalised pedestrian crossings and two informal crossings.

10.5.27 The increase in HGV traffic is unlikely to result in an increase in intimidation for any pedestrians walking in Dalgety Bay on the potential construction routes due to the small number of HGVs which would be added to the road network during the construction period. The magnitude of this impact is considered to be very low. Along with medium sensitivity of receptors, the significance of effects on pedestrian delay, intimidation and loss of amenity is considered to be negligible.

### Road Accidents and Safety

10.5.28 An increase in traffic on any particular route theoretically has the potential to increase the risk of accidents occurring. However, there are no general thresholds for determining the significance of increased traffic on road safety. Indeed, this is confirmed by the IEMA Guidelines which note that road accidents are attributable to a variety of local factors and as such do not provide a threshold to determine significance. As such judgement and discretion on the part of the assessor is required to determine any detrimental effects associated with the traffic generated by the Development.

10.5.29 An increase in slow moving HGV traffic can result in a convoy of vehicles being unable to overtake the HGV. This in turn can lead to increased journey times, driver frustration and drivers taking unnecessary risks.

10.5.30 The crashmap.co.uk database has been interrogated to provide a review of accident statistics within a 10Km vicinity of the Site. The review has been performed for the most recent five year period for which data is available, from January 2011 to December 2015. The search



revealed over the 5 year period there were no serious or fatal accidents at Western Access, Regents Way, The Wynd and Eastern Access Road.

- 10.5.31 An area where there is a slightly higher risk of an incident is at the A921. There was one slight accident at the Western Access Road/A921 junction and six slight accidents at the A921/Harbour Drive junction. ES Volume 2 – Figure 10.9 shows the location and the severity of the accidents that took place in Dalgety area between 2011 and 2016.
- 10.5.32 Considering the low rate of accidents on the road at present and the fact that the site will produce less than 1 HGV movement each way per day on average, the increase in the rate of accidents will be unlikely to be affected. The magnitude of this impact is therefore considered very low.
- 10.5.33 Given the sensitivity receptors are considered to be medium, the significance of effect is therefore classed as negligible.

#### Increased Journey Times for Non-Construction Traffic

- 10.5.34 HGVs by their very nature travel slower than the average vehicle and can delay other road users by increasing their journey time. It is not uncommon for a 'convoy' effect to occur when suitable overtaking opportunities for vehicles are few and far between. Increased journey times can lead to driver frustration.
- 10.5.35 If HGVs do cause a 'convoy' effect then this can cause delays for vehicles wishing to join the carriageway that the HGV is travelling on.
- 10.5.36 The levels of HGV traffic associated with construction equated to less than 1 HGV movement each way per day therefore the magnitude of the change of HGVs on increased journey times is considered to be very low. Furthermore, the HGVs movements will not take place during the peak hours, avoiding the times when the roads are more congested.
- 10.5.37 The potential impact of this is considered to be very low and the associated medium sensitivity of receptor results in a significance of effect which is considered to be negligible.

#### Dust and Dirt

- 10.5.38 HGVs travelling on areas of the Site will potentially disturb the surface of the access tracks producing dust. There are a number of residential properties located in the in eastern extent of The Wynd adjacent to and opposite the DBSC entrance that could be adversely affected.
- 10.5.39 HGVs travelling to the Site, if not properly covered, can produce dust from the loads they are carrying.
- 10.5.40 HGVs leaving the Site and entering onto the local road network will potentially deposit mud and earth onto the carriageway over a localised area.
- 10.5.41 The magnitude of this impact is considered to be very low given the small level of HGV traffic associated with the Site. The sensitivity of the receptors on the route are considered medium, due to the residential properties which front on to much of the route. As such, the significance of effects from dust and dirt is considered to be negligible.

## 10.6 Mitigation

### **Material Delivery**

- 10.6.1 As previously discussed, the Contractor is yet to be appointed and as such the source of materials and subsequent vehicle routing for materials not delivered by barge cannot be identified at this stage. If the contractor's approach to transporting materials to site results in more significant effects than have been considered within this ES, they will be required to demonstrate acceptability to the Local Authority and SEPA.



- 10.6.2 If the bulk of construction materials are brought to site by barge it is not anticipated that any further mitigation measures would be required for material delivery given the negligible impact of the residual construction traffic on the local road network.

### Traffic Management Plan

- 10.6.3 Temporary effects relating to an increase in general construction traffic will also be minimised through the implementation of an appropriate locally focused Traffic Management Plan (TMP) which will seek to promote the safe and efficient transportation of components and materials in order to minimise congestion and disruption. This will be produced during the post planning stage and approved in consultation with Fife Council, SEPA, Police Scotland and Transport Scotland.
- 10.6.4 The TMP will apply to all sections of the public road network but should be enhanced with locally specific measures as appropriate. It will include:
- The proposed route for construction traffic including abnormal loads;
  - The necessary agreements and timing restrictions for construction traffic, including relevant liaison with DBS Ltd.;
  - Details of proposed Condition Survey on access routes;
  - Proposals for abnormal maintenance of these routes during (and attributable to) construction;
  - Proposals for monitoring and agreeing (abnormal maintenance) costs attributable to construction of the Development;
  - Escort arrangements for abnormal loads – albeit not considered relevant in this instance and more applicable to renewable energy and significant industrial development construction;
  - Route signing;
  - Details of advanced notification to the general public, warning of HGV transport movements;
  - Details of informative road signage warning other users of construction traffic movements;
  - Arrangements for regular road maintenance and cleaning, e.g. road sweeping in the vicinity of the site access point as necessary, wheel cleaning / dirt control arrangements;
  - Loads that may produce excessive dust during transport will be covered;
  - Specific timing of deliveries outside peak traffic hours;
  - The briefing of drivers on pulling over to the side of the road at suitably safe locations to allow other road users to overtake safely;
  - Contractor speed limits; and,
  - Community and emergency services liaison details.
- 10.6.5 The hours for which construction can take place and therefore the hours for which construction traffic will be travelling to and from the site will be agreed with the Planning Authority and all other relevant stakeholders prior to construction commencing; the Applicant proposes weekday working hours from 8am until 6pm.

## 10.7 Assessment of Residual Effects

- 10.1.1 As shown in the assessment of impacts, it is considered that the use of barges to transport construction material to site would determine that the magnitude of impact to the local road network, in terms of all identified impacts, would be considered very low. With the sensitivity of receptors assessed as medium, the significance of each effect is negligible.

## 10.8 References

IEMA, 1993 - Institute of Environmental Management and Assessment (IEMA) 'Guidelines for the Environmental Assessment of Road Traffic, 1993'

DMRB HA205/08, 2008 - Design Manual for Roads and Bridges (DMRB), Volume 11, Section 2 (Part 5, HA 205/08)

DMRB Volume 15, 2013 - DMRB Volume 15, 'Economic Assessment of Road Schemes in Scotland; Section 1 The NESA Manual,'

## 11. NOISE AND VIBRATION

### 11.1 Introduction

11.1.1 This Chapter considers potential noise and vibration impacts from the proposed construction and demolition activities at the site. In particular, effects from the following activities have been considered:

- Construction and demolition noise and vibration impacts at nearby sensitive receptors; and,
- Traffic noise impacts at sensitive receptors due to increased flows on surrounding roads.

11.1.2 This Chapter is supported by the following Annexes, located in ES Volume 3 – Appendix 11 of the ES:

- Appendix 11.1: Terminology.
- Appendix 11.2: Noise Model Input Data.
- Appendix 11.3: Monitoring Location Photographs.
- Appendix 11.4: Monitoring Data.
- Appendix 11.5: Consultation.

### 11.2 Legislative Background

11.2.1 Both the Environmental Protection Act (EPA) 1990 and the Control of Pollution Act (CoPA) 1974 may be used to control noise and vibration from construction works. Within Section 60, the CoPA provides power to Local Authorities to serve a notice to impose operating conditions on the development to minimise the impacts of construction and demolition noise and vibration. Under Section 61 a developer may apply for prior consent to the Local Authority to negotiate and agree operating procedures prior to the commencement of any site works.

11.2.2 Construction and demolition noise can be managed through best practicable means and a noise management plan that is drawn up in agreement with the Local Authority.

#### National and Local Planning Policy and Guidance

11.2.3 With regard to planning and noise the current national guidance is contained in Planning Advice Note (PAN) 1/2011 Planning and Noise. In addition, a Technical Advice Note (TAN 2011) accompanies this document and provides technical guidance on noise assessment. TAN 2011 states that BS 5228 “*provides a definitive guide to the control of noise from construction and open sites for use with the powers to under [sic] the Control of Pollution Act 1974*”.

11.2.4 While there is no specific policy relating to noise impacts from development of this type in the adopted Dunfermline & West Fife Local Plan, the Proposed FIFE Plan Local Development Plan Policy 10 ‘Amenity’ states that:

*“Development will only be supported if it does not have a significant detrimental impact on the amenity of existing or proposed land uses. Development proposals must demonstrate that they will not lead to a significant detrimental impact on amenity in relation to:*

*3. Noise, light, and odour pollution and other nuisances, including shadow flicker from wind turbines”*

#### British Standards and Guidance

**BS 5228: 2009+A1:2014 'Noise and Vibration Control on Construction and Open Sites'**

11.2.5 BS 5228 includes the following:

- Guidance on the potential impacts of construction and demolition noise and vibration;
- Discussion of the legislative framework;
- Prediction assessment methodology;
- General best practice control measures; and,
- Example criteria that may be used to assess the resulting impact significance of construction and demolition noise and vibration.

**BS 7385: 1993 'Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from ground borne vibration'**

11.2.6 BS 7385 (as referenced in BS 5228) establishes the basic principles for carrying out vibration measurements and processing the data, with regard to evaluating vibration effects on buildings. In addition it includes recommended peak particle velocity (ppv) vibration limits for transient excitation for different types of buildings to give a minimal risk of vibration-induced cosmetic damage.

**Calculation of Road Traffic Noise**

11.2.7 The Department of Transport/Welsh Office publication 'Calculation of Road Traffic Noise' (CRTN) describes procedures for traffic noise calculation, and is suitable for environmental assessments of schemes where road traffic noise may have an impact.

**Design Manual for Road and Bridges**

11.2.8 The Highways Agency 'Design Manual for Road and Bridges Volume 11 Section 3 Part 7 - Traffic Noise and Vibration' (DMRB) provides guidance on the appropriate level of assessment to be used when assessing the noise and vibration impacts arising from schemes involving changes in road traffic flows.

## 11.3 Scope and Methodology

11.3.1 The scope of this assessment is to identify the potential for significant effects to occur due to changes in the sound and vibration levels at the identified sensitive receptors as a result of the construction and demolition activities associated with the Development.

11.3.2 The operation of the Development is not likely to generate significant noise or vibration levels at receptors. The only activities associated with the operation of the Development which may generate noise and vibration is repair and maintenance of the rock armour or Slipway. This will generate substantially lower levels of noise and vibration than the construction of the development, and therefore operational noise and vibration impacts have been scoped out of the assessment.

11.3.3 As outlined in ES Volume 1 – Chapter 1 (Table 1.1), the site has been divided into five Management Strategy Areas (MSA's) where works will be carried out as follows:

- Headland (Area H): Construction of rock armoured revetments;
- Slipway (Area S): construction of rock armoured revetments and Slipway;
- Boat Park Bay North and South (Areas BN & BS): Construction of rock armoured revetments; and,
- Boat Park Bay North – Zone 1: materials from this area will be excavated and higher activity radium material will be characterised, segregated and removed off site at the end of each working day. The area will then be backfilled with clean material.

- 11.3.4 The proposed works at Boat Park Bay North – Zone 1 have been scoped out of the noise assessment as it is considered that modelling the excavation works at Boat Park Bay North, the area closest to the identified receptors, is sufficient to identify environmental effects
- 11.3.5 This Chapter has considered potential noise and vibration impacts on human receptors. Potential noise and vibration impacts on ecological receptors are considered within ES Volume 1 - Chapter 8, 'Nature Conservation' and Chapter 9, 'Ornithology'.
- 11.3.6 The noise-sensitive receptors likely to be most exposed to the noise emissions from the Development have been identified, as shown in Table 11.1 below and illustrated, along with associated noise monitoring locations, in ES Volume 2 - Figure 11.7 'Receptors and Monitoring Locations'. Receptors R1 to R3 represent the properties closest to each of the identified MSAs above, and will therefore be exposed to the highest construction noise levels from the works at the relevant MSA. This ensures that the worst-case impacts are considered, impacts at other properties in the vicinity will be of lower magnitude than those identified at these locations.

Table 11.1 – Identified Noise-Sensitive Receptors

Receptor Number	Description	Distance from site boundary (m)
R1	47 The Wynd	74
R2	41 The Wynd	29
R3	39 The Wynd	23

### Assessment Methodology – Construction and Demolition Noise

- 11.3.7 The sound levels generated by construction and demolition activities and experienced by nearby sensitive receptors depend upon a number of variables, the most significant of which are:
- Sound generated by plant or equipment used on site, generally expressed as a sound power level;
  - Periods of operation of the plant on the site, known as its 'on-time';
  - Distance between the sound source and the receptors; and,
  - Attenuation due to ground absorption and barrier effects.
- 11.3.8 In order to quantify the likely sound from construction works in accordance with the methods and guidance in BS 5228, it is necessary to define the various activities to be undertaken and the equipment to be used, based upon the anticipated programme of work.
- 11.3.9 The construction contractor has not yet been appointed. Therefore, for the purposes of this EIA, the anticipated works have been divided into the following subsections:
- Construction of Cover System, which will include the following phases:
    - Excavation;
    - Delivery; and,
    - Construction.
  - Construction of Slipway, which will include the following phases:
    - Demolition;
    - Granular filling; and,
    - Construction.
- 11.3.10 A construction compound, including material and plant storage will be required. The actual location of the compound will be determined by the Contractor prior to works commencing on

site, however in order to consider a worst case, this has been located in the vicinity of receptor R3.

11.3.11 In order to predict the sound emissions by the construction works, a sound propagation model has been developed using SoundPLAN sound modelling software. The software implements a range of calculation methods, including ISO 9613, which was utilised for this work.

11.3.12 While it is possible that the construction of the Slipway could overlap with any of the other construction activities, the construction of the Cover System will not occur in more than one MSA at once. However, it is understood that the excavation, delivery and construction phases for the construction of the Cover System could occur simultaneously in one MSA. The demolition, granular filling and construction phases of the construction of the Slipway will occur sequentially. The sound power levels of the equipment associated with the construction of the Slipway have been summed for each phase and the loudest phase has been determined to be the demolition. Therefore to consider a worst-case, the following potential scenarios have been modelled:

- Scenario 1: Construction of Cover System at Area H and demolition phase of construction of Slipway at Area S;
- Scenario 2: Construction of Cover System and demolition phase of construction of Slipway at Area S;
- Scenario 3: Construction of Cover System at Area BN & BS and demolition phase of construction of Slipway at Area S;

11.3.13 Input data for the modelling were as follows:

- OS base mapping for the Site and surroundings (including residential buildings);
- Ground elevation data for the Site and surroundings. Due to the nature of the works, the ground elevation will change through the construction schedule. In order to consider a worst-case, the ground elevation has been taken to be as proposed once the works are completed, as these are higher than the existing thereby reducing the potential for noise shielding barriers to occur between the source and receptor;
- Sound power levels for the construction plant have been taken from BS 5228;
- Each zone has been modelled as an area source with the combined sound power level of all items of equipment operating in that zone. In addition, delivery vehicles anticipated to visit the site have been modelled as line sources extending from the public highway to the zone. Finally, the construction equipment (generator) which will be located in the construction compound has been modelled as a point source; and,
- Ground absorption factors have been taken to be 0 off-shore and 0.8 on-shore.

11.3.14 Further details of the modelling procedures are detailed in ES Volume 3 – Appendix 11.1. Sound levels have been predicted at the receptor locations listed in Table 11.1.

11.3.15 In order to assess the impacts of the construction and demolition noise, the “ABC Method” identified in Appendix E of BS 5228 relating to potential significant effect at dwellings has been adopted. The adopted assessment methodology proposes threshold values of  $L_{Aeq,T}$  as a function of baseline sound levels at the receptors, as shown in Table 11.2 below.

**Table 11.2 – Identified Noise-Sensitive Receptors**

Assessment Category and Threshold Value Period	Threshold Value $L_{Aeq,T}$ dB(A) façade		
	Category A (a)	Category B (b)	Category C (c)
Night-time (23:00 – 07:00)	45	50	55



Assessment Category and Threshold Value Period	Threshold Value $L_{Aeq,T}$ dB(A) façade		
	Category A (a)	Category B (b)	Category C (c)
Evenings and Weekends (d)	55	60	65
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75
<p>NOTE 1: A potential significant effect is indicated if the <math>L_{Aeq,T}</math> noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level.</p> <p>NOTE 2 If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total <math>L_{Aeq,T}</math> noise level for the period increases by more than 3 dB due to site noise.</p> <p>NOTE 3: Applies to residential receptors only.</p> <p>(a) Category A: Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.</p> <p>(b) Category B: Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as Category A values.</p> <p>(c) Category C: Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than Category A values.</p> <p>(d) 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays, 07:00 – 23:00 Sundays.</p>			

11.3.16 For the appropriate period, the ambient noise level is determined and rounded to the nearest 5 dB. The appropriate Threshold Value is then determined. It is currently proposed for all construction and demolition works to occur during the daytime only, therefore only the daytime Threshold Values are determined. The magnitude of the impact of the construction noise is based on the difference between the likely construction noise level and the Threshold Value, at the façade of a sensitive receptor, using the criteria shown in Table 11.3.

**Table 11.3 – Construction and Demolition Noise Magnitude of Impact**

Construction and Demolition Sound Level above Threshold Value (dB)	Magnitude of Impact
>1	Negligible
1>3	Minor
3>5	Moderate
5+	Major

11.3.17 Baseline noise measurements were carried out in order to identify the ambient noise levels at the sensitive receptor locations.

### Assessment Methodology – Construction and Demolition Vibration

11.3.18 BS 5228 Part 2 provides a simple method of determining annoyance alongside evaluation of the potential for cosmetic damage resulting from vibration.

11.3.19 Table 11.4 (adapted from Table B.1, BS 5228 Part 2) details PPV levels and their potential effect on humans, and provides a semantic scale for description of vibration impacts on human receptors.

Table 11.4 – Guidance on Human Effects of Vibration Levels (PPV)

Vibration Level (mm/s)	Effect	Magnitude of Impact
0.14	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.	Negligible
0.3	Vibration might be just perceptible in residential environments.	Minor
1.0	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents.	Moderate
10	Vibration is likely to be intolerable for any more than a very brief exposure to this level.	Major

11.3.20 In addition to the above, vibration from construction and demolition activities may impact on adjacent buildings. The criteria used in this assessment relate to the potential for cosmetic damage, not structural damage. The recommended PPV vibration limits in BS 7385 (referenced in BS 5228) for transient excitation for different types of buildings are presented in Table 11.5.

Table 11.5 – Transient Vibration Guide Values for Cosmetic Damage

Type of Structure	Peak Component Particle Velocity in Frequency Range of Predominant Pulse <sup>1</sup>	
	4 Hz to 15 Hz	15 Hz and above
Reinforced or framed structures Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	
Un-reinforced or light framed structures Residential or light commercial type buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz <sup>2</sup>	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above
<sup>1</sup> - Values referred to are at the base of the building. <sup>2</sup> - At frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) should not be exceeded.		

11.3.21 The levels quoted in Table 11.5 refer to transient sources of vibration. BS 7385 states that “Where the dynamic loading caused by continuous vibration is such as to give rise to dynamic

*magnification due to resonance, especially at the lower frequencies where lower guide values apply, then the guide values in ... [Table 11.5] may need to be reduced by up to 50 %."*

11.3.22 BS 7385-2:1993 indicates that minor damage occurs at a vibration level twice that of cosmetic damage and major damage occurs at a vibration level twice that of minor damage. This guidance can be used to define the magnitude of impact as shown in Table 11.6.

Table 11.6 – Magnitude of Impact for Vibration Damage

Magnitude of Impact	Damage Risk	Continuous Vibration Level ppv (mm/s)
Major	Major	30
Moderate	Minor	15
Minor	Cosmetic	7.5
Negligible	Negligible	6

### Assessment Methodology – Road Traffic

11.3.23 Construction traffic noise has been assessed by considering the short-term increase in traffic flows during works, following the principles of CRTN and DMRB.

11.3.24 The criteria for the assessment of traffic noise changes arising from construction works have been adapted from Table 3.1 of DMRB and are provided in Table 11.7.

Table 11.7 – Road Traffic Noise Assessment Criteria (Temporary Changes)

Noise Change, $L_{A10,18h}$	Magnitude of Impact
0 – 0.9 dB	Negligible
1 – 2.9 dB	Minor
3 – 4.9 dB	Moderate
5 dB or more	Major

11.3.25 DMRB states that a change in traffic sound levels in the short-term of less than 1 dB  $L_{A10,18h}$  is imperceptible to the human ear. Therefore, roads which undergo a change in emitted sound level of less than 1 dB(A) due to the Development are likely to give rise to only a negligible change in the road traffic sound level.

### Sensitivity of Receptors

11.3.26 In accordance with the principles of environmental impact assessment, the sensitivity of receptors to noise or vibration impacts has been defined in Table 11.8.

Table 11.8 – Receptor Sensitivity

Sensitivity of Receptor	Description
Very High	Concert halls/theatres, specialist vibration sensitive equipment

Sensitivity of Receptor	Description
High	Residential properties, educational buildings, medical facilities, care homes
Medium	Places of worship, community facilities, offices
Low	Other commercial/retail premises

11.3.27 No non-residential noise sensitive receptors have been identified in the vicinity of the site; hence all the receptors are classified as having a sensitivity of “high”.

## Significance Criteria

11.3.28 The methodology for determination of the significance of an effect is described in ES Volume 1 - Chapter 4 of the ES. This has been adapted for use in this assessment as shown in Table 11.9.

Table 11.9 – Significance of Effect

Sensitivity of Receptor	Magnitude of Impact			
	Major	Moderate	Minor	Negligible
Very High	Major	Major	Moderate	Minor
High	Major	Moderate	Minor	Negligible
Medium	Moderate	Minor	Negligible	Negligible
Low	Minor	Negligible	Negligible	Negligible

11.3.29 Descriptions are provided below for the effects likely to occur depending on their significance. These are based on the IEMA Guidelines for Environmental Noise Impact Assessment.

- Major: Disruptive, causes a material change in behaviour and/or attitude. Potential for sleep disturbance. Quality of life diminished due to change in character of the area.
- Moderate: Intrusive, noise can be heard and causes small changes in behaviour and/or attitude. Potential for non-awakening sleep disturbance. Affects the character of an area such that there is a perceived change in the quality of life.
- Minor: Non-intrusive, can be heard but does not cause any change in behaviour or attitude. Can slightly affect the character of an area but not such that there is a perceived change in the quality of life.
- Negligible: No discernible effect on the receptor.

11.3.30 Based on the above descriptions, it is considered that effects of negligible or minor significance are not significant, and those effects of moderate or major significance are considered significant.

## Consultation

11.3.31 The proposed assessment methodology was provided to the Environmental Health Department of Fife Council in an e-mail dated 7th October 2016. This methodology was

confirmed to be appropriate in an e-mail dated 12<sup>th</sup> October 2016. See ES Volume 3 – Appendix 11.5 for full details.

### Mitigation by Design

- 11.3.32 The worst case scenario of all material being supplied to the Site by HGV was originally assessed at the early stages of this project. This assessment (included in ES Volume 3 – Appendix 10.1 for information only) resulted in approximately 2,650 two-way delivery vehicle movements over the construction period. The associated impacts on the local road network and adjacent residential properties were identified as being of concern. This number of vehicle deliveries would also likely cause significant effects due to the increase in the road traffic noise levels at the most exposed properties.
- 11.3.33 To mitigate these impacts it is proposed that the bulk of the materials will be delivered to the Site by sea. This strategy will reduce the number of deliveries to approximately 30 over the two consecutive six-month summer periods currently proposed for the construction schedule.
- 11.3.34 In addition to the sea transport, for the purposes of this assessment it is assumed an average of one and a maximum of 6 two-way HGV moments would be required to deliver plant and materials per day.

## 11.4 Baseline Conditions

### Overview

- 11.4.1 Long-term baseline noise monitoring has been completed at one location which was considered representative of all the identified sensitive receptors.
- 11.4.2 Photographs of the monitoring location are provided in ES Volume 3 – Appendix 11.3.

### Survey Details

- 11.4.3 The measurements were taken at between 1.2 and 1.5 metres above ground level, and located at least 3.5 metres from any vertical reflecting surfaces. The measurements conformed to the requirements of BS 7445:2003.

### Instrumentation

- 11.4.4 The make and model of the equipment used to perform the measurements is detailed in ES Volume 3 – Appendix 11.4. The instrumentation was programmed to log  $L_{Aeq}$  and  $L_{A90}$  values over a 6 day period from 20<sup>th</sup> to 25<sup>th</sup> October 2016 in contiguous 15 minute intervals. The calibration levels of the instrumentation were checked prior to and after the monitoring periods and no significant changes (+/- 0.2 dB) were noted.

### Meteorological Conditions

- 11.4.5 Meteorological conditions were obtained from publically available data sources. Periods when precipitation occurred have been removed from the datasets. In addition, the wind speeds have been used to remove periods when wind-induced noise could have caused the background sound levels to be elevated. Periods when the wind speed exceeded 5 m/s have therefore been excluded from the data. Further details of the weather conditions are provided in ES Volume 3 – Appendix 11.4.

### Results

- 11.4.6 A summary of the baseline monitoring results is provided in Table 11.10. All measurements are free-field. Further details of the monitoring results are provided ES Volume 3 – Appendix 11.4. The equivalent sound levels in the table have been derived from the logarithmic average

of the measured  $L_{Aeq,15min}$  values over the relevant time period. The reported background sound level is the modal value (the most frequently measured  $L_{A90,15min}$ ).

Table 11.10 – Summary of Noise Monitoring Data (Free-Field)

Start Date (dd/mm/yy)	Start Time (hh:mm:ss)	End Date (dd/mm/yy)	Start Time (hh:mm:ss)	Period*	L <sub>Aeq,T</sub> (dB)	L <sub>A90</sub> (dB)
20/10/16	11:30:00	25/10/16	14:00:00	Day	49	36
				Evening	49	42
				Night	44	39
<p><i>* Time periods defined in the “ABC Method” which is identified in Appendix E of BS 5228 have been adopted:</i></p> <p><i>Day – weekdays from 07.00 to 19.00 and Saturdays from 07.00 to 13.00.</i></p> <p><i>Evening – weekdays from 19.00 to 23.00, Saturdays from 13.00 to 23.00 and Sundays from 07.00 to 23.00.</i></p> <p><i>Night – from 23.00 to 07.00.</i></p>						

11.4.7 Notes were taken on the sources contributing to the ambient sound climate at the monitoring location. The dominant sound source was road traffic on local roads and the A90, and occasional bird call.

11.4.8 The monitoring results show that the measured background level was higher during the evening and night than during the day; however the equivalent sound levels were the same during the day and evening, and lower at night. No manned monitoring was performed during the evening or night. It is possible that additional sound sources are present during these periods which are not present during the day. The reasons for the elevated evening and night-time background sound levels are unknown.

## 11.5 Assessment

### Construction Noise

11.5.1 Using the measured free-field  $L_{Aeq,T}$  noise levels, façade noise levels and the corresponding ‘ABC’ noise limit categories (referenced from Table 11.2) have been derived, as presented in Table 11.11 below.

Table 11.11 – Receptor ‘ABC’ Assessment Category and Threshold Value

Receptor	Period	Noise Level $L_{Aeq,T}$ dB (Façade)*	ABC Category	Threshold Value
R1	Daytime	52	A	65
R2	Daytime	52	A	65
R3	Daytime	52	A	65

\* Façade noise level calculated by addition of 3dB to the measured free-field values, as required by BS 5228.

11.5.2 Adherence to the Threshold Value limits within Table 11.11 at the closest residential receptors should ensure that construction noise impacts are kept to a minimum. The predicted sound levels at each receptor location are provided in Table 11.12.



Table 11.12 – Predicted Construction Noise Levels at Receptors

Modelled Scenario	Receptor	Noise Level $L_{Aeq,12h}$ dB (façade)			Magnitude of Impact
		Construction Noise	Threshold Value	Level above Threshold	
1	R1	65	65	0	Negligible
	R2	64	65	-1	Negligible
	R3	66	65	+1	Negligible
2	R1	55	65	-10	Negligible
	R2	64	65	-1	Negligible
	R3	66	65	+1	Negligible
3	R1	57	65	-8	Negligible
	R2	66	65	+1	Negligible
	R3	68	65	+3	Minor

- 11.5.3 It is clear from the above that for R1 the worst-case impacts are anticipated to occur during Modelled Scenario 1, for R2 and R3 it is Modelled Scenario 3.
- 11.5.4 Graphical illustrations of the sound emissions from the site during each scenario identified in Table 11.12 are provided in ES Volume 2 - Figures 11.1, 11.3 and 11.5.
- 11.5.5 The worst-case magnitude of construction noise impacts has been identified to be negligible at R1 and R2 (Modelled Scenarios 1, 2 and 3) and minor at R3 (Modelled Scenarios 3 only). The sensitivity of the receptors is high, therefore the significance of the effects is negligible (R1 and R2) and minor (R3).

### Construction Vibration

- 11.5.6 As neither piling or blasting will be required it is considered that the potential for effects to occur at the receptors due to vibration impacts is low. Mobile plant associated with the site activities does not give rise to high levels of ground borne vibration. Typically the levels of ground borne vibration from tracked earth moving equipment (such as a bulldozer or excavator) are imperceptible to humans at a distance of approximately 20 metres, and those generated by vehicles with rubber tyres (e.g. a heavy lorry or dump truck) would be imperceptible at more than 10 metres from the vehicle.
- 11.5.7 The closest residential property to the site working areas is 39 The Wynd, at a minimum distance of 67metres. The same property is the closest to the currently proposed location for the construction compound, at a minimum distance of 23metres. It is therefore unlikely that any properties will experience perceptible vibration levels as a result of mobile plant used on site. However the routes of HGVs used for delivery purposes may be within 10 metres distance to the sensitive properties.
- 11.5.8 Given that the worst case scenario has been identified as a maximum of 6 two-way HGV movements per day, the magnitude of the construction and demolition vibration impacts is assessed as negligible. The significance of the effects of construction vibration is therefore negligible.

### Road Traffic Noise

- 11.5.9 For the vast majority of the construction schedule, there will be a maximum of one two-way HGV movement per day. However, as a worst-case scenario, it has been identified that there could be up to 6 two-way HGV movements. These will give rise to a negligible change in the

road traffic noise levels on the local roads. Hence the magnitude of the construction road traffic noise impacts is assessed as negligible. The significance of the effects is therefore also negligible.

## 11.6 Mitigation

- 11.6.1 The majority of the noise and vibration impacts associated with the proposed project will result in a negligible significance of effects. However it has been identified that the construction noise emissions have the potential to exceed the identified BS 5228 Threshold Value by a maximum of 3 dB (at receptor R3), resulting in a minor magnitude of impact.
- 11.6.2 The identified exceedance is primarily due to the sound from the diesel generator which may be located in the construction compound. It should be noted that the levels have been assessed on a typical worst case day and noise levels will be lower as the construction works move further from receptors. As mentioned previously, the current identified location of the construction compound is a worst-case and may change depending on the opinion of the Contractor once appointed. It is also clear that, as the worst-case impact is determined as minor (not significant), no mitigation is strictly required. Irrespective of this, to mitigate the construction noise emissions it is proposed to reposition the diesel generator away from the receptors. The alternative location of the generator is shown in ES Volume 2 - Figures 11.2, 11.4 and 11.6.

### Proposed Mitigation

- 11.6.3 In the sound propagation model developed to predict the construction noise emissions, the diesel generator was modelled as a point source located at the nearest possible location to receptor R3 within the construction compound. The proposed mitigation increases the distance between the diesel generator and receptor R3 from 23 m to 70 m. The effects of this mitigation option have been predicted, as shown in Table 11.13.

Table 11.13 – Mitigated Construction Noise Impacts

Modelled Scenario	Receptor	Noise Level $L_{Aeq,12h}$ dB (façade)			Magnitude of Impact
		Construction Noise	Threshold Value	Level above Threshold	
Mitigated 1	R1	65	65	0	Negligible
	R2	59	65	-6	Negligible
	R3	58	65	-7	Negligible
Mitigated 2	R1	55	65	-10	Negligible
	R2	58	65	-7	Negligible
	R3	58	65	-7	Negligible
Mitigated 3	R1	59	65	-6	Negligible
	R2	64	65	-1	Negligible
	R3	64	65	-1	Negligible

- 11.6.4 The magnitude of the impact of the construction noise is identified to be negligible at all receptors. Hence the significance of the effect of all the identified potential impacts is negligible. Therefore no further measures are required beyond the application of good site practices.
- 11.6.5 Graphical illustrations of the sound emissions from the site during each mitigated scenario identified in Table 11.13 are provided in ES Volume 2 - Figures 11.2, 11.4 and 11.6.

## Proposed Good Site Practices

11.6.6 A range of good site practices will be adopted by the Contractor in order to minimise construction and demolition noise and vibration. The Contractor will follow best practicable means to reduce the noise and vibration impact on the local community, including:

- Fixed and semi-fixed ancillary plant such as generators, compressors etc. which can be located away from receptors to be positioned so as to cause minimum noise disturbance. If necessary, acoustic barriers or enclosures to be provided for specific items of fixed plant;
- If necessary, use of site boundary acoustic barriers/hoarding to screen neighbouring receptors;
- All plant used on site will comply with the EC Directive on Noise Emissions for Outdoor Equipment (2000/14/EC), where applicable;
- Operation of plant in accordance with the manufacturer's instructions;
- Selection of inherently quiet plant where appropriate. All major compressors to be 'sound reduced' models fitted with properly lined and sealed acoustic covers which are kept closed whenever the machines are in use, and all ancillary pneumatic percussive tools to be fitted with mufflers or silencers of the type recommended by the manufacturers;
- All plant used on site will be regularly maintained, paying particular attention to the integrity of silencers and acoustic enclosures;
- Machines in intermittent use to be shut down in the intervening periods between work or throttled down to a minimum;
- Drop heights of materials from lorries and other plant will be kept to a minimum;
- Adherence to the codes of practice for construction working given in BS 5228:2009+A1:2014 and the guidance given therein for minimising noise and vibration emissions from the site;
- Provision of rest periods during any prolonged noisy activities;
- Prohibition of the use of stereos and radios on site;
- Compliance with Fife Council's preferred working hours; and,
- Keeping local residents informed and provision of a contact name and number for any queries or complaints.

## 11.7 Residual Effects

11.7.1 The proposed mitigation measure reduces the worst-case effects due to the impact of construction noise on the nearby residential properties from minor to negligible.

11.7.2 The remaining impacts are identified as negligible.

## 12. CUMULATIVE ASSESSMENT

### 12.1 Introduction

- 12.1.1 Schedule 4 of the Planning EIA Regulations and Schedule 3 of the Marine EIA Regulations each require that the cumulative effects of any proposed development be taken into account as part of the EIA process.
- 12.1.2 Cumulative effects are those that occur when a number of individual predicted environmental impacts from a proposed development collectively cause a greater effect on any one receptor than would be experienced in isolation.
- 12.1.3 Planning Advice Note (PAN) 1/2013: 'Environmental Impact Assessment' states in paragraph 4.32 that when considering the potential impact of a particular proposal on the environment, planning authorities will wish to take account of:
- **Impact Interactions:** The reactions between the impacts of just one project or between the impacts of other projects in the area.
  - **Additive Impacts:** Impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project.
- 12.1.4 In line with this, this Chapter of the ES therefore describes and assesses the potential cumulative effects that could arise from the Development.

### 12.2 Scope of Assessment

- 12.2.1 The cumulative assessment has been carried out to reflect the established scope of the EIA and therefore focuses specifically on those technical assessments which have been carried out in Volume 1 - Chapters 6 to 11 of this ES, namely: landscape and visual, the water environment, nature conservation, ornithology, traffic and transport and noise and vibration.
- 12.2.2 The only significant effects which have been identified through the EIA process relate to visual impacts during construction and impacts on water quality during construction. While less significant effects have been identified, it is not considered that these would have a cumulative effect on any one individual receptor and as such reactions between impacts identified for the Development itself (impact interactions) have not been considered further.
- 12.2.3 Furthermore, as no significant effects have been identified for the Development upon completion, an assessment of operational cumulative impacts has also been scoped out of detailed assessment.
- 12.2.4 The combined impact of other foreseeable development has however been assessed, although it should be noted that it is not possible or appropriate for this assessment to consider in detail the potential individual environmental impacts associated with other developments.
- 12.2.5 For clarity, the scope of development considered as part of the additive impacts assessment will include:
- Significant developments which have had planning consent approved in the last three years but are not yet constructed;
  - Significant development applications which have been submitted within the last three years but are not yet determined;
  - Sites which have been identified as development opportunities in the adopted Dunfermline and West Fife Local Plan (2012) and the proposed FIFEplan Local Development Plan (2016);
  - Larger scale/sensitive developments located close to the chosen road route for contractors/deliveries; and,
  - Marine developments identified through consultation with Marine Scotland (11th November 2016).

- 12.2.6 Note that a period of three years has been considered to reflect the time period for expiration of planning consent as identified in Section 58 (1) of the Town and Country Planning (Scotland) Act 1997 (as amended by the Planning etc. (Scotland) Act 2006).
- 12.2.7 The geographical scope of the assessment considers a 3km radius around the Site and has been determined based on the nature and sensitivity of specific issues within a local context. Following consultation with Fife Council it was recommended that consideration also be given to any potential impacts the Development may have on larger scale/sensitive developments located within close proximity to the chosen road route(s) for contractors/deliveries of material to the site. Therefore there are some sites that fall outwith the 3km radius that have been included within the assessment.
- 12.2.8 ES Volume 2 - Figure 10.4 identifies the preferred HGV route to Site, based on the assumption that local suppliers will be utilised. However it should be noted that this was developed as an assumption to inform the assessment in ES Volume 1 - Chapter 10 and the Contractor may source materials from elsewhere.
- 12.2.9 Additionally, Marine Scotland provided a select number of marine developments for consideration; consequently these have been included within the cumulative assessment. ES Volume 2 - Figure 12.1 and 12.2' shows the radius of the proposed geographical Study Area in more detail as well as identifying the location of those development proposals outlined in Tables 12.1 and 12.2 which have been considered as part of the cumulative assessment.

## 12.3 Approach and Assessment Methodology

- 12.3.1 A qualitative, desk-based assessment has been carried out using professional expertise to make a judgment as to the likely significance of changes in baseline conditions as a result of incremental changes caused by other past, present or reasonably foreseeable actions together with the Development at Dalgety Bay.
- 12.3.2 Table 12.1 below outlines the significant proposals within 3 km of the Development which have (i) been approved in the last three years or (ii) are currently under consideration by Fife Council as planning applications. Also outlined in Table 12.1 are those marine developments identified and considered by Marine Scotland necessary for inclusion within the cumulative assessment.
- 12.3.3 Table 12.2 outlines those sites that are committed development allocations identified in the adopted Local Plan, and those sites allocated within the proposed Local Development Plan. It is reasonable to assume for the purpose of this assessment that the development proposals which have been considered could all either be brought forward to construction within the same timeframe as the Development (approximately 2018 to 2019), or have recently been completed.
- 12.3.4 Section 12.5 identifies the nature and extent of cumulative effects resulting from specific development proposals (short, medium or long term) and provides a judgment on the likely significance of impact drawing on the evidence in the outcomes of the topic-specific chapters within this ES. As previously defined in section 4.5.10 of ES Volume 1 - Chapter 4, significance of effect has been defined as either:
- Major Adverse;
  - Moderate Adverse;
  - Minor Adverse;
  - Negligible;
  - Minor Beneficial;
  - Moderate Beneficial; or,
  - Major Beneficial.
- 12.3.5 In determining the possible significance of such cumulative impacts, the location and timing of potential developments and their associated impacts has been considered.

## 12.4 Limitations

- 12.4.1 It should be noted that opportunities for assessing cumulative effects in detail or quantitatively are generally limited due to uncertainty regarding other committed development and the resulting environmental impacts that are predicted to arise.
- 12.4.2 The EIA process aims to assist good decision-making based on information about the potential environmental effects of the Development; however, there will inevitably be some uncertainty as to the exact scale and nature of the environmental effects. This uncertainty arises for various reasons, for instance due to the limitations of the prediction process itself.
- 12.4.3 Assumptions specific to certain environmental aspects are discussed in the relevant technical chapters of the ES. As detailed below however, a number of general assumptions have been made during preparation of the ES:
- The land uses adjacent to the Site remain as they are at the time of the ES submission; Information provided by third parties, including publicly available information and previous studies remain accurate at the time of publication.
  - Baseline conditions have been assumed to be accurate at the time of the physical surveys but, due to the dynamic nature of the environment, conditions may change during the site preparation, construction and operational phases; and,
  - The assessment of cumulative impacts has been reliant on the availability of information on the development schemes identified (status confirmed on 24th January 2017).



Table 12.1 – Potential and Committed Development Resulting from Planning / Marine Applications

Reference. to Figure 12.1	Reference/ Status	Description	Location
<b>Terrestrial development brought forward through planning applications</b>			
1	15/01980/FULL (Received 03 Jun 2015) Application Refused (Thu 29 Oct 2015) Appeal submitted (02 Feb 2016)	Erection of 56 residential units, a business/commercial unit (including demolition of existing business/commercial units) and associated works, transportation infrastructure and landscaping	Site adjacent To Dalgety Bay Recycling Centre Ridge Way Hillend Industrial Park Dalgety Bay Fife
2	13/02953/PPP (Received 1 Oct 2013) Conditional Approval/Legal Agreement (21 Jul 2015)	Planning permission in principle for a mixed use development comprising the erection of a Class 1 retail unit, erection of restaurant with licensed bar (Class 3), erection of a drive-thru restaurant (Class 3), erection of a business unit (Class 4) and children's indoor play area (Class 11) with associated works including access, car parking and landscaping	Fleming Building Donibristle Industrial Park Ridge Way Hillend Industrial Park Dalgety Bay Dunfermline Fife KY11 9HZ
3	16/00998/FULL Pending (application validated 17 Mar 2016)	Erection of 46 residential units, SUDS, open space and associated roads infrastructure	Land Site 1 Fulmar Way Donibristle Industrial Park Dalgety Bay Fife
4	16/01887/FULL Pending (application validated 22 Jun 2016)	Erection of 51 residential units, SUDS, open space and associated roads infrastructure	Land To South Of Fulmar Way Donibristle Industrial Park Dalgety Bay, Fife
5	15/03782/PPP Conditional Approval/Legal Agreement	Planning permission in principle for a mixed use development comprising the erection of a Class 1 retail unit, erection of restaurant with licensed bar (Class 3), erection of a drive-thru restaurant (Class 3), erection of a business unit (Class 4) and children's indoor play area (Class 11) with	Fleming Building Donibristle Industrial Park Ridge Way Hillend Industrial Park

Reference. to Figure 12.1	Reference/ Status	Description	Location
	(15 Apr 2016) & 16/02388/ARC Decision pending (Validated: 08 Aug 2016) & 16/02676/ARC Decision pending (Validated: 08 Aug 2016)	associated works including access, car parking and landscaping (Section 42 application to amend Condition 4)  Application for Approval of Matters Specified in Conditions 1, 2, 3, 8, 9, 13 & 14 of Planning Permission in Principle 15/03782/PPP  Application for Approval of Matters Specified in Conditions 2A, 2B and 2C of Planning Permission in Principle 15/03782/PPP	Dalgety Bay Dunfermline Fife KY11 9HZ
6	16/00931/FULL Application Refused (28 Jul 2016) Appeal submitted on 18 Oct 2016	Erection of Starter and Trade Counter Units (Class 4, 5 & 6), Office accommodation (Class 4), Retail (Class 1), Food and Drink (Class 3), Car parking and access	2 Muirton Way Donibristle Industrial Park Dalgety Bay Fife
7	15/01147/PPP Application Refused (30 Jul 2015) – Subsequently approved with conditions following appeal ( 20 June 2016) & 16/03554/ARC Decision pending: (Received: 20 Oct 2016) (Validated: 01 Nov 2016)	Application for erection of 295 No residential development with associated access road and infrastructure.	Land At Spencerfield The Avenue Inverkeithing Fife
8	15/02946/PAN	Proposal of Application Notice for demolition of existing flatted blocks and	Land To The East Of

Reference. to Figure 12.1	Reference/ Status	Description	Location
	PAN Agreed (17 Aug 2015) & 15/03844/PPP Permitted with Conditions (28 Apr 2016) & 16/01809/ARC Decision pending (Received:23 May 2016) (Validated: 08 Jun 2016)	integral shop units to create new housing units, neighbourhood commercial units (Classes 1, 2 and 3) and local open space Site: Land to the East of Spittalfield Road, Inverkeithing Planning Permission in Principle for demolition of existing housing and retail units and erection of replacement affordable residential development and retail units with associated infrastructure and open space Approval required by condition for erection of 53 affordable dwellinghouses with associated infrastructure and landscaping (15/03844/PPP)	Spittalfield Road Fraser Avenue Inverkeithing Fife
9	16/00155/PAN PAN Agreed Decision Issued: 29 Jan 2016	Proposal of application for residential development (circa 75 units) with related access, public open space, SUDs and landscaping	Land To The South Of Nether Bouprie Farm Bouprie Fife
<b>Applications identified beyond 3km (located along potential construction traffic routes)</b>			
10	16/03491/FULL Decision pending (Received: 13 Oct 2016) (Validated: 14 Oct 2016)	Erection of 134 residential units including SUDS, open space, access and associated services	Land To North Of 25 Dalbeath Gardens Hill Of Beath Fife
11	16/03599/PAN PAN Agreed Decision Issued: 01 Nov 2016	Proposal of Application Notice for residential development with associated landscaping, access and car parking, and relocation of existing school and facilities (Estimated 120 unit capacity)	Hillside School 3 Main Street Aberdour Burntisland Fife KY3 0RH

Reference. to Figure 12.1	Reference/ Status	Description	Location
12	16/03438/FULL Decision pending (Received: 7 Oct 2016) (Validated: 7 Oct 2016)	Erection of 137 dwelling houses, formation of new vehicular accesses with open space, landscaping and other associated engineering operations (Section 42 to delete condition No. 30 of 15/01222/FULL)	Land To North Of B925 And East Of Curling Knowe Curling Knowe Crossgates Fife
<b>Marine Development</b>			
13	022/OW/SEM - 10	Fife Energy Park Offshore Demonstration Wind Turbine (Renewables Device)	Firth of Forth
14	05161	Port of Rosyth, Rosyth Channel (Dredging)	Firth of Forth
15	n/a – relates to multiple discrete developments.	Forth & Tay Windfarm Developments (Renewables Device)	East Coast
16	05568	Forth Road Bridge Maintenance Works (Construction)	Firth of Forth
17	017/OW/HWYD	Hywind Scotland Pilot Park (Renewables Device)	East Coast
18	05709	Amey - Maintenance Works on Kincardine Bridge (Construction)	Firth of Forth
19	05964 & 05965	Aberdeen Harbour Expansion Project (Construction & Dredging)	East Coast

Table 12.2 – Potential and Committed Development Resulting from adopted Local Plan and proposed Local Development Plan Allocations

Reference. to Figure 12.1	Reference/	Description	Proposal	Notes
Terrestrial development committed through Local Plan Allocations				
20	DGB 001/DGB 001	Donnibristle Industrial Estate	Housing with estimated capacity of 125	Relates to approved application 10/02513/FULL. Site appears to be under construction.
21	DGB 003/DGB 002	Fulmer Way 2	Housing with capacity of 50	Relates to application 14/01974/FULL which was refused.
22	DGB 010/DGB004	St Davids Harbour	Housing with capacity of 24	Relates to application 12/00607/FULL which was initially refused but sustained at appeal. Waiting to commence development.
23	DGB 002/DGB 005	Ferris Way	Employment	Still to be undertaken.
24	DGB 004/DGB 006	Fulmer Way 1	Employment	Relates to application 16/00998/FULL which has yet to be determined.
25	DGB 005/DGB 007	Hillend Industrial Park	Employment	Relates to application 15/03782/PPP which was granted conditional approval (21 Jul 2015). AMSIC applications 16/02388/ARC and 16/02676/ARC have since been submitted (Aug 2016) but are awaiting determination.
26	No existing Ref (Allocation new to PLDP)/DGB 008	Muirton Way	Employment	Relates to application 16/00931/FULL which was initially refused (28 Jul 2016), but has since gone to appeal (submitted 18 Oct 2016).

Reference. to Figure 12.1	Reference/	Description	Proposal	Notes
27	INV 004/INV 012	Fraser Avenue and Barr Crescent	According to the PLDP this site was to be the subject of masterplanning with a view to developing a regeneration strategy for the South East of Inverkeithing.	Application 15/03844/PPP was submitted and approved with 16/01809/ARC validated on 08 Jun 2016 (decision pending).
<b>Allocations identified beyond 3km (along potential construction traffic routes)</b>				
28	Former Caldwell Mill	Employment	Still to be undertaken. However it appears demolition work has commenced.	INV09
29	Land to west of Old Perth Road	Housing (260 units)	Still to be undertaken. No applications have been submitted in relation to this site.	CRO 002
30	Gallows Knowe	Housing (150 units)	Still to be undertaken. Relates to application 16/03438/FULL/15/01222/FULL.	CRO 003



## 12.5 Summary of Cumulative Impacts

Due to the nature of the Development, key receptors with respect to cumulative impacts are the water environment and local ecology. Of the proposals discussed above which may, in conjunction with the Development, impact the water environment and ecology, the majority are much larger projects located at significant distances (25-190km) from the Site. In all cases they involve very different types of works (largely wind farms and a large harbour expansion). In view of the very minimal and insignificant impacts associated with the Development itself, it is highly unlikely that the impacts associated with these other very different developments could become more significant in combination with those identified through this EIA. Two developments are in closer proximity to the site: maintenance works on the Forth Road Bridge and works (dredging etc.) at Port of Rosyth. The ornithological impacts of these developments are themselves controlled through separate consenting regimes and again, in view of the very minimal and insignificant impacts associated with the Development itself, it is not considered likely that any impacts associated with these two developments could become more significant in combination with those from those identified through this EIA. Any potential cumulative impacts relating to the water environment, ornithology or nature conservation are therefore considered to be negligible.

- 12.5.1 During construction, adverse effects on landscape character would arise from the presence of construction activity forming a dominant influence on the site character and change in land use from the existing jetty, slipway and rock armour to construction activity. Viewpoints significantly affected by the Development are limited to temporary and reversible effects during the construction phase of activity, and are from locations on the edge of the Site itself. Overall, these impacts will be localised to the Site and it is not considered that construction impacts of other consented development will result in significant cumulative landscape or visual effects. Any potential cumulative impacts relating to landscape and visual impacts are therefore considered to be negligible.
- 12.5.2 It should also be noted that a supporting technical assessment (AECOM Coastal Processes Report, February 2017) which considers the impacts associated with the coastal processes in Dalgety Bay resulting from the Development has been included as part of the planning and marine licence application packages. The assessment concludes that the Development will not adversely affect the sediment transport within Dalgety Bay. The existing rate of supply of sediment is considered to be small and will reduce to nearly zero and there will be no change to the actual forcing mechanisms of tide, wind and waves in the bay. As a result no cumulative impacts have been identified with respect to coastal processes.
- 12.5.3 Overall, the primary cumulative effect which has been identified results from increases in road based construction traffic. Should a number of developments be brought forward concurrently, there could be possible air quality, noise and traffic related impacts as a result of increased construction vehicles. These impacts will be short term and given the minimal amount of HGV movements proposed as part of the Development, the effects are considered to be minor adverse, which is not significant. It is expected that traffic levels will be appropriately controlled by consenting authorities as wider developments are approved.

## 12.6 References

European Parliament, (1985). Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment.

European Parliament (2011) Council Directive 97/11/EC of 3 March 1997 amending Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment.

European Parliament (2003) Directive 2003/35/EC of the European Parliament and of the Council providing for public participation in respect of the drawing up of certain plans and programmes relating to the environment and amending with regard to public participation and access to justice Council Directives 85/337/EEC and 96/61/EC.

European Parliament (2009) Directive 2009/31/EC of the European Parliament and of the council of 23 April 2009 on the geological storage of carbon dioxide and amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulations (EC) No 1013/2006.

European Parliament, (2011). Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment.

European Parliament, (2014). Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment.

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

Scottish Government, (2011a). Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 (as amended).

Scottish Government, (2011b). Planning Circular 3 2011: The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011. Edinburgh: Scottish Government.

Scottish Government, (2013). Planning Advice Note 1/2013: Environmental Impact Assessment. Edinburgh: Scottish Government.

UK Government (2007). The Marine Works (EIA) Regulations (as amended).

Scottish Natural Heritage (SNH), (2013). A Handbook on Environmental Impact Assessment: 4th Edition. [Electronic], Available: <http://www.snh.gov.uk/docs/A1198363.pdf> [Accessed throughout October 2016].

## 13. SUMMARY OF EFFECTS AND MITIGATION

### 13.1 Introduction

- 13.1.1 This Chapter of the ES provides a summary of the environmental impacts that have been described in each environmental topic chapter (ES Volume 1 – Chapters 6-11).
- 13.1.2 Table 13.1 below reports on the potential environmental impacts associated with the Development, identifies mitigation measures where appropriate and recognises any residual effects. Emboldened effects are those which are still considered significant after mitigation has been applied.
- 13.1.3 The mitigation item numbers assigned in this Table are reflected in Table 14.1 – Schedule of Environmental Commitment in Chapter 14.

### 13.2 Primary Mitigation Measures (Mitigation by Design)

- 13.2.1 Due to the embedded mitigation measures which have been incorporated into the design, as outlined in the development description in ES Volume 1 – Chapter 2, potential significant effects have been reduced. Those measures include the following:
- The rock armour will be removed in strips to minimise the duration the unprotected embankment is exposed to erosion, therefore minimising the risk of release of point sources (Area H);
  - The grassed area which will form the working platform will require a temporary cover system (geotextile and stone) to mitigate any potential cross contamination;
  - Work on the foreshore would be progressed between high tides this would mitigate any disturbance to marine mammals and fish from barge movements;
  - Construction works and depositing of materials will take place between high tides, which will reduce the potential for disturbance to marine mammals and fish through noise/vibrations traveling within the water. No materials will be deposited into the water environment;
  - The proposed Slipway will be formed in sections from pre-cast concrete slabs with the geotextile membrane placed beneath, negating the requirement for foundation piling and mitigating any adverse noise/vibration effects (Area S);
  - A protective bund or barrier will require to be installed during excavation to prevent seawater ingress and the subsequent risk of contaminant dispersal (Area BN-Z);
  - Radioactive materials will be removed off-site at the end of each working day and disposed of under an appropriate licence;
  - The rock armour stone and large pre-cast concrete slabs for the Slipway will be delivered by barge and stockpiled primarily on the foreshore area, minimising the requirement for this to be stored on land;
  - Works will be carried out over two consecutive six-month summer periods (approximately April to September), primarily to mitigate potential impacts on wintering birds in the adjacent Special Protection Area (SPA);
  - To mitigate the impacts on the local road network and residential properties that would be associated with bringing all material to the Site by heavy goods vehicle (HGV), it is envisaged that the bulk of the materials will be delivered to the Site by barge;
  - There is no anticipated lighting requirements proposed as part of the Development, the works will not be undertaken at night and therefore disturbance to key species from lighting will be mitigated;
  - To ensure legislative compliance, a Radiation Protection Advisor (RPA) will be nominated to assess movements of radioactive material and specify movement categorisation and container types to be used.

- As outlined in the Memorandum of Agreement (MoA) which was signed in April 2015 by DIO, Fife Council, and SEPA; SEPA will be responsible for undertaking a 24 month 'Validation Monitoring Period' to ensure the finalised Development meets the requirement of delivering the Management Strategy. Beyond this period SEPA will remain responsible for post completion monitoring in line with their regulatory role, for the purpose of public health re-assurance; and,
- Upon completion, the rock armour will be maintained as appropriate by Fife Council in line with the recommendations of the Management Strategy. It is expected that this will include a regular inspection regime.

## 13.3 Summary of Conclusions

13.3.1 Due to the embedded mitigation measures which have been incorporated into the design, significant effects have been reduced.

### Adverse Effects

13.3.2 Residual adverse effects resulting from the Development which cannot be avoided by the implementation of suitable mitigation can be summarised as follows. These impacts are temporary (during construction only) and reversible.

#### Landscape and Visual:

- Visual impacts resulting from construction processes at 2 of the 6 identified viewpoints (Viewpoint 1 – Dalgety Bay Sailing Club and Viewpoint 3 - Fife Coastal Path, Crow Hill Wood east of 'Sealstrand').

### Beneficial Effects

13.3.3 Beyond the primary benefits of remediating the foreshore in order to reduce the health and environmental risks associated with the pollutant linkages identified and thereby meeting the requirements of the Management Strategy; and, implementing a new Slipway to improve the recreational facilities of DBSC, the following additional minor positive effects resulting from the Development should be recognised:

- Surface water quality of the Firth of Forth Water Body will be enhanced in the longer term;
- The risk of erosion and flooding impacts on vacant coastal land will be reduced; and,
- Existing coastal grassland will be enhanced, given the inclusion of sowing of a coastal grassland seed mix of local provenance in the area behind the concrete headwall in Area H once filled with topsoil.

Table 13.1 – Summary of Environmental Effects and Mitigation

Item Ref	Description of Potential Impact and Receptor (construction = short term / operation = long term)	Sensitivity/ Value of Receptor	Magnitude of Impact	Initial Assessment of Effect	Mitigation Objective and Commitment	Significance of Effect with Mitigation.	Mitigation Item Ref
Landscape and Visual (ES Volume 1 - Chapter 6)							
1	Construction impacts on Cullaloe Hills and Coast Local Landscape Area (LLA)	Low	Low	Minor Adverse	None Required	Minor Adverse	n/a
2	Operational impacts on Cullaloe Hills and Coast LLA	Low	Negligible	Negligible	None Required	Negligible	n/a
3	Construction impacts on St. Colme Garden and Designed Landscape	Medium	Low	Minor Adverse	None Required	Minor Adverse	n/a
4	Operational impacts on St. Colme Garden and Designed Landscape	Medium	Negligible	Negligible	None Required	Negligible	n/a
5	Construction impacts on Landscape Character C.17 Other Intertidal Shores	Low	Low	Minor Adverse	None Required	Minor Adverse	n/a
6	Operational impacts on Landscape Character C.17 Other Intertidal Shores	Low	Negligible	Negligible	None Required	Negligible	n/a
7	Construction impacts on Landscape Character C.19 Firth of Forth and Tay	Low	Low	Minor Adverse	None Required	Minor Adverse	n/a

Item Ref	Description of Potential Impact and Receptor (construction = short term / operation = long term)	Sensitivity/ Value of Receptor	Magnitude of Impact	Initial Assessment of Effect	Mitigation Objective and Commitment	Significance of Effect with Mitigation.	Mitigation Item Ref
8	Operational impacts on Landscape Character C.19 Firth of Forth and Tay	Low	Negligible	Negligible	None Required	Negligible	n/a
9	Construction impacts on Landscape Character LCU:CH74: Aberdour Hills	Medium	Low	Minor Adverse	None Required	Minor Adverse	n/a
10	Operational impacts on Landscape Character LCU:CH74: Aberdour Hills	Medium	Negligible	Negligible	None Required	Negligible	n/a
11	<b>Construction impacts at Viewpoint 1</b>	<b>Medium</b>	<b>High</b>	<b>Major Adverse</b>	<b>Taking into account the nature of the views, no mitigation measures will be possible or appropriate</b>	<b>Major Adverse</b>	<b>Although unavoidable these effects would be temporary and reversible</b>
12	Operational impacts at Viewpoint 1	Medium	Low	Minor Adverse	None Required	Minor Adverse	n/a
13	Construction impacts at Viewpoint 2	Medium	Low	Minor Adverse	None Required	Minor Adverse	n/a
14	Operational impacts at Viewpoint 2	Medium	Negligible	Negligible	None Required	Negligible	n/a
15	<b>Construction impacts at Viewpoint 3</b>	<b>Medium</b>	<b>Medium</b>	<b>Moderate Adverse</b>	<b>Taking into account the nature of the</b>	<b>Moderate Adverse</b>	<b>Although unavoidable these effects would be</b>



Item Ref	Description of Potential Impact and Receptor (construction = short term / operation = long term)	Sensitivity/ Value of Receptor	Magnitude of Impact	Initial Assessment of Effect	Mitigation Objective and Commitment	Significance of Effect with Mitigation.	Mitigation Item Ref
					<b>views, no mitigation measures will be possible or appropriate</b>		<b>temporary and reversible</b>
16	Operational impacts at Viewpoint 3	Medium	Low	Minor Adverse	None Required	Minor Adverse	n/a
17	Construction impacts at Viewpoint 4	Medium	Low	Minor Adverse	None Required	Minor Adverse	n/a
18	Operational impacts at Viewpoint 4	Medium	Negligible	Negligible	None Required	Negligible	n/a
19	Construction impacts at Viewpoint 5	Medium	Negligible	Negligible	None Required	Negligible	n/a
20	Operational impacts at Viewpoint 5	Medium	Negligible	Negligible	None Required	Negligible	n/a
21	Construction impacts at Viewpoint 6	Medium	Negligible	Negligible	None Required	Negligible	n/a
22	Operational impacts at Viewpoint 6	Medium	Negligible	Negligible	None Required	Negligible	n/a
<b>Water Environment (ES Volume 1 – Chapter 7)</b>							
23	Construction impacts on surface water quality of the Firth of Forth Water Body	High	Low	Moderate	Implementation of CEMD	Minor	WE1

Item Ref	Description of Potential Impact and Receptor (construction = short term / operation = long term)	Sensitivity/ Value of Receptor	Magnitude of Impact	Initial Assessment of Effect	Mitigation Objective and Commitment	Significance of Effect with Mitigation.	Mitigation Item Ref
24	Construction impacts of flooding on vacant coastal land	Low	Medium	Minor	None required, however Any temporary risk of flooding could be mitigated by daily review of the flood warning system for the Firth of Forth operated by SEPA to ensure preparation can be made ahead of predicted floods.	Minor	WE2
25	Construction impacts on existing drainage outfalls	See below					
a)	SW Pipeline	High	Medium	Major	All drainage outfalls should be clearly marked on site and a plan showing each should be displayed in the contractor's compound area. Barriers	Minor	WE3

Item Ref	Description of Potential Impact and Receptor (construction = short term / operation = long term)	Sensitivity/ Value of Receptor	Magnitude of Impact	Initial Assessment of Effect	Mitigation Objective and Commitment	Significance of Effect with Mitigation.	Mitigation Item Ref
					could be placed around Scottish Water structures to minimise the risk of damage. It should be ensured that all outfalls are fully licensed prior to works around them commencing		
b)	Drainage Outfalls	Low	Medium	Minor	None Required	Minor	n/a
26	Construction impacts on movement of Burntisland groundwater body	Low	Very Low	Negligible	Implementation of CEMD	Negligible	WE1
27	Construction impacts on quality of Burntisland groundwater body	Low	Very Low	Negligible	Implementation of CEMD	Negligible	WE1
28	Operational impacts on surface water quality of the Firth of Forth Water Body	High	Low	Minor Beneficial	Upon completion, the rock armour will be maintained as appropriate by Fife Council in line with the Management Strategy	Minor Beneficial	WE4

Item Ref	Description of Potential Impact and Receptor (construction = short term / operation = long term)	Sensitivity/ Value of Receptor	Magnitude of Impact	Initial Assessment of Effect	Mitigation Objective and Commitment	Significance of Effect with Mitigation.	Mitigation Item Ref
29	Operational impacts of flooding on vacant coastal land	Low	Medium	Minor Beneficial	n/a	Minor Beneficial	n/a
30	Operational impacts on existing drainage outfalls	See below					
a)	SW Pipeline	High	Very Low	Minor	n/a	Minor	n/a
b)	Drainage Outfalls	Low	Very Low	Negligible	n/a	Negligible	n/a
31	Operational impacts on movement of Burntisland groundwater body	Low	Very Low	Negligible	n/a	Negligible	n/a
32	Operational impacts on quality of Burntisland groundwater body	Low	Very Low	Negligible	n/a	Negligible	n/a
<b>Nature Conservation (ES Volume 1 – Chapter 8)</b>							
33	Impacts on Firth of Forth SSSI	National	Low	Minor Adverse	A coastal grassland seed mix of local provenance be sown along the coastal edge to replace and enhance the minor loss of coastal grassland at the	Minor Beneficial	NC1

Item Ref	Description of Potential Impact and Receptor (construction = short term / operation = long term)	Sensitivity/ Value of Receptor	Magnitude of Impact	Initial Assessment of Effect	Mitigation Objective and Commitment	Significance of Effect with Mitigation.	Mitigation Item Ref
					edge of Area H		
34	Ross Plantation Listed Wildlife Site, Green Network Asset & Ancient Woodland	County	Very Low	Negligible	None Required	Negligible	n/a
35	Other woodland (part of Green Network Asset along coastal edge)	Local	Very Low	Negligible	None Required	Negligible	n/a
36	Coastal grassland (part of Green Network Asset along coastal edge)	Local	Low	Negligible	Remediation will include sowing of a coastal grassland seed mix of local provenance in the area behind the concrete headwall in Area H once filled with topsoil.	Minor Beneficial	NC1
37	Other terrestrial habitats	Site/Zone Influence	Very Low	Negligible	None Required	Negligible	n/a
38	Benthic habitats (excluding mud and the PMF which are assessed separately)	Site/Zone Influence	Low	Negligible	None Required	Negligible	n/a
39	Bats	Local	Very Low	Negligible	None Required	Negligible	n/a
40	Otter	District	Low	Negligible	Standard	Negligible	NC2

Item Ref	Description of Potential Impact and Receptor (construction = short term / operation = long term)	Sensitivity/ Value of Receptor	Magnitude of Impact	Initial Assessment of Effect	Mitigation Objective and Commitment	Significance of Effect with Mitigation.	Mitigation Item Ref
					method statements and mitigation to minimise impacts upon commuting/foraging otter (and other non-protected mammals)		
41	Common porpoise	District	Low	Negligible	None Required beyond that embedded within design.	Negligible	n/a
42	Grey Seal	Local	Low	Negligible	None Required beyond that embedded within design.	Negligible	n/a
43	Diadromous fish	Local	Very Low	Negligible	None Required beyond that embedded within design.	Negligible	n/a
44	PMF – blue mussel on littoral sediments	Local	Very Low	Negligible	Suitable method statements will ensure that pollution (including disturbance of sediments)	Negligible	NC3



Item Ref	Description of Potential Impact and Receptor (construction = short term / operation = long term)	Sensitivity/ Value of Receptor	Magnitude of Impact	Initial Assessment of Effect	Mitigation Objective and Commitment	Significance of Effect with Mitigation.	Mitigation Item Ref
					outside the works footprint) does not occur.		
<b>Ornithology (ES Volume 1 – Chapter 9)</b>							
45	Impacts on habitat used by birds within Firth of Forth SPA/Ramsar/SSSI	National	Low	Negligible	None Required	Negligible	n/a
46	Cormorant (breeding/wintering)	National	Low	Negligible	Reduce disturbance by working April-September, barges min. 300m from rocks/islands, no night work, ECoW to monitor.	Negligible	O1, O3
47	Common tern (breeding)	County	Low	Negligible	As above	Negligible	O1, O3
48	Eider (breeding)	Local	Low	Negligible	As above	Negligible	O1, O3
49	Herring gull (breeding/wintering)	National	Low	Negligible	As above	Negligible	O1, O3
50	Lesser black-backed gull (breeding)	Local	Low	Negligible	As above	Negligible	O1, O3
51	Roseate tern (breeding)	National	Low	Negligible	As above	Negligible	O1, O3

52	Sandwich tern (breeding/passage)	National	Low	Negligible	As above	Negligible	O1, O3
53	Shelduck (breeding)	Local	Low	Negligible	As above	Negligible	O1, O3
54	Breeding seabird assemblage	National	Low	Negligible	As above	Negligible	O1, O3
55	Bar-tailed godwit (wintering)	National	Low	Negligible	As above	Negligible	O1, O3
56	Common scoter (wintering)	National	Low	Negligible	As above	Negligible	O1, O3
57	Curlew (wintering)	National	Low	Negligible	As above	Negligible	O1, O3
58	Great crested grebe (wintering)	National	Low	Negligible	As above	Negligible	O1, O3
59	Lapwing (wintering)	National	Low	Negligible	As above	Negligible	O1, O3
60	Oystercatcher (wintering)	National	Low	Negligible	As above	Negligible	O1, O3
61	Red-breasted merganser (wintering)	National	Low	Negligible	As above	Negligible	O1, O3
62	Red-throated diver (wintering)	National	Low	Negligible	As above	Negligible	O1, O3
63	Redshank (wintering)	National	Low	Negligible	As above	Negligible	O1, O3
64	Turnstone (wintering)	National	Low	Negligible	As above	Negligible	O1, O3
65	Wigeon (wintering)	National	Low	Negligible	As above	Negligible	O1, O3
66	Firth of Forth SPA/Ramsar/SSSI	International / National	Low	Negligible	As above	Negligible	O1, O3
67	Forth Islands SPA	International	Low	Negligible	As above	Negligible	O1, O3
68	Outer Firth of Forth & St Andrews Bay Complex pSPA	International	Low	Negligible	As above	Negligible	O1, O3
69	Inchmickery SSSI	National	Low	Negligible	As above	Negligible	O1, O3

70	Long Craig Island SSSI	National	Low	Negligible	As above	Negligible	O1, O3
71	Imperial Dock Lock Leith SPA	International	Low	Negligible	As above	Negligible	O1, O3
72	Terrestrial breeding birds – tree sparrow	District	Low	Negligible	None required	Negligible	n/a
73	Terrestrial breeding birds – other species	Local	Low	Negligible	Vegetation clearance outside bird breeding season, or ECoW monitoring.	Negligible	O2
Traffic and Transport (ES Volume 1 – Chapter 10)							
74	Severance resulting from construction traffic	Medium	Very Low	Negligible	Implementation of Traffic Management Plan	Negligible	TT1
75	Pedestrian delay, intimidation, loss of amenity during construction	Medium	Very Low	Negligible	As above	Negligible	TT1
76	Road accidents and safety during construction	Medium	Very Low	Negligible	As above	Negligible	TT1
77	Increased journey times for non-construction traffic	Medium	Very Low	Negligible	As above	Negligible	TT1
78	Dust and dirt impacts during construction	Medium	Very Low	Negligible	As above	Negligible	TT1

Noise and Vibration (ES Volume 1 – Chapter 11)							
79	Construction noise at Receptor R1	High	Negligible	Negligible	Adoption of good site practices to reduce the noise and vibration impacts on the local community.	Negligible	NV1
80	Construction noise at Receptor R2	High	Negligible	Negligible	Adoption of good site practices to reduce the noise and vibration impacts on the local community.	Negligible	NV1
81	Construction noise at Receptor R3	High	Minor	Minor Adverse	Ensure diesel generator (if required), is located away from identified receptors.	Negligible	NV2
82	Construction vibration	High	Negligible	Negligible	Adoption of good site practices to reduce the noise and vibration impacts on the local community.	Negligible	NV1
83	Road Traffic Noise during Construction	High	Negligible	Negligible	Adoption of good site practices to reduce the noise and vibration impacts on the local community.	Negligible	NV1

## 14. SCHEDULE OF ENVIRONMENTAL COMMITMENTS

### 14.1 Summary

- 14.1.1 This Chapter of the ES provides a summary of the environmental commitments that have been recommended in each topic-specific technical chapter of the ES and which will be required to ensure the effective implementation of the Development. The contractor will be required to carry forward the mitigation measures identified below into detailed design.
- 14.1.2 Table 14.1 'Schedule of Environmental Commitments' outlined below reports the specific mitigation measures which have emerged from the environmental assessment, establishing a robust environmental management process for the construction and operation of the Development. This should be read in conjunction with Table 13.1 and 13.2 in ES Volume 1 – Chapter 13 which describe the potential effects of the Development and assigns a mitigation item number which has been carried forward to this Chapter. Additional mitigation items are also established where relevant.

### 14.2 Construction and Environmental Management Document (CEMD)

- 14.2.1 In addition to the specific mitigation measures identified in this ES and following good practice recommended by SEPA in their scoping response (21<sup>st</sup> May 2014), the appointed contractor for the Development should produce a Construction Environmental Management Document (CEMD). The CEMD is a key management tool for implementing the Schedule of Environmental Commitments by providing a useful link between the principles of development which need to be outlined at the early stages of the project and the method statements which are usually produced following award of contract. The document will also ensure compliance with applicable legislation and good practice.
- 14.2.2 The CEMD should reflect the mitigation measures and additional steps which have been established in the Schedule of Environmental Commitments (Table 14.1) as well as covering issues including, but not limited to the following:
- Information on construction practices and in particular, how the use of raw materials will be minimised and the use of secondary aggregates and recycled or renewable materials maximised;
  - Details of how the works will be programmed to avoid any adverse impact on sensitive receptors;
  - How surface water run-off will be managed during construction;
  - Proposals for dust management including dust sprays, if required during construction;
  - Environmental impacts resulting from concrete batching plant operations, if proposed;
  - Environmental impacts resulting from spillages, refuelling and burst cables. Contingency plans for large oil spills that cannot be dealt with at a local level, details of designated bunded fuel stores and mobile bunded stores, if applicable;
  - Details of waste water drainage from temporary and permanent facilities for workers on site should be provided;
  - Details on restoration proposals; and,
  - Environmental management, including details of the designated environmental manager and any ecological clerk of works (ECoW).

## 14.3 Waste Management

### Management of Radioactive Wastes

- 14.3.1 The various waste streams generated during the construction phase will be segregated to ensure appropriate characterisation is undertaken and thereby appropriately reduce volumes of materials for off-site disposal.
- 14.3.2 A final disposal route for radioactive waste (radium) will be established in consultation with SEPA prior to the main works commencing and material movement will be controlled under an existing SEPA authorisation held by the Ministry of Defence (MoD) which reflects the requirements of the Radioactive Substances Act 1993 (as amended).
- 14.3.3 The legislation applicable to the transport of radioactive material, including low level and intermediate level waste, is the Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (as amended). To ensure compliance with the legislation, a Radiation Protection Advisor (RPA) will be nominated to assess movements of radioactive material and specify movement categorisation and container types to be used.
- 14.3.4 At the end of each working day any higher activity radium material encountered will be removed off-site in order to achieve the overall aims of the Management Strategy. The following principles, as established in the Management Strategy, will be adhered to during the construction phase and controlled through the CEMD:
- Operation of a management system, organisational structure and resources that are sufficient to achieve compliance with the authorisation discussed above;
  - Consultation with Radiation Protection Advisers or other qualified experts to achieve compliance;
  - Provision of written operating procedures for radioactive waste management;
  - Supervision of radioactive waste disposal by suitably qualified and experienced named persons;
  - Use of best practicable means to minimise radioactive waste;
  - Disposal of radioactive waste in a manner which minimises the radiological effects on the environment and the public;
  - Establishment and maintenance of adequate systems and equipment to meet the requirements of the authorisation;
  - Prevention of loss or escape of radioactive waste;
  - Notification of authorities in the event of loss or escape of radioactive waste;
  - Collection and retention of records pertaining to radioactive waste;
  - Provision of information; and,
  - Sampling and analysis of waste.
- 14.3.5 The following measures should be adopted, unless agreed otherwise with the Planning Authority, when managing material and waste stockpiles at construction work sites:
- Storage areas to be clearly marked;
  - Materials will be stored in suitable containers that are appropriately labelled with fitted lids, taps and tops in good condition;
  - Control measures will be put in place and/or spill response kits/materials will be located near to bulk stores;
  - Materials will be stored and protected against breakage, vandalism, theft or inundation/flood damage;



- Different grades of soil and waste types will be separated;
- So far as possible having regard to the nature of the works materials will be stored away from sensitive site plant and environmental receptors such as watercourses; and,
- Materials will be stored away from main site access roads.

## Management of Non-Radioactive Wastes

- 14.3.6 Beyond the removal of higher activity radium, it is not envisaged that significant volumes of material require to be removed from the site. The primary aim will be to re-use any non-contaminated excavated material for earth works and landscaping, respecting the principles of the waste hierarchy as outlined in the Waste Framework Directive (WFD) (2008/98/EC) and reflected in Scotland's Zero Waste Plan (2010) and Scottish Planning Policy (2014).
- 14.3.7 Any non-radium contaminated materials such as asbestos or excess construction material will be stored in covered stockpiles and/or skips and disposed of appropriately under the requirements of the Waste Management Licensing (Scotland) Regulations 2011 and the Waste (Scotland) Regulations 2012 and in full consultation with SEPA, Fife Council and Marine Scotland.
- 14.3.8 To mitigate the impact of waste, the following measures will be employed as required:
- Waste Management Plan (as part of a wider CEMD);
  - Segregated and secured (where necessary) skips and/or stockpiles for waste disposal and recycling;
  - Suitable location, identification and labelling of waste storage areas;
  - Use of suitable waste storage containers e.g. double skinned storage tanks for waste oil, and,
  - Management throughout works under the materials management plan prepared for the site.

## 14.4 Relevant Policies and Guidance

- 14.4.1 As well as the information detailed in the Planning Advice Notes detailed in ES Volume 1 – Chapter 5 (Table 5.1) and those documents referenced in the conclusions of each technical chapter, the following regulations, best practice and guidance documents should be considered in the development of the CEMD:
- SEPA and the Highland Council's Guidance Note on Construction Environmental Management Process for Large Scale Projects (August 2010);
  - The Water Environment (Oil Storage) (Scotland) Regulations 2006;
  - The Water Environment Controlled Activities (Scotland) Regulations (CAR) 2011;
  - SEPA Guidance Note LUPS GU12 'Planning Advice on Sustainable Drainage Systems (SUDS)';
  - SEPA Policy No. 19 - Groundwater Protection Policy for Scotland;
  - SEPA Interim Position Statement on Planning and Flooding;
  - SEPA Engineering Activities in The Water Environment: Good practice guide – River Crossings;
  - SEPA Land Use Planning System SEPA Guidance Note 31, 'Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems';
  - SEPA Technical Flood Risk Guidance For Stakeholders;

- SEPA Pollution Prevention Guidelines have been revoked in order to undergo revision. However, in Scotland they are to be used as a source of information on good practice and those relevant to the Development will therefore be referenced.
- Scottish Natural Heritage (SNH), A Handbook on Environmental Impact Assessment
- CIRIA, C532 Control of water pollution from construction sites
- CIRIA, C648 Guidance on Controlling water pollution from linear construction projects
- CIRIA, C741 Environmental good practice on site guide (fourth edition)

14.4.2 Note that this list is not exhaustive and we would expect additional sources of advice and guidance to be provided by statutory consultees as part of the Environmental Statement consultation process and incorporated into the finalised CEMD.

## 14.5 Additional Sustainability Commitments

- 14.5.1 In conjunction with the EIA, the MoD have carried out a project-wide Sustainability Appraisal, in accordance with the guidance outlined in the MoD Sustainability & Environmental Appraisal Tools Handbook (Section 2: Sustainability Appraisal, Version 7.1 May 2016). Sustainability Appraisal is a process that helps to ensure sustainability considerations and policy requirements are integrated into all plans, programmes and projects (P/P/Ps) that have the potential to affect the environment, society or the economy on, over or around areas owned, occupied or used by MOD, its agencies and partners. It helps to identify potential negative impacts, allowing alternative options to be sought or mitigation measures to be implemented, and to identify positive sustainability benefits and enhancement opportunities. This document will be passed to the Contractor upon project award and will be updated and refreshed as the project develops to ensure key sustainability objectives are met.
- 14.5.2 The Ministry of Defence (MoD), as a part of HM Government is also fully committed to the principles of Sustainable Procurement (SP) and to using its purchasing power to promote good SP practice. Industry understands the importance for companies to become more sustainable in order to remain competitive in the market, bringing benefit to its shareholders, employees and customers. Whilst delivery of operational capability must always be the primary goal, MoD wishes to work actively, and in partnership, with its Suppliers and their Trade Associations to capitalise on industry's enterprise and innovation to develop and embed SP principles into acquisition and through life management practices.
- 14.5.3 Any successful Contractor will be required to voluntarily register with the Considerate Constructor Scheme and will agree to abide by the Code of Considerate Practice, designed to encourage best practice beyond statutory requirements. The Scheme is concerned about any area of construction activity that may have a direct or indirect impact on the image of the industry as a whole. The main areas of concern fall into three categories: the general public, the workforce and the environment. For more information on the Code, please see the Considerate Constructor website (<https://www.ccscheme.org.uk/>)

Table 14.1 – Schedule of Environmental Commitments

Mitigation Item No.	Location	Mitigation Objective and Commitment	Potential Mitigation Measure(s)	Timing of Mitigation Measure(s)	Monitoring Requirements	Potential Additional Consultation
Landscape and Visual (ES Volume 1 - Chapter 6)						
n/a	n/a	n/a	Proposed mitigation measures associated with the Development are embedded in the design. These have not been informed by the LVIA. No secondary mitigation measures are proposed.	n/a	n/a	n/a
Water Environment (ES Volume 1 - Chapter 7)						
WE1	Site wide	To avoid sediment mobilisation and spillage or discharge of other pollutants (including radium) into coastal water or groundwater.	<p>The Contractor will produce a Construction and Environmental Management Document (CEMD) which will describe the specific procedures to be put in place to control sediment mobilisation, surface water discharges, and chemical spillages. The CEMD will be discussed and agreed with SEPA and Marine Scotland prior to commencement of site works and all staff on site will be briefed on and trained in the procedures contained within the CEMD. The CEMD shall incorporate best practice guidance as detailed in PPG's published by SEPA and CIRIA Reports C532, C584, &amp; C648, as a minimum. In particular, the following measures shall be adopted on site:</p> <ul style="list-style-type: none"> <li>A CAR Licence (if required) and Marine Licence shall be obtained prior to starting</li> </ul>	During Construction	Details to be agreed between contractor, Fife Council, SEPA, and Marine Scotland upon appointment.	n/a

Mitigation Item No.	Location	Mitigation Objective and Commitment	Potential Mitigation Measure(s)	Timing of Mitigation Measure(s)	Monitoring Requirements	Potential Additional Consultation
			<p>work on site and this shall be displayed prominently on a notice board in the site offices;</p> <ul style="list-style-type: none"> <li>The Contractor will apply for a temporary discharge licence under the Controlled Activity Regulations if required by SEPA for the construction stage;</li> <li>Identify and clearly sign all surface water features within the construction site during site set up and brief personnel on their location during induction;</li> <li>The Contractor will use self-bunded tanks or provide impervious bunds around any fuel, oil (minimum capacity 110%), and other chemical stores, and shall centralise and minimise the number of these stores if any are required on site;</li> <li>Refuelling will be permitted only within the construction compound and will only take place on hardstanding, or an appropriate temporary cover system (geotextile and stone) to mitigate any potential cross contamination. This will be reinstated upon completion of work;</li> <li>Chemical and fuel stores, and welfare facilities will be located as far from the edge of the MHWS mark as possible and will be located on hardstanding or an appropriate</li> </ul>			

Mitigation Item No.	Location	Mitigation Objective and Commitment	Potential Mitigation Measure(s)	Timing of Mitigation Measure(s)	Monitoring Requirements	Potential Additional Consultation
			<p>temporary cover system (geotextile and stone);</p> <ul style="list-style-type: none"> <li>Welfare facilities will be provided and maintained by a specialist contractor;</li> <li>Appropriate wash down and decontamination of vehicles will be agreed prior to commencement of works;</li> <li>Stripped areas, stockpiles, and areas of excavation will have fabric silt fences placed so as to intercept the surface water run-off from these areas;</li> <li>The Contractor shall give consideration to creating the sustainable drainage system infrastructure at the outset of construction work, should this be required, or shall use suitable proprietary treatment systems (e.g. lamella clarifiers);</li> <li>Appropriate consideration will be given to the location of construction materials and other stockpiles so that they are as far from the intertidal zone or other water bodies as practically possible;</li> <li>Plant shall be stored and maintained away from surface water features. No plant, equipment or stores shall be left on the foreshore within the intertidal zone after each shift. Mobile plant when parked and</li> </ul>			

Mitigation Item No.	Location	Mitigation Objective and Commitment	Potential Mitigation Measure(s)	Timing of Mitigation Measure(s)	Monitoring Requirements	Potential Additional Consultation
			<p>all static plant shall be fitted with plant nappies;</p> <ul style="list-style-type: none"> <li>All mobile plant shall carry spill kits and spill kits shall also be located close to the working environment where they can be easily accessible but above MHWS. Staff shall be trained in their use. After use, spill kits should be replaced;</li> <li>Wet working will be avoided;</li> <li>The Contractor shall instigate re-vegetation of stripped areas on a sectional basis as early as possible within the programme to reduce the potential for silt laden run off;</li> <li>The CEMP shall identify a clear monitoring regime to confirm the application of the above mitigation requirements. It is anticipated that the Contractor's site management personnel would be made responsible for monitoring, and in practice many of the measures could be monitored based on a daily or weekly inspection of the site and the completion of a "mitigation requirements" tick sheet. These tick sheets would then be retained as auditable evidence of the monitoring of the mitigation requirements;</li> <li>Where necessary, a Pollution Incident Response Plan will be implemented, in</li> </ul>			

Mitigation Item No.	Location	Mitigation Objective and Commitment	Potential Mitigation Measure(s)	Timing of Mitigation Measure(s)	Monitoring Requirements	Potential Additional Consultation
			<p>accordance with SEPA PPG21 and PPG22. This will include formulation of emergency procedures to address accidental pollutant releases and spillages, and will include appropriate staff briefings and training, as required; and,</p> <ul style="list-style-type: none"> <li>Works shall be monitored as appropriate by the Ecological Clerk of Works (ECoW) to ensure that no chemical spillages have occurred, and should they occur ensure that they are immediately cleaned up in accordance with the Pollution Incident Response Plan.</li> </ul> <p>The following measures shall be adopted on site in relation to mitigating the potential effects on groundwater quality:</p> <ul style="list-style-type: none"> <li>Construction workforce sewage and washing effluent should be contained and taken offsite;</li> <li>The Contractor shall provide bunds around any fuel, oil, and other chemical stores, and shall centralise and minimise the number of these stores if any are required on site;;</li> <li>The Contractor shall complete all servicing, fuelling, and storage of vehicles at construction compounds or off-site;</li> <li>Appropriate wash down and</li> </ul>			



Mitigation Item No.	Location	Mitigation Objective and Commitment	Potential Mitigation Measure(s)	Timing of Mitigation Measure(s)	Monitoring Requirements	Potential Additional Consultation
			<p>decontamination of vehicles will be agreed prior to commencement of works;</p> <ul style="list-style-type: none"> <li>The Contractor shall implement appropriate drainage control measures should they be required at the site to prevent areas of standing surface water that could become contaminated and infiltrate into the shallow groundwater; and, </li></ul> <p>As noted above, these are to be monitored by the Contractor's site personnel based on regular inspections and maintain records for inspection.</p>			
WE2	Shoreline	To minimise the risk of temporary flooding from the Firth of Forth during construction.	Beyond the primary mitigation of working in small sections along the coastline to minimise the length of undefended sections, the temporary risk of flooding could be mitigated by reviewing SEPA's flood warning system for the Firth of Forth. This should be reviewed daily to ensure preparation can be made ahead of predicted floods.	During Construction	Details to be agreed between the contractor, Fife Council and SEPA upon appointment.	n/a
WE3	Drainage Outfalls	To reduce the risk of damage to drainage outfalls	All drainage outfalls should be clearly marked on site and a plan showing each should be displayed in the contractor's compound area. Barriers could be placed around Scottish Water structures to minimise the risk of damage. It should be ensured that all outfalls are fully licensed prior to works around them commencing.	During Construction	n/a	Scottish Water and SEPA.

Mitigation Item No.	Location	Mitigation Objective and Commitment	Potential Mitigation Measure(s)	Timing of Mitigation Measure(s)	Monitoring Requirements	Potential Additional Consultation
WE4	Site wide	To monitor and maintain the rock armour	Upon completion, the rock armour will be maintained as appropriate by Fife Council in line with the recommendations of the Management Strategy.	During Construction	Details to be agreed between DIO, Fife Council and SEPA.	Landowners
<b>Nature Conservation (ES Volume 1 - Chapter 8)</b>						
NC1	Area H	To reduce potential impact relating to terrestrial habitats.	A coastal grassland seed mix of local provenance should be sown along the coastal edge to replace and enhance the minor loss of coastal grassland at the edge of Area H.	Post Construction	Details to be agreed by Local Authority following completion of works	DBSC Ltd.
NC2	Site wide	Avoid potential impacts on commuting/foraging otter (and other protected species)	<p>The following standard procedures should be incorporated into Method Statements to avoid potential disturbance to protected species using the Site and surrounding habitat during the works:</p> <ul style="list-style-type: none"> <li>Avoid suitable protected species habitat where possible and avoid creating any obstructions to commuting features (such as woodland edges);</li> <li>Avoiding working during the hours of darkness and within 2 hours after sunrise and 2 hours before sunset; and,</li> </ul>	During construction	Details to be agreed between Contractor, Fife Council, SEPA and SNH upon appointment.	n/a

Mitigation Item No.	Location	Mitigation Objective and Commitment	Potential Mitigation Measure(s)	Timing of Mitigation Measure(s)	Monitoring Requirements	Potential Additional Consultation
			<ul style="list-style-type: none"> <li>Providing exit ramps from any exposed trenches or holes (to prevent otters, and other mammals, entering and becoming trapped).</li> </ul>			
NC3	Site wide	Avoid impacts on blue mussel Priority Marine Feature	Suitable method statements will ensure that pollution (including disturbance of sediments outside the works footprint) does not occur. Good practice management measures for working near water will be adhered to including SEPA Pollution Prevention Guidelines. Controls and contingency measures will be provided for management of run-off from construction areas, silt management, and management of fuel, oil, chemicals and materials.	During construction	Details to be agreed between Contractor, Fife Council, SEPA and SNH upon appointment.	n/a
NC4	Site wide	Management of the introduction and spread of Marine Non-Native Species (MNNS).	<p>A Marine Biosecurity Plan should be provided and follow The Scottish Governments Code of Practice on Non-Native Species. This code of practice recommends the following which are the main elements of a biosecurity plan:</p> <ul style="list-style-type: none"> <li>Adopting a precautionary approach and not carrying out operations which might lead to the spread of NNS until there is a clear understanding of the situation;</li> <li>Carrying out risk assessments to understand the risk of spreading a NNS, setting out how to avoid it happening;</li> </ul>	During construction	Details to be agreed between Contractor, Fife Council, SEPA and SNH upon appointment.	n/a

Mitigation Item No.	Location	Mitigation Objective and Commitment	Potential Mitigation Measure(s)	Timing of Mitigation Measure(s)	Monitoring Requirements	Potential Additional Consultation
			<ul style="list-style-type: none"> <li>Seeking advice and following good practice; and,</li> <li>Reporting the presence of NNS.</li> </ul>			
NC5	Site wide	Commitment to site wide good ecological practices.	<p>Works will be supervised when necessary by an Ecological Clerk of Works (ECoW). In particular the ECoW will: a) supervise clearance of breeding bird habitat during the breeding season (see ES Volume 1 – Chapter 9, Ornithology for further discussion); and b) ensure that mitigation measures to avoid pollution are effective.</p> <p>The following standard procedures should be incorporated into Method Statements to avoid potential disturbance to protected species using the Site and surrounding habitat during the works:</p> <ul style="list-style-type: none"> <li>Avoid suitable protected species habitat where possible and avoid creating any obstructions to commuting features (such as woodland edges);</li> <li>Where possible, avoid working during the hours of darkness and within 2 hours after sunrise and 2 hours before sunset; and,</li> <li>Providing exit ramps from any exposed trenches or holes (to prevent otters, and other mammals, entering and becoming trapped).</li> </ul> <p>Good practice management measures for working near water will be adhered to including SEPA</p>	During construction	Details to be agreed between Contractor, Fife Council, SEPA and SNH upon appointment.	n/a

Mitigation Item No.	Location	Mitigation Objective and Commitment	Potential Mitigation Measure(s)	Timing of Mitigation Measure(s)	Monitoring Requirements	Potential Additional Consultation
			Pollution Prevention Guidelines. Controls and contingency measures will be provided for management of run-off from construction areas, silt management, and management of fuel, oil, chemicals and materials.			
Ornithology (ES Volume 1 - Chapter 9)						
O1	Firth of Forth and mouth of Dalgety Bay	To avoid potentially significant disturbance of qualifying/notified waterfowl bird species.	Barge movements will be restricted such that barges maintain a minimum distance of 300m from all exposed rocks/islands in the Firth of Forth and mouth of Dalgety Bay.	During Construction	Details to be agreed between contractor, Local Authority, SNH, and Marine Scotland	Forth Ports
O2	Site wide	To avoid destruction or damage of active terrestrial bird nests.	Any trees/shrubs needing to be cleared (the amount of which is anticipated to be very small or zero, and involving only small/immature trees/shrubs) will preferably be cleared in the period September-February inclusive to avoid possible illegal destruction or damage of active terrestrial bird nests. If this is not possible, an ECoW will monitor the relevant trees/shrubs prior to clearance to check for active terrestrial bird nests; should active terrestrial bird nests be found, the ECoW will halt	During Construction	Not Applicable	n/a

Mitigation Item No.	Location	Mitigation Objective and Commitment	Potential Mitigation Measure(s)	Timing of Mitigation Measure(s)	Monitoring Requirements	Potential Additional Consultation
			works in that area until the breeding attempts have finished.			
O3	Site wide	To ensure disturbance of birds is not greater than expected.	An Ecological Clerk of Works (ECoW) will be employed to determine whether the disturbance responses by waterfowl during the works are greater than those predicted. In the unlikely event that greater disturbance responses occur, and that these are considered significant at the scale of the relevant designated sites and therefore require mitigation, the ECoW will consult with SNH and seek to reduce disturbance using proven methods such as use of screens to reduce visual disturbance, or alteration of barge route.	During construction	Details to be agreed between Contractor, Fife Council and SNH upon appointment.	n/a
<b>Traffic and Transport (ES Volume 1 - Chapter 10)</b>						
TT1	Site wide	To reduce potential impacts relating to: <ul style="list-style-type: none"> <li>Dust and dirt impacts on localised residential properties;</li> <li>Road accidents and safety;</li> </ul>	Design and implementation of a robust Traffic Management Plan, to include the following details: <ul style="list-style-type: none"> <li>The proposed route for construction traffic including abnormal loads;</li> <li>The necessary agreements and timing restrictions for construction traffic, including relevant liaison with DBS Ltd.;</li> <li>Details of proposed Condition Survey on access routes;</li> <li>Proposals for abnormal maintenance of</li> </ul>	During Construction	Details to be agreed between Contractor, Fife Council and SEPA upon appointment.	Local Residents DBSC Police Scotland Marine Scotland Forth Ports

Mitigation Item No.	Location	Mitigation Objective and Commitment	Potential Mitigation Measure(s)	Timing of Mitigation Measure(s)	Monitoring Requirements	Potential Additional Consultation
		<ul style="list-style-type: none"> <li>Increased journey times for non-construction traffic; and,</li> <li>Pedestrian delay and loss of amenity.</li> </ul>	<p>these routes during (and attributable to) construction;</p> <ul style="list-style-type: none"> <li>Proposals for monitoring and agreeing (abnormal maintenance) costs attributable to construction of the Development;</li> <li>Escort arrangements for abnormal loads – albeit not considered relevant in this instance and more applicable to renewable energy and significant industrial development construction;</li> <li>Route signing;</li> <li>Details of advanced notification to the general public, warning of HGV transport movements;</li> <li>Details of informative road signage warning other users of construction traffic movements;</li> <li>Arrangements for regular road maintenance and cleaning, e.g. road sweeping in the vicinity of the site access point as necessary, wheel cleaning / dirt control arrangements;</li> <li>Loads that may produce excessive dust during transport will be covered;</li> <li>Specific timing of deliveries outside peak traffic hours;</li> </ul>			



Mitigation Item No.	Location	Mitigation Objective and Commitment	Potential Mitigation Measure(s)	Timing of Mitigation Measure(s)	Monitoring Requirements	Potential Additional Consultation
			<ul style="list-style-type: none"> <li>The briefing of drivers on pulling over to the side of the road at suitably safe locations to allow other road users to overtake safely;</li> <li>Contractor speed limits; and,</li> <li>Community and emergency services liaison details.</li> </ul>			
<b>Noise and Vibration (ES Volume 1 - Chapter 11)</b>						
NV1	Site wide	Reduce the noise and vibration impacts on the residential receptors	<p>Good site practices, including the following:</p> <ul style="list-style-type: none"> <li>Fixed and semi-fixed ancillary plant such as generators, compressors etc. which can be located away from receptors to be positioned so as to cause minimum noise disturbance. If necessary, acoustic barriers or enclosures to be provided for specific items of fixed plant;</li> <li>If necessary, use of site boundary acoustic barriers/hoarding to screen neighbouring receptors;</li> <li>All plant used on site will comply with the EC Directive on Noise Emissions for Outdoor Equipment (2000/14/EC), where applicable;</li> <li>Operation of plant in accordance with the manufacturer's instructions;</li> <li>Selection of inherently quiet plant where</li> </ul>	During construction	Details to be agreed between Contractor, Local Authority and SEPA upon appointment.	DBSC Ltd.

Mitigation Item No.	Location	Mitigation Objective and Commitment	Potential Mitigation Measure(s)	Timing of Mitigation Measure(s)	Monitoring Requirements	Potential Additional Consultation
			<p>appropriate. All major compressors to be 'sound reduced' models fitted with properly lined and sealed acoustic covers which are kept closed whenever the machines are in use, and all ancillary pneumatic percussive tools to be fitted with mufflers or silencers of the type recommended by the manufacturers;</p> <ul style="list-style-type: none"> <li>• All plant used on site will be regularly maintained, paying particular attention to the integrity of silencers and acoustic enclosures;</li> <li>• Machines in intermittent use to be shut down in the intervening periods between work or throttled down to a minimum;</li> <li>• Drop heights of materials from lorries and other plant will be kept to a minimum;</li> <li>• Adherence to the codes of practice for construction working given in BS 5228:2009+A1:2014 and the guidance given therein for minimising noise and vibration emissions from the site;</li> <li>• Provision of rest periods during any prolonged noisy activities;</li> <li>• Prohibition of the use of stereos and radios on site;</li> <li>• Confirmation that no foundation piling or</li> </ul>			

Mitigation Item No.	Location	Mitigation Objective and Commitment	Potential Mitigation Measure(s)	Timing of Mitigation Measure(s)	Monitoring Requirements	Potential Additional Consultation
			blasting will be carried out; <ul style="list-style-type: none"> <li>• Compliance with Fife Council's preferred working hours; and,</li> <li>• Keeping local residents informed and provision of a contact name and number for any queries or complaints.</li> </ul>			
NV2	Compound	Minimise noise impacts from diesel generator (if required).	Repositioning of the diesel generator away from sensitive receptors.	During construction	Not Applicable	Not Applicable

## ***ABOUT AECOM***

In a complex and unpredictable world, where growing demands have to be met with finite resources, AECOM brings experience gained from improving quality of life in hundreds of places.

We bring together economists, planners, engineers, designers and project managers to work on projects at every scale. We engineer energy efficient buildings and we build new links between cities. We design new communities and regenerate existing ones. We are the first whole environments business, going beyond buildings and infrastructure.

Our Europe teams form an important part of our worldwide network of nearly 100,000 staff in 150 countries. Through 360 ingenuity, we develop pioneering solutions that help our clients to see further and go further.

[www.aecom.com](http://www.aecom.com)

Follow us on Twitter: [@aecom](https://twitter.com/aecom)