

Table of Contents

NON-TECHNICAL SUMMARY (ENGLISH VERSION)

NON-TECHNICAL SUMMARY (IRISH VERSION)

1. INTRODUCTION.....1-1

1.1	Introduction.....	1-1
1.1.1	References to the Project	1-1
1.1.2	Site Location.....	1-2
1.2	Legislative Context	1-2
1.2.1	Environmental Impact Assessment.....	1-2
1.2.2	EIAR Guidance.....	1-3
1.2.3	Marine Legislative Context.....	1-3
1.2.4	National Marine Policy and Guidelines.....	1-4
1.2.4.1	National Marine Planning Framework.....	1-4
1.2.4.2	National Marine Planning Policy Statement.....	1-4
1.2.4.3	Offshore Renewable Energy Development Plan.....	1-5
1.2.4.4	Offshore Renewable Energy Development Guidelines	1-6
1.2.5	Wind Energy Development Guidelines.....	1-6
1.3	The Applicant.....	1-6
1.4	Brief Description of the Project	1-6
1.5	History of the Project	1-8
1.5.1	Original Foreshore Lease/Licence.....	1-8
1.5.2	Relevant Project Status Confirmation.....	1-8
1.5.3	Maritime Area Consent.....	1-8
1.5.4	Foreshore Licences	1-9
1.5.5	ORESS 1 Auction	1-9
1.5.6	MAC Amendments.....	1-9
1.6	Need for the Project	1-10
1.6.1	Overview.....	1-10
1.6.2	Energy Security	1-13
1.6.3	REPowerEU.....	1-14
1.6.4	Competitiveness of Wind Energy.....	1-15
1.6.5	European Renewable Energy Policy and Targets.....	1-15
1.6.5.1	Renewable Energy Directive.....	1-15
1.6.5.2	EU Strategy on Offshore Renewable Energy (2020)	1-16
1.6.5.3	Revised TEN-E Regulation.....	1-17
1.6.6	Increasing Energy Consumption.....	1-17
1.6.7	Reduction of Carbon Emissions and Other Greenhouse Gases	1-19
1.6.8	Economic Benefits	1-20
1.7	Purpose and Scope of the EIAR.....	1-22
1.8	Structure and Content of the EIAR.....	1-23
1.8.1	General Structure	1-23
1.8.2	Description of the Likely Significant Effects	1-25
1.9	Project Team	1-25
1.9.1	Project Team Responsibilities	1-25
1.9.2	Project Team Members.....	1-28
1.9.2.1	MKO	1-28
1.9.2.2	Xodus	1-35
1.9.2.3	HiDef Aerial Surveying.....	1-39
1.9.2.4	Macroworks.....	1-40
1.9.2.5	Cork Ecology	1-41
1.9.2.6	Anatec.....	1-41
1.9.2.7	Coleman Aviation.....	1-42
1.9.2.8	Maritime Archaeology.....	1-42
1.9.2.9	Hoare Lea.....	1-43
1.9.2.10	Subacoustec.....	1-43
1.9.2.11	Hydro Environmental Services Ltd.....	1-43
1.9.2.12	AWN Consulting Ltd	1-44
1.9.2.13	Tobar Archaeological Services.....	1-44

1.9.2.14	Alan Lipscombe Traffic and Transport Consultants	1-45
1.9.2.15	Michael Gibbons	1-45
1.10	Difficulties Encountered	1-45
1.11	Viewing and Purchasing of the EIA	1-45

2. BACKGROUND AND PLANNING POLICY 2-1

2.1	Introduction	2-1
2.1.1	Renewable Energy Resources	2-2
2.2	Climate Change Policy and Targets	2-2
2.2.1	International Climate Policy	2-4
2.2.1.2	Project Compliance with International Climate Policy	2-7
2.2.2	National Climate Policy	2-7
2.2.2.2	Project Compliance with National Climate Policy	2-11
2.3	Renewable Energy Policy and Targets	2-11
2.3.1	European Renewable Energy Policy	2-11
2.3.1.2	Project Compliance with European Renewable Energy Policy	2-16
2.3.2	National Renewable Energy Policy	2-17
2.3.2.2	Project Compliance with the National Renewable Energy Policy	2-20
2.4	Climate and Renewable Energy Target Progress	2-20
2.5	Planning Policy Context	2-24
2.5.1	National Policy Context	2-25
2.5.2	Regional Policy Context	2-30
2.5.3	Local Policy Context	2-33
2.5.3.1	Galway County Council	2-34
2.5.3.2	Clare County Council	2-42
2.5.3.3	Limerick County Council	2-49
2.5.4	Other Relevant Material Considerations	2-51
2.6	Planning History	2-53
2.6.1	Project Consenting History	2-53
2.6.2	Planning Applications within the Red Line Boundary	2-55
2.6.3	Maritime Applications and Consents within the Red Line Boundary	2-57
2.7	Scoping and Consultation	2-58
2.7.1	Scoping	2-58
2.7.2	Scoping Responses	2-58
2.8	Other Consultations	2-72
2.8.1	Community Engagement	2-72
2.8.2	Pre-Application Consultation	2-73
2.8.2.1	An Bord Pleanála	2-73
2.8.2.2	Galway County Council	2-75
2.8.2.3	Clare County Council	2-77

3. SITE SELECTION AND REASONABLE ALTERNATIVES 3-1

3.1	Introduction	3-1
3.2	Consideration of Reasonable Alternatives	3-2
3.2.1	Methodology	3-2
3.2.2	'Do-Nothing Alternative'	3-3
3.2.3	Alternative Site Locations	3-11
3.2.3.1	Foreshore Licence/Lease Applications	3-11
3.2.3.2	Suitability of the Offshore Site	3-12
3.2.3.3	Suitability of the Onshore Site	3-20
3.2.4	Alternative Renewable Energy Technologies	3-28
3.2.4.1	Onshore Wind	3-29
3.2.4.2	Wave Energy	3-29
3.2.4.3	Tidal Energy	3-29
3.2.4.4	Solar Energy	3-30
3.2.5	Alternative Project Design Options	3-30
3.2.5.1	Offshore Site	3-30
3.2.5.2	Onshore Site	3-56
3.2.6	Alternative Mitigation Measures	3-67
3.2.7	Alternative Construction Methodologies	3-67
3.2.7.1	Offshore Site	3-67
3.2.7.2	Onshore Site	3-68

4. ENVIRONMENTAL IMPACT ASSESSMENT METHODOLOGY..... 4-1

4.1	Introduction.....	4-1
4.2	EIA Guidance and Legislation	4-1
4.2.1	Legislation and Policy	4-1
4.2.2	Wind Energy Development Guidelines.....	4-2
4.2.3	EIAR Guidance.....	4-2
4.3	EIA Process	4-3
4.3.1	EIA Scoping.....	4-4
4.3.2	Consideration of Alternatives and Project Description.....	4-5
4.3.3	Impact Assessment.....	4-5
4.3.3.1	Baseline Characterisation.....	4-5
4.3.3.2	Assessment of Potential Effects.....	4-6
4.3.3.3	Mitigation.....	4-12
4.3.3.4	Cumulative Effects Assessment Approach.....	4-13
4.3.3.5	Interaction of Effects.....	4-14
4.3.3.6	Transboundary Effects.....	4-14
4.3.3.7	Residual Effects.....	4-14
4.3.3.8	Structure and Content of the EIAR	4-14

5. PROJECT DESCRIPTION..... 5-1

5.1	Introduction.....	5-1
5.2	Project Layout.....	5-3
5.3	Project Components.....	5-6
5.3.1	Offshore Site	5-6
5.3.1.1	GBS Seabed Preparation	5-8
5.3.1.2	Dredging	5-8
5.3.1.3	GBS Foundations	5-11
5.3.1.4	Wind Turbines	5-12
5.3.1.5	Offshore Substation.....	5-14
5.3.1.6	Inter Array Cables.....	5-17
5.3.1.7	Offshore Export Cable	5-18
5.3.1.8	IAC and OEC Protection.....	5-19
5.3.1.9	Landfall Exit Location	5-26
5.3.1.10	Site Activities.....	5-26
5.3.2	Onshore Site	5-27
5.3.2.1	Onshore Landfall Location.....	5-30
5.3.2.2	Onshore Grid Connection.....	5-33
5.3.2.3	Onshore Compensation Compound	5-38
5.3.2.4	Temporary Construction Compounds.....	5-42
5.3.2.5	Spoil Management	5-47
5.3.2.6	Hedgerow and Woodland Removal and Replanting.....	5-50
5.3.2.7	Site Drainage.....	5-51
5.3.2.8	Site Activities.....	5-54
5.4	Transport and Site Access	5-58
5.4.1	Offshore Site	5-58
5.4.1.1	Vessel requirements	5-58
5.4.1.2	Advisory Safe Clearance Ranges	5-59
5.4.2	Onshore Site	5-59
5.4.2.1	Site Access.....	5-59
5.4.2.2	Traffic Management.....	5-60
5.5	Construction Management.....	5-60
5.5.1	Offshore Construction Management.....	5-60
5.5.2	Onshore Construction Management.....	5-63
5.5.2.1	Construction Phasing and Timing.....	5-63
5.5.2.2	Construction Phase Monitoring and Oversight	5-63
5.6	Construction Methodologies	5-64
5.6.1	Offshore Infrastructure	5-64
5.6.1.1	Offshore Pre-Construction Surveys.....	5-64
5.6.1.2	GBS Seabed Preparation	5-64
5.6.1.3	Other Seabed Preparation Activities	5-67

5.6.1.4	GBS Foundations	5-69
5.6.1.5	WTG	5-72
5.6.1.6	Installation of the OSS Topside	5-74
5.6.1.7	IAC and OEC Installation	5-75
5.6.1.8	IAC and OEC Burial	5-78
5.6.1.9	IAC and OEC External Protection	5-78
5.6.1.10	Landfall Construction	5-79
5.6.2	Onshore Infrastructure	5-80
5.6.2.1	General Requirements	5-80
5.6.2.2	Onshore Grid Connection	5-80
5.6.2.3	Onshore Compensation Compound	5-92
5.6.2.4	Temporary Construction Compounds	5-94
5.7	Operation and Maintenance	5-95
5.7.1	Offshore Site	5-95
5.7.1.1	Operations and Maintenance Strategy	5-95
5.7.1.2	O&M Activities	5-95
5.7.2	Onshore Site	5-96
5.7.2.1	Operation and Maintenance	5-96
5.8	Decommissioning	5-97
5.8.1	Offshore Site	5-97
5.8.1.1	WTG and OSS	5-97
5.8.1.2	Gravity-Based Structure Foundations	5-98
5.8.2	Cables (Inter-array and Export Cables)	5-98
5.8.3	Onshore Site	5-98
5.8.3.1	Landfall	5-98
5.8.3.2	Onshore Grid Connection	5-98
5.8.3.3	Onshore Compensation Compound	5-99
5.9	Community Gain Proposal	5-99
5.9.1	Background	5-99
5.9.2	Offshore Renewable Electricity Support Scheme	5-100
5.9.3	Community Benefit Fund	5-100

6. POPULATION AND HUMAN HEALTH 6-1

6.1	Introduction	6-1
6.2	Statement of Authority	6-1
6.3	Methodology	6-2
6.3.1	Legislation, Policy and Guidance	6-2
6.3.2	Population	6-3
6.3.2.1	Offshore Population Study Area	6-4
6.3.2.2	Onshore Population Study Area	6-7
6.3.3	Human Health	6-9
6.3.3.1	National Guidance	6-9
6.3.3.2	IEMA Guidance 2017	6-10
6.3.3.3	EIA Significance Matrix for Human Health, IEMA Guidance 2022	6-10
6.4	Scoping and Consultation	6-11
6.4.1	Scoping Responses	6-11
6.5	Population and Socio-Economics	6-14
6.5.1	Population Trends	6-14
6.5.2	Population Density	6-15
6.5.3	Household Statistics	6-15
6.5.4	Age Structure	6-16
6.5.5	Employment and Economic Activity	6-19
6.5.5.1	Principal Economic Status of the Study Area	6-19
6.5.5.2	Employment by Socio-Economic Group	6-21
6.5.5.3	Employment and Investment Potential in the Irish Wind Energy Industry	6-23
6.6	Tourism and Recreation	6-27
6.6.1	Tourism	6-27
6.6.1.1	Overseas Tourism and Revenue	6-28
6.6.1.2	Domestic Tourism and Revenue	6-29
6.6.1.3	Onshore Population Study Area	6-31
6.6.1.4	Tourist Attitudes to Wind Farms	6-32
6.6.2	Recreation	6-35

6.6.2.1	Offshore Population Study Area.....	6-35
6.6.2.2	Onshore Population Study Area	6-35
6.6.3	Sea Use and Land Use	6-36
6.6.3.1	Offshore Population Study Area.....	6-36
6.6.3.2	Onshore Population Study Area	6-36
6.6.4	Services.....	6-37
6.6.4.2	Education	6-38
6.6.4.3	Access and Public Transport.....	6-38
6.6.4.4	Amenities and Community Facilities	6-39
6.6.5	Commercial Fisheries	6-39
6.6.5.1	Offshore Population Study Area.....	6-39
6.7	Public Perception of Wind Energy	6-40
6.7.1	WEI Interactions Opinion Poll on Wind Energy 2019.....	6-40
6.7.2	Sustainable Energy Authority Ireland Survey 2017	6-40
6.7.3	Public Perceptions of Wind Power in Scotland and Ireland Survey 2005.....	6-41
6.7.3.1	Background.....	6-41
6.7.3.2	Study Area	6-41
6.7.3.3	Findings.....	6-41
6.7.3.4	Conclusions.....	6-42
6.7.4	Wind Energy Ireland Public Attitudes Monitor 2022	6-42
6.7.5	SEAI Survey of Households near Commercial Wind and Solar Farms 2023	6-43
6.7.6	Wind Energy Ireland Public Attitudes Monitor 2024.....	6-43
6.7.7	Public Perception of Offshore Wind Farms in Ireland	6-44
6.7.8	Public Perceptions of Offshore Wind Farms in Scotland Survey	6-45
6.8	Health Effects of Wind Farms.....	6-45
6.8.1	Introduction	6-45
6.8.2	Wind Farm Health Effects Studies.....	6-45
6.8.3	Offshore	6-51
6.8.3.1	Shadow Flicker	6-51
6.8.3.2	Turbine Safety	6-51
6.8.4	Onshore.....	6-53
6.8.4.1	Electromagnetic Interference.....	6-53
6.8.5	Assessment of Effects on Human Health of the Project.....	6-53
6.8.6	Vulnerability of the Project to Natural Disasters and Major Accidents.....	6-54
6.9	Property and Land Values.....	6-55
6.9.1	Offshore Population Study Area.....	6-55
6.9.2	Onshore Population Study Area.....	6-58
6.10	Residential Amenity.....	6-60
6.10.1	Offshore Site	6-60
6.10.2	Onshore Site	6-60
6.11	Likely Significant Effects and Associated Mitigation Measures	6-61
6.11.1	'Do Nothing' Scenario	6-61
6.11.2	Construction Phase	6-62
6.11.2.1	Population.....	6-62
6.11.2.2	Health.....	6-69
6.11.3	Operation and Maintenance Phase	6-77
6.11.3.1	Population.....	6-78
6.11.3.2	Health.....	6-84
6.11.4	Decommissioning Phase.....	6-92
6.11.4.2	Population.....	6-93
6.11.4.3	Health.....	6-98
6.11.5	Cumulative and In-Combination Effects.....	6-104
6.11.5.1	Large Scale Projects	6-104
6.11.5.2	Other Projects	6-106
6.11.5.3	Noise.....	6-107
6.11.5.4	Summary of Cumulative and In-Combination effects.....	6-109
6.11.6	Conclusion	6-109

7. MARINE PHYSICAL AND COASTAL PROCESSES 7-1

7.1	Introduction.....	7-1
7.1.1	Statement of Authority.....	7-1
7.2	Legislation, Policy and Guidance.....	7-1

7.2.1	Legislation	7-1
7.2.2	Policy & Guidance.....	7-2
7.3	Consultation.....	7-2
7.4	Assessment Methodology.....	7-4
7.4.1	Data and Information Sources	7-4
7.4.2	Site Surveys and Studies	7-8
7.4.2.1	Geophysical surveys	7-8
7.4.2.2	Environmental survey.....	7-8
7.4.2.3	Metocean hindcast datasets and characterisation.....	7-11
7.4.2.4	Sceirde Rocks Numerical Modelling.....	7-12
7.4.3	Consideration of Data Sources and Quality	7-13
7.4.4	Impact Assessment Methodology.....	7-14
7.4.4.1	Impacts Requiring Assessment	7-14
7.4.4.2	Assessment Methodology	7-15
7.4.4.3	Design Parameters	7-18
7.4.4.4	Mitigation by design	7-26
7.5	Baseline Conditions.....	7-26
7.5.1	MPCP Study Area.....	7-26
7.5.1.1	Sceirde Model Domain.....	7-28
7.5.2	Baseline Environment.....	7-28
7.5.2.1	Designated Sites	7-28
7.5.2.2	Bathymetry and Morphology.....	7-37
7.5.2.3	Bedrock and Quaternary geology	7-48
7.5.2.4	Seabed sediment	7-50
7.5.2.5	Coastal Morphology	7-55
7.5.2.6	Water levels.....	7-57
7.5.2.7	Currents.....	7-61
7.5.2.8	Waves	7-74
7.5.2.9	Sediment transport regime.....	7-86
7.5.2.10	Fronts and stratification.....	7-99
7.5.3	Summary	7-105
7.6	Likely Significant Effects and Associated Mitigation Measures	7-105
7.6.1	Do Nothing Scenario	7-105
7.6.2	Quantification of Effects	7-105
7.6.3	Construction Phase	7-106
7.6.3.1	Change to seabed levels due to construction activities.....	7-106
7.6.3.2	Change to sediment properties due to construction activities	7-114
7.6.3.3	Change to suspended sediment concentrations due to construction activities	7-116
7.6.3.4	Impact on Qualifying Interest features within the designated sites due to construction.....	7-120
7.6.3.5	Change to Coastal Landfall Morphology	7-125
7.6.4	Operational Phase	7-128
7.6.4.1	Change to the tidal, wave and sediment transport regimes	7-128
7.6.4.2	Change to offshore and coastal morphology.....	7-148
7.6.4.3	Impact to Qualifying Interest features within the designated sites due to the presence of the Offshore Site.....	7-150
7.6.4.4	Introduction of scour, including edge scour	7-159
7.6.4.5	Changes to water column structure with impact to stratification	7-160
7.6.5	Decommissioning Phase.....	7-164
7.6.5.1	Change to seabed levels due to decommissioning.....	7-164
7.6.5.2	Change to sediment properties due to decommissioning	7-165
7.6.5.3	Change to suspended sediment concentrations due to decommissioning	7-166
7.6.5.4	Impact on Qualifying Interest features within the designated sites due to decommissioning.....	7-167
7.7	Residual Effects	7-170
7.7.1	Construction Phase	7-170
7.7.2	Operational Phase	7-171
7.7.3	Decommissioning Phase.....	7-172
7.8	Cumulative Effects	7-173
7.8.1	Cumulative Construction Effects	7-180
7.8.2	Cumulative Operational Effects	7-180
7.8.3	Cumulative Decommissioning Effects	7-181

7.9	Conclusion.....	7-181
-----	-----------------	-------

8. WATER AND SEDIMENT QUALITY 8-1

8.1	Introduction.....	8-1
8.1.1	Statement of Authority.....	8-1
8.2	Legislation Policy and Guidance.....	8-1
8.2.1	Legislation	8-2
8.2.2	Policy & Guidance.....	8-2
8.3	Scoping and Consultation.....	8-3
8.4	Assessment Methodology.....	8-4
8.4.1	Data and Information Sources	8-4
8.4.2	Consideration of data sources and quality	8-5
8.4.3	Assessment Methodology	8-5
8.4.3.1	Effects requiring assessment	8-5
8.4.3.2	Characterisation of impacts and effects.....	8-7
8.4.3.3	Determining Significance of Effects.....	8-8
8.4.4	Project Design Parameters	8-8
8.4.5	Analytical Assessment of Marine Physical and Coastal Processes.....	8-14
8.4.6	Mitigation by Design.....	8-14
8.5	Baseline Characterisation.....	8-15
8.5.1	Study Area	8-15
8.5.2	Site-Specific Surveys.....	8-17
8.5.2.1	Geophysical survey	8-17
8.5.2.2	Benthic and Environmental Survey	8-17
8.5.3	Assessment of Sediment Quality	8-21
8.5.3.1	Guidelines for the Assessment of Dredged material in Irish Waters	8-21
8.5.3.2	Canadian Marine sediment quality guidelines	8-22
8.5.4	Assessment of Water Quality	8-23
8.5.4.1	Physico-chemical Criteria	8-23
8.5.4.2	EQS	8-24
8.5.5	Baseline Description.....	8-25
8.5.5.1	Water Quality	8-26
8.5.5.2	Sediment Quality.....	8-54
8.5.5.3	Marine INNS.....	8-66
8.5.6	Baseline Summary.....	8-66
8.6	Likely Significant Effects and Associated Mitigation Measures	8-67
8.6.1	Do Nothing Scenario	8-67
8.6.2	Construction Phase	8-68
8.6.2.1	Changes in water quality due to increased suspended sediment concentrations.....	8-68
8.6.2.2	Changes in WSQ due to accidental release of contaminated sediment.....	8-72
8.6.2.3	Changes in WSQ due to routine and accidental discharges from vessels during construction.....	8-75
8.6.2.4	Effects on water quality status of designated waterbodies due to increased suspended sediment and potential release of contaminants or accidental pollution	8-77
8.6.3	Operation and Maintenance Phase	8-79
8.6.3.1	Effects on water quality status of designated waters due to increased suspended sediment concentrations.....	8-79
8.6.3.2	Changes in WSQ due to accidental release of contaminated sediment.....	8-81
8.6.3.3	Changes in WSQ due to routine and accidental discharges from vessels and WTGs during operations and maintenance	8-82
8.6.3.4	Effects on water quality status of designated waterbodies due to increased suspended sediment and potential release of contaminants or accidental pollution	8-83
8.6.4	Decommissioning Phase.....	8-85
8.7	Residual Effects	8-86
8.7.1	Construction Phase	8-86
8.7.2	Operational and Maintenance Phase.....	8-87
8.7.3	Decommissioning Phase.....	8-88
8.8	Cumulative Effects	8-88

8.8.1	Cumulative Construction Effects	8-92
8.8.2	Cumulative Operational and Maintenance Effects	8-93
8.8.3	Cumulative Decommissioning Effects	8-93

9. BENTHIC ECOLOGY 9-1

9.1	Introduction.....	9-1
9.1.1	Statement of Authority	9-1
9.2	Legislation, Policy and Guidance	9-2
9.3	Consultation	9-4
9.4	Assessment Methodology.....	9-6
9.4.1	Data and Information Sources	9-6
9.4.1.1	Desktop Study	9-6
9.4.1.2	Site Surveys.....	9-7
9.4.2	Consideration of data sources and quality	9-13
9.4.3	Impact Assessment Methodology.....	9-13
9.4.3.1	Impacts Requiring Assessment	9-13
9.4.3.2	Assessment Methodology	9-14
9.4.3.3	Design Parameters	9-17
9.4.3.4	Mitigation by Design.....	9-22
9.5	Baseline Conditions.....	9-22
9.5.1	Study Area.....	9-22
9.5.2	Baseline Environment.....	9-24
9.5.2.1	Bathymetry and Seabed Features	9-24
9.5.2.2	Benthic Species and Habitats	9-32
9.5.2.3	Features of Conservation Importance	9-39
9.6	Likely Significant Effects and Associated Mitigation Measures	9-51
9.6.1	Do Nothing Scenario	9-51
9.6.2	Quantification of Effects	9-51
9.6.2.1	Direct Temporary and Long-Term Offshore Site Footprint	9-51
9.6.2.2	Quantification of Direct Effects to Reef Habitat	9-54
9.6.2.3	Quantification of Effects to Annex I Reef in Regional Context	9-55
9.6.2.4	Quantification of Sediment Deposition (Smothering)	9-55
9.6.2.5	Quantification of Electromagnetic Fields (EMF).....	9-57
9.6.3	Construction Phase	9-58
9.6.3.1	Temporary habitat or species loss / disturbance	9-58
9.6.3.2	Long-term loss or damage to benthic habitats and species	9-64
9.6.3.3	Increased suspended sediment concentrations and associated deposition.....	9-71
9.6.3.4	Increased risk of introduction and spread of invasive non-native species	9-80
9.6.4	Operational and maintenance phase	9-87
9.6.4.1	Long term loss or damage to benthic habitats and species.....	9-87
9.6.4.2	Hydrodynamic changes leading to scour around subsea infrastructure.....	9-88
9.6.4.3	Temporary habitat or species loss / disturbance	9-88
9.6.4.4	Increased suspended sediment concentrations and associated deposition.....	9-89
9.6.4.5	Colonisation of hard structures.....	9-93
9.6.4.6	Effect of cable thermal load or EMF on benthic ecology	9-95
9.6.4.7	Increased risk of introduction and spread of INNS	9-96
9.6.5	Decommissioning Phase.....	9-98
9.6.5.1	Removal of hard substrate during decommissioning.....	9-99
9.7	Residual Effects	9-100
9.7.1	Construction Phase	9-100
9.7.1.1	Temporary habitat or species loss / disturbance	9-100
9.7.1.2	Long term loss / damage to benthic habitats and species.....	9-100
9.7.1.3	Increased SSC and associated deposition	9-100
9.7.1.4	Increased risk of introduction and spread of INNS	9-101
9.7.2	Operational and maintenance phase	9-101
9.7.2.1	Hydrodynamic changes leading to scour around subsea infrastructure	9-101
9.7.2.2	Temporary habitat or species loss / disturbance	9-101
9.7.2.3	Increased SSC and associated deposition	9-102
9.7.2.4	Colonisation of hard structures.....	9-102
9.7.2.5	Effect of cable thermal load or EMF on benthic ecology	9-102
9.7.2.6	Increased risk of introduction and spread of INNS	9-104
9.7.3	Decommissioning Phase.....	9-104

9.7.3.1	Removal of hard substrate during decommissioning.....	9-104
9.8	Cumulative Effects	9-104
9.8.1	Cumulative construction effects.....	9-108
9.8.2	Cumulative operational effects.....	9-108
9.8.3	Cumulative decommissioning effects	9-108
9.9	Conclusion	9-108

10. FISH AND SHELLFISH ECOLOGY10-1

10.1	Introduction.....	10-1
10.1.1	Statement of Authority.....	10-1
10.2	Legislation, Policy and Guidelines.....	10-2
10.3	Consultation.....	10-4
10.4	Assessment Methodology.....	10-4
10.4.1	Data and Information Sources	10-4
10.4.1.1	Desktop Study	10-4
10.4.1.2	Site Surveys.....	10-6
10.4.2	Consideration of data sources and quality	10-6
10.4.2.1	Fish capture surveys	10-7
10.4.3	Likely Significant Effects Assessment Methodology.....	10-7
10.4.3.1	Impacts Requiring Assessment	10-7
10.4.3.2	Assessment Methodology	10-9
10.4.3.3	Design Parameters	10-12
10.4.3.4	Mitigation by Design	10-19
10.5	Baseline Conditions.....	10-20
10.5.1	Study Area.....	10-20
10.5.2	Overview.....	10-22
10.5.3	eDNA Analysis	10-22
10.5.4	Spawning and Nursery Grounds.....	10-23
10.5.4.1	Nursery Grounds	10-24
10.5.4.2	Spawning Grounds.....	10-31
10.5.5	Marine Finfish.....	10-36
10.5.6	Shellfish.....	10-39
10.5.6.1	Nephrops.....	10-39
10.5.6.2	Lobster	10-40
10.5.7	Elasmobranchs.....	10-41
10.5.8	Diadromous Fish.....	10-44
10.5.8.1	Lamprey Species.....	10-44
10.5.8.2	Allis Shad.....	10-45
10.5.8.3	Twaite Shad.....	10-45
10.5.8.4	Eels.....	10-45
10.5.8.5	Trout.....	10-45
10.5.8.6	Atlantic Salmon	10-46
10.5.8.7	Freshwater Pearl Mussel.....	10-47
10.5.9	Protected Sites and Species.....	10-47
10.5.9.1	Species of Conservation Importance.....	10-47
10.5.9.2	Protected Sites.....	10-52
10.5.10	Species of Commercial Importance.....	10-54
10.5.11	Summary of Baseline Environment.....	10-54
10.6	Likely Significant Effects and Associated Mitigation Measures	10-54
10.6.1	Do Nothing Scenario	10-54
10.6.2	Construction Phase	10-55
10.6.2.1	Disturbance or Damage to Fish and Shellfish due to Underwater Noise Generated from Construction Activities	10-55
10.6.2.2	Temporary Habitat Loss or Disturbance	10-62
10.6.2.3	Long-term Habitat Loss	10-66
10.6.2.4	Temporary Increase in SSC.....	10-70
10.6.2.5	Accidental Release of Pollutants	10-75
10.6.3	Operational Phase	10-77
10.6.3.1	Habitat Creation and Fish Aggregation.....	10-77
10.6.3.2	Temporary Increase in SSC.....	10-80
10.6.3.3	Electromagnetic Field Effects	10-82
10.6.3.4	Thermal Emissions from Operational Cables	10-86

10.6.3.5	Underwater Noise	10-87
10.6.3.6	Barrier Effects.....	10-89
10.6.3.7	Ghost Fishing	10-90
10.6.4	Decommissioning Phase.....	10-91
10.7	Residual Effects	10-92
10.7.1	Construction and Decommissioning Phase.....	10-92
10.7.2	Operational Phase	10-94
10.8	Cumulative Effects	10-98
10.8.1	Introduction	10-98
10.8.2	Cumulative construction effects.....	10-105
10.8.2.1	Increases in SCC and accidental release of pollutants	10-105
10.8.3	Cumulative operation effects.....	10-105
10.8.4	Cumulative decommissioning effects	10-106
10.9	Conclusion.....	10-106

11. MARINE ORNITHOLOGY.....11-1

1.1	Introduction.....	11-1
1.1.1	Statement of Authority.....	11-1
1.2	Legislation, Policy and Guidelines.....	11-3
1.2.1	Legislation, Policy and Guidelines	11-3
1.2.2	Policy	11-5
1.2.3	Guidance.....	11-5
1.3	Scoping and Consultation.....	11-6
1.4	Survey Methodology	11-7
1.4.1	Study Areas.....	11-7
1.4.1.1	Offshore Ornithology Regional Study Area	11-7
1.4.1.2	Offshore Ornithology Study Area.....	11-8
1.4.2	Baseline Data Sources.....	11-10
1.4.3	Digital Aerial Surveys	11-11
1.5	Assessment Methodology.....	11-13
1.5.1	Assessment Criteria.....	11-14
1.5.1.1	Sensitivity of Receptor Criteria	11-14
1.5.1.2	Magnitude of Impact Criteria.....	11-16
1.5.1.3	Determining Significance of Effects.....	11-17
1.6	Consideration of Data Sources and Quality	11-18
1.7	Baseline Characterisation.....	11-18
1.7.1	Offshore Ornithology Study Area.....	11-18
1.7.2	Designated Sites	11-24
1.7.3	Defining the sensitivity of the Baseline.....	11-25
1.7.4	Offshore Export Cable (OEC) route	11-31
1.7.5	Baseline characteristics of the OEC route.....	11-32
1.8	Likely Significant Effects and Associated Mitigation Measures	11-33
1.8.1	Scope of the assessment	11-33
1.8.2	Design Parameters	11-33
1.8.3	Mitigation by Design.....	11-36
1.8.4	Do-Nothing Scenario.....	11-37
1.8.5	Construction Phase	11-37
1.8.5.1	Impact 1: Disturbance and displacement within the OAA during construction... 11-37	
1.8.5.2	Impact 2 - Disturbance and displacement along the OEC route during construction.....	11-41
1.8.5.3	Impact 3 - Indirect effects on foraging seabirds during construction.....	11-41
1.8.6	Operation and Maintenance Phase	11-43
1.8.6.1	Impact 4: Disturbance from maintenance activities within the OAA	11-43
1.8.6.2	Impact 5 - Indirect effects on seabirds due to presence of project infrastructure	11-44
1.8.6.3	Impact 6 - Displacement and barrier effects within the OAA	11-45
1.8.6.4	Impact 7 - Collision Mortality within the OAA	11-64
1.8.6.5	Impact 8- Disturbance from turbine lighting.....	11-91
1.8.7	Decommissioning Phase.....	11-92
1.8.7.1	Impact 9 - Disturbance and displacement within the OAA during decommissioning.....	11-92
1.9	Effects on Designated Sites	11-93

1.10	Residual Effects	11-98
1.11	Cumulative Effects	11-98
1.12	Conclusion.....	11-101

12. MARINE MAMMALS AND OTHER MEGAFAUNA..... 12-1

12.1	Introduction.....	12-1
12.1.1	Statement of Authority.....	12-2
12.2	Legislation, Policy and Guidelines.....	12-3
12.3	Scoping and Consultation.....	12-4
12.4	Assessment Methodology.....	12-5
12.4.1	Data and Information Sources	12-5
12.4.2	Site-specific Surveys	12-7
12.4.3	Consideration of data sources and quality	12-9
12.4.3.1	Basking sharks	12-10
12.4.3.2	Data summary.....	12-10
12.4.4	Impact Assessment Methodology.....	12-10
12.4.4.1	Impacts requiring assessment.....	12-10
12.4.4.2	Assessment Methodology	12-12
12.4.4.3	Design Parameters	12-15
12.4.4.4	Mitigation by Design.....	12-19
12.4.5	Annex IV Species – requirement for Regulation 54 derogation	12-21
12.5	Baseline Conditions.....	12-21
12.5.1	Study Area	12-21
12.5.2	Baseline Environment.....	12-23
12.5.2.1	Cetaceans	12-23
12.5.2.2	Pinnipeds.....	12-39
12.5.2.3	Other species	12-44
12.5.2.4	Protected Sites.....	12-47
12.5.2.5	Protected sites	12-47
12.5.3	Summary	12-59
12.6	Likely Significant Effects and Associated Mitigation Measures	12-59
12.6.1	Do Nothing Scenario	12-59
12.6.2	Construction Phase	12-60
12.6.2.1	Acoustic effects associated with construction (including pre-construction).....	12-60
12.6.2.2	Indirect effects of construction sound on the prey species of marine mammals and megafauna	12-74
12.6.2.3	Disturbance due to the physical presence of vessels	12-75
12.6.2.4	Risk of injury resulting from collision of marine mammals and other megafauna with installation vessels.....	12-79
12.6.2.5	Impacts associated with effects upon marine water quality, particularly due to any disturbed sediments affecting turbidity	12-81
12.6.2.6	Impacts associated with effects upon marine water quality due to any accidental release of pollutants	12-84
12.6.3	Operational and Maintenance Phase.....	12-85
12.6.3.1	Risk of injury resulting from collision of marine mammals or other megafauna with WTG foundations	12-85
12.6.3.2	Effects from operational sound	12-86
12.6.3.3	Displacement or barrier effects resulting from the physical presence of devices and infrastructure.....	12-87
12.6.3.4	Disturbance due to the physical presence of vessels	12-89
12.6.3.5	Risk of injury resulting from collision of marine mammals and megafauna with operations and maintenance vessels.....	12-90
12.6.3.6	Risk associated with electromagnetic fields (EMFs) associated with subsea cabling.....	12-91
12.6.3.7	Impacts associated with effects upon marine water quality due to any accidental release of pollutants	12-93
12.6.3.8	Habitat change, including the potential for change in foraging opportunities ..	12-96
12.6.4	Decommissioning Phase.....	12-97
12.6.5	Summary of Effects.....	12-98
12.6.5.1	Construction Phase.....	12-98
12.6.5.2	Operational and maintenance phase.....	12-101
12.6.6	Cumulative Effects.....	12-106

12.6.6.1 Cumulative construction effects.....	12-112
12.6.6.2 Cumulative operational effects.....	12-112
12.6.6.3 Cumulative decommissioning effects.....	12-112
12.6.7 Conclusion.....	12-112

13. COMMERCIAL FISHERIES..... 13-1

13.1 Introduction.....	13-1
13.1.1 Statement of Authority.....	13-1
13.2 Legislation, Policy and Guidelines.....	13-1
13.3 Consultation.....	13-3
13.4 Assessment Methodology.....	13-3
13.4.1 Data and Information Sources	13-3
13.4.1.1 Desktop Study	13-3
13.4.1.2 Site Surveys.....	13-6
13.4.1.3 Vessel Traffic Survey.....	13-6
13.4.1.4 Fishing Gear Visual Survey	13-6
13.4.2 Data gaps and limitations.....	13-8
13.4.3 Likely Significant Effects Assessment Methodology.....	13-9
13.4.3.1 Effects Requiring Assessment	13-9
13.4.3.2 Assessment Methodology	13-10
13.4.3.3 Design Parameters	13-13
13.4.3.4 Mitigation by Design.....	13-18
13.5 Baseline Conditions.....	13-19
13.5.1 Study Area	13-19
13.5.2 Functional Units	13-21
13.5.3 Baseline Environment.....	13-23
13.5.3.1 Fisheries Statistics.....	13-23
13.5.3.2 Fishing Effort.....	13-28
13.5.3.3 Vessel Monitoring System (VMS).....	13-32
13.5.3.4 Automatic Information System (AIS)	13-34
13.5.3.5 Inshore Fishing.....	13-35
13.5.4 Summary	13-39
13.6 Likely Significant Effects and Associated Mitigation Measures	13-40
13.6.1 Do Nothing Scenario	13-40
13.6.2 Construction Phase	13-40
13.6.2.1 Loss of access to fishing grounds.....	13-40
13.6.2.2 Displacement of fishing activity into other areas	13-44
13.6.2.3 Interference to fishing activity due to increased vessel traffic.....	13-48
13.6.2.4 Safety issues for fishing vessels.....	13-51
13.6.3 Operational Phase	13-52
13.6.3.1 Loss of access to fishing grounds.....	13-52
13.6.3.2 Displacement of fishing activity into other areas	13-56
13.6.3.3 Interference to fishing activity due to increased vessel traffic.....	13-60
13.6.3.4 All vessels	13-60
13.6.3.5 Increased steaming times.....	13-60
13.6.3.6 Safety issues for fishing vessels	13-62
13.6.4 Decommissioning Phase.....	13-64
13.7 Summary of Residual Effects.....	13-65
13.7.1 Construction and Decommissioning Phases.....	13-65
13.7.1.1 Loss of access to fishing grounds.....	13-65
13.7.1.2 Displacement of fishing activity into other areas	13-65
13.7.1.3 Interference to fishing activity due to increased vessel traffic.....	13-66
13.7.1.4 Increased steaming times.....	13-66
13.7.1.5 Safety issues for fishing vessels.....	13-66
13.7.2 Operational Phase	13-67
13.7.2.1 Loss of access to fishing grounds.....	13-67
13.7.2.2 Displacement of fishing activity into other areas	13-67
13.7.2.3 Interference to fishing activity due to increased vessel traffic.....	13-68
13.7.2.4 Increased steaming times.....	13-68
13.7.2.5 Safety issues for fishing vessels.....	13-68
13.8 Cumulative Effects	13-69
13.8.1 Cumulative Construction Effects	13-72

13.8.2	Cumulative Operational Effects	13-72
13.8.3	Cumulative Decommissioning Effects	13-72
13.9	Conclusion.....	13-72

14. SHIPPING AND NAVIGATION.....14-1

14.1	Introduction.....	14-1
14.1.1	Statement of Authority	14-1
14.1.1.1	Samantha Westwood (BSc (Hons) Shipping and Port Operations)	14-1
14.1.1.2	James Milne (BSc (Hons) Mathematics).....	14-2
14.2	Legislation, Policy and Guidelines.....	14-2
14.2.1	Legislation	14-2
14.2.2	Policy	14-2
14.2.3	Guidance.....	14-5
14.3	Scoping and Consultation.....	14-5
14.3.1	Regular Operators	14-6
14.3.2	Hazard Workshop	14-6
14.3.3	Meeting with Rossaveel Harbour	14-7
14.3.4	Meetings with Irish Lights	14-8
14.3.5	Meeting with Irish Coast Guard	14-8
14.3.6	Meeting with Marine Survey Office	14-8
14.4	Assessment Methodology.....	14-8
14.4.1	Data and Information Sources	14-8
14.4.2	Project Site-Specific Surveys.....	14-9
14.4.3	Consideration of Data Sources and Quality	14-9
14.4.4	Impacts Requiring Assessment	14-10
14.4.5	Characterisation of Impacts and Effects.....	14-11
14.4.6	Project Design Parameters	14-13
14.4.7	Mitigation by Design.....	14-17
14.5	Baseline Characterisation.....	14-18
14.5.1	Study Area	14-18
14.5.2	Baseline Description.....	14-20
14.5.2.1	Existing Baseline	14-20
14.5.2.2	Vessel Traffic Movements.....	14-22
14.5.2.3	Historical Maritime Incidents.....	14-28
14.5.3	Baseline Summary	14-28
14.6	Likely Significant Effects and Associated Mitigation Measures	14-29
14.6.1	Do Nothing Scenario	14-29
14.6.1.1	Increases in Commercial Vessel Activity	14-29
14.6.1.2	Increases in Commercial Fishing Vessel and Recreational Vessel Activity	14-30
14.6.2	Project Scenario	14-30
14.6.2.1	Displacement of Third-Party Vessels and Resulting Increased Collision Risk	14-30
14.6.2.2	Collision Risk Between Third-Party Vessels and Project Vessels	14-33
14.6.2.3	Reduced Access to Local Ports	14-35
14.6.2.4	Creation of Third-Party Allision Risk	14-36
14.6.2.5	Reduction in Under-Keel Clearance due to Cable Protection	14-39
14.6.2.6	Anchor Interaction with Subsea Infrastructure	14-41
14.6.2.7	Reduction in Emergency Response Capability	14-42
14.7	Residual Effects	14-44
14.8	Cumulative Effects	14-46
14.8.1	Methodology	14-46
14.8.1.1	Offshore Renewables.....	14-46
14.8.1.2	Subsea Cables	14-47
14.8.2	Cumulative Summary.....	14-48
14.9	Summary.....	14-48

15. CIVIL AND MILITARY AVIATION15-1

15.1	Introduction.....	15-1
15.1.1	Statement of Authority	15-2
15.2	Legislation, Policy and Guidelines.....	15-2
15.2.1	Legislation	15-2
15.2.2	Policy	15-2
15.2.3	Guidance.....	15-3

15.3	Consultation	15-4
15.4	Assessment Methodology	15-6
15.4.1	Study Area	15-6
15.4.2	Data and information sources	15-1
15.4.2.1	Site specific surveys	15-1
15.4.2.2	Desk study	15-1
15.4.3	Impact Assessment	15-2
15.4.3.1	Significance Criteria	15-2
15.4.4	Assumptions and limitations	15-3
15.5	Baseline Conditions	15-3
15.5.1	Airspace Designations	15-3
15.5.2	Military Aviation Operations	15-4
15.5.3	Military Exercise and Training Areas	15-4
15.5.4	Major Civil Airport Procedures	15-4
15.5.5	Minor Civil Aerodrome Procedures	15-4
15.5.6	Helicopters	15-4
15.5.7	Civil and Military Radar (including Met Eireann Meteorological Radar)	15-5
15.5.7.1	PSR	15-5
15.5.7.2	SSR	15-5
15.5.7.3	NAVAIDS	15-5
15.5.7.4	Military Radar	15-5
15.5.7.5	Met Eireann Meteorological Radar	15-5
15.5.8	Climate Change and Natural Trends	15-6
15.5.9	Predicted Future Baseline	15-6
15.6	Receptor Evaluation	15-6
15.6.1	Consideration of data sources and quality	15-6
15.6.2	Mitigation by Design	15-6
15.6.3	Impact Assessment Methodology	15-8
15.6.3.1	Key parameters for assessment	15-8
15.7	Likely Significant Effects and Associated Mitigation Measures	15-10
15.7.1	Do Nothing Scenario	15-10
15.7.2	Construction Phase	15-10
15.7.2.1	Creation of physical obstacles affecting air traffic	15-10
15.7.3	Operational Phase	15-12
15.7.3.1	Creation of physical obstacles affecting air traffic	15-12
15.7.3.2	Interference with Civil PSR Systems	15-13
15.7.3.3	Decommissioning Phase	15-14
15.8	Residual Effects	15-14
15.9	Cumulative Effects	15-15
15.10	Potential Inter-Related Effects	15-15
15.11	Transboundary Impacts	15-16
15.12	Conclusion	15-16

16. SEASCAPE / LANDSCAPE AND VISUAL 16-1

16.1	Introduction	16-1
16.1.1	Statement of Authority	16-1
16.2	Legislation, Policy and Guidelines	16-2
16.3	Consultation	16-2
16.3.1	Consultation Feedback from An Bord Pleanála and Galway County Council	16-2
16.3.2	Consultation Feedback from Fáilte Ireland	16-3
16.4	Assessment Methodology	16-3
16.4.1	Outline Methodology	16-3
16.4.2	SLVIA Study Area	16-4
16.4.3	Assessment Criteria	16-5
16.4.3.1	Seascape / Landscape Sensitivity	16-5
16.4.3.2	Seascape / Landscape Impact Magnitude	16-8
16.4.3.3	Visual Receptor Sensitivity	16-8
16.4.3.4	Representative Viewpoint Selection	16-11
16.4.3.5	Visual Impact Magnitude	16-13
16.4.3.6	Significance of Seascape/Landscape and Visual Effects	16-14
16.4.3.7	Quality and Timescale of Effects	16-15

16.4.3.8	Assessment of Cumulative Effects	16-15
16.5	Baseline Conditions.....	16-16
16.5.1	Seascape / Landscape Baseline	16-16
16.5.1.1	Regional Seascape Character Assessment for Ireland (2020)	16-19
16.5.2	Policy Context	16-24
16.5.2.1	National Marine Policy Framework	16-24
16.5.2.2	Galway County Development Plan (2022-2028)	16-24
16.5.2.3	Clare County Development Plan (2023 – 2029).....	16-30
16.5.2.4	Mayo County Development Plan (2022-2028).....	16-32
16.6	Visual Receptors.....	16-32
16.6.1	Zone of Theoretical Visibility (ZTV) Mapping	16-32
16.6.1.1	Bare-Ground ZTV mapping	16-33
16.6.1.2	Route Screening Analysis (RSA)	16-33
16.6.1.3	Identification of Visual Receptors.....	16-35
16.7	Likely Significant Effects and Associated Mitigation Measures	16-48
16.7.1	Seascape and Landscape Impact Assessment	16-48
16.7.1.1	Seascape and Landscape Sensitivity	16-48
16.7.1.2	Seascape and Landscape Impact Magnitude.....	16-55
16.7.2	Visual Impact Assessment.....	16-62
16.7.2.1	Visual Receptor Sensitivity.....	16-62
16.7.2.2	Visual Impact Magnitude	16-62
16.7.3	Do Nothing Scenario	16-79
16.8	Residual Effects	16-79
16.9	Cumulative Effects	16-79
16.9.1	Cumulative Landscape / Seascape Effects.....	16-79
16.9.2	Cumulative Visual Effects	16-80
16.10	Conclusion.....	16-81

17. MARINE ARCHAEOLOGY 17-1

17.1	Introduction.....	17-1
17.1.1	Statement of Authority	17-3
17.1.1.1	Maritime Archaeology Ltd	17-3
17.1.1.2	Michael Gibbons	17-4
17.1.2	Legislation, Policy, and Guidance	17-4
17.1.3	Consultation.....	17-7
17.2	Assessment Methodology.....	17-7
17.2.1	Study Area	17-7
17.2.2	Baseline Data.....	17-7
17.2.3	Assessment Methodology	17-10
17.2.3.1	Methodology for the archaeological assessment of geophysical data.....	17-10
17.2.4	Side Scan Sonar Data.....	17-11
17.2.4.1	2022	17-11
17.2.4.2	2024	17-11
17.2.5	Echo sounder (multi-beam system) data.....	17-12
17.2.6	Magnetic data	17-13
17.2.7	Sub-bottom profiler data	17-14
17.2.8	Methodology geophysical data interpretation.....	17-14
17.2.9	Methodology for the archaeological assessment of geotechnical data.....	17-15
17.3	Baseline Conditions.....	17-18
17.3.1	Environmental context.....	17-18
17.3.2	Maritime activity: baseline review	17-19
17.3.2.1	Previous Archaeological Investigations	17-19
17.3.3	Palaeolithic (800,000-8,000 BCE), Mesolithic (8,000 - 4,000 BCE) and Neolithic (4,000 - 2,500 BCE).....	17-19
17.3.4	Bronze Age (2,500 - 800 BCE) and Iron Age (800 BCE- AD 400)	17-20
17.3.5	Early Medieval (AD 500 - 1100) and Medieval (1100 - 1550)	17-21
17.3.6	Post-medieval (1550 onwards).....	17-21
17.3.6.1	Church Sites	17-22
17.3.6.2	Holy Wells	17-23
17.3.6.3	Fort Sites	17-23
17.3.6.4	Graveyard Sites.....	17-24
17.3.7	Wrecks, aviation, and documented losses	17-24

17.3.8	Known Wrecks.....	17-24
17.3.9	Unknown Wrecks.....	17-26
17.3.10	Uncharted Wrecks.....	17-26
17.3.11	Aviation Archaeology.....	17-26
17.3.12	Submerged Landscapes.....	17-26
17.3.13	Assessment of Geophysical Data.....	17-27
17.3.14	Assessment of Geotechnical Data	17-30
17.4	Receptor Evaluation.....	17-30
17.4.1	Sensitivity of Receptor Criteria	17-30
17.4.2	Magnitude of Impact Criteria.....	17-31
17.4.3	Defining the Significance of Effect.....	17-33
17.5	Likely Significant Effects and Associated Mitigation Measures	17-34
17.5.1	Mitigation by Design.....	17-34
17.5.2	Project Design	17-36
17.5.3	Do Nothing Scenario	17-39
17.5.4	Construction Phase	17-39
17.5.4.1	Removal of sediment containing undisturbed archaeological contexts during seabed preparation.....	17-39
17.5.4.2	Compression of stratigraphic contexts containing archaeological material from combined weight of foundation, transition piece, tower, and WTG	17-41
17.5.4.3	Disturbance of sediment containing potential marine archaeology receptors (material and contexts) during the laying of inter-array cables and offshore export cable laying operations.....	17-42
17.5.4.4	Penetration and compression effects of jack-up vessels and anchoring of construction vessels during WTG, OSS, or cable installation	17-43
17.5.5	Operation and Maintenance Phase	17-44
17.5.5.1	Scour effects caused by the presence of WTG and substation foundations, causing, or accelerating loss of the receptor	17-44
17.5.5.2	Exposure and replacement of inter-array and offshore export cable activities or the use of cable protection measures (such as remedial cable burial).....	17-45
17.5.5.3	Penetration and compression effects caused by corrective and preventative operation and maintenance activities (via jack-up vessels or anchors).....	17-46
17.5.5.4	Assessment of Setting	17-47
17.5.6	Decommissioning Phase.....	17-54
17.5.6.1	Draw-down of sediment into voids left by removed WTG foundations leading to loss of sediment, causing, or accelerating loss of the receptor.....	17-54
17.5.6.2	Penetration and compression effects of jack-up vessels and anchoring of decommissioning vessels.....	17-55
17.5.7	Summary	17-56
17.6	Cumulative Effects	17-59
17.6.1	Project Scoping.....	17-59
17.6.2	Cumulative Effects Assessment	17-59
17.6.2.1	Cumulative Assessment Summary	17-61
17.7	Conclusion.....	17-61

18. OTHER SEA USERS.....18-1

18.1	Introduction.....	18-1
18.1.1	Statement of Authority.....	18-1
18.2	Legislation Policy and Guidelines.....	18-2
18.2.1	Policy	18-2
18.2.2	Guidance.....	18-2
18.3	Scoping and Consultation.....	18-3
18.4	Assessment Methodology.....	18-4
18.4.1	Data and Information Sources	18-4
18.4.2	Consideration of data sources and quality	18-5
18.4.3	Assessment Methodology	18-6
18.4.3.1	Impacts Requiring Assessment	18-6
18.4.3.2	Characterisation of Impacts and Effects	18-8
18.4.3.3	Determining Significance of Effects	18-10
18.4.4	Project Design Parameters	18-10
18.4.5	Mitigation by Design.....	18-17
18.5	Baseline Characterisation.....	18-18

18.5.1	Study Area.....	18-18
18.5.1.1	Site-specific Surveys and Studies	18-20
18.5.2	Baseline Description.....	18-20
18.5.2.1	Existing Baseline	18-20
18.5.3	Baseline Summary	18-30
18.6	Likely Significant Effects and Associated Mitigation Measures	18-30
18.6.1	Do Nothing Scenario	18-30
18.6.2	Construction Phase	18-30
18.6.2.1	Obstruction to offshore renewable energy developments	18-30
18.6.2.2	Obstruction to cable installations	18-31
18.6.2.3	Obstruction to Marine Recreational Users.....	18-33
18.6.2.4	Potential effects to aquaculture operations	18-35
18.6.2.5	Obstruction to military activities.....	18-40
18.6.2.6	Obstruction to oil and gas activities.....	18-41
18.6.2.7	Obstruction to spoil disposal activities	18-41
18.6.3	Operational and Maintenance Phase.....	18-43
18.6.3.1	Obstruction to offshore renewable energy developments as a result of operational and maintenance activities.....	18-43
18.6.3.2	Obstruction to cable installations	18-44
18.6.3.3	Obstruction to marine recreational users.....	18-45
18.6.3.4	Potential effects to aquaculture operations.....	18-46
18.6.3.5	Obstruction to military activities	18-49
18.6.3.6	Obstruction to oil and gas activities	18-49
18.6.3.7	Obstruction to spoil disposal activities	18-50
18.6.4	Decommissioning Phase.....	18-51
18.7	Summary of Effects	18-51
18.7.1	Construction Phase	18-51
18.7.2	Operational and Maintenance Phase.....	18-53
18.7.3	Decommissioning Phase.....	18-54
18.8	Cumulative Effects	18-54
18.8.1	Cumulative Construction Effects	18-57
18.8.2	Cumulative Operational Effects	18-57
18.8.3	Cumulative Decommissioning Effects	18-57

19. OFFSHORE AIR QUALITY, AIRBORNE NOISE AND VIBRATION 19-1

19.1	Introduction.....	19-1
19.1.1	Statement of Authority.....	19-1
19.2	Legislation, Policy and Guidance.....	19-2
19.2.1	Legislation	19-2
19.3	Policy.....	19-2
19.3.1	Guidance.....	19-2
19.3.2	Air Quality Objectives	19-3
19.3.3	Operational Airborne Noise Guidance	19-4
19.4	Consultation.....	19-5
19.5	Assessment Methodology.....	19-6
19.5.1	Data and Information Sources	19-6
19.5.2	Site Surveys.....	19-7
19.5.2.1	Metocean Survey	19-7
19.5.2.2	Vessel Traffic Surveys	19-7
19.5.2.3	Baseline Noise Survey	19-7
19.5.3	Consideration of data sources and quality	19-8
19.5.4	Assessment Methodology	19-8
19.5.4.1	Impacts requiring assessment.....	19-8
19.5.4.2	Assessment Methodology	19-10
19.5.5	Design Parameters	19-12
19.5.6	Mitigation by design	19-15
19.6	Baseline Conditions.....	19-15
19.6.1	Study Area.....	19-15
19.6.2	Baseline Environment.....	19-17
19.6.2.1	Airborne pollutants	19-17
19.6.2.2	Meteorology	19-20
19.6.2.3	Mace Head Atmospheric Research Station.....	19-20

19.6.2.4	Airborne noise	19-20
19.6.3	Baseline Summary	19-24
19.7	Likely Significant Effects and Associated Mitigation Measures	19-25
19.7.1	Do Nothing Scenario	19-25
19.7.2	Construction Phase	19-25
19.7.2.1	Impacts to Mace Head Atmospheric Research Station	19-25
19.7.2.2	Airborne noise and vibration generated from construction vessel movements and Project construction activities.....	19-26
19.7.2.3	Exhaust emissions from Offshore Site vessels	19-28
19.7.3	Operational Phase	19-30
19.7.3.1	Impacts to Mace Head Atmospheric Research Station	19-30
19.7.3.2	Production of airborne noise during WTG operation.....	19-32
19.7.3.3	Increase in noise, vibration and vessel emissions from Project vessels	19-35
19.7.4	Decommissioning Phase.....	19-36
19.8	Residual Effects	19-38
19.8.1	Construction and Decommissioning Phase.....	19-38
19.8.2	Operational Phase	19-39
19.9	Assessment of Cumulative Effects	19-40
19.9.1	Cumulative construction effects.....	19-43
19.9.2	Cumulative operational effects.....	19-43
19.9.3	Cumulative decommissioning effects	19-43
19.10	Conclusion	19-43

20. TERRESTRIAL BIODIVERSITY..... 20-1

20.1	Introduction.....	20-1
20.1.1	Requirements for Ecological Impact Assessment	20-4
20.1.2	Review of Relevant Guidance and Sources of Consultation	20-6
20.1.3	Statement of Authority	20-7
20.2	Methodology.....	20-8
20.2.1	Desk Study.....	20-8
20.2.1.1	Designated Sites	20-8
20.2.1.2	NPWS Article 17 Reporting	20-9
20.2.2	Scoping and Consultation.....	20-9
20.2.3	Field Surveys	20-13
20.2.3.1	Multi-disciplinary Walkover Surveys (as per NRA Guidelines, 2009).....	20-13
20.2.3.2	Habitat Surveys	20-14
20.2.3.3	Terrestrial Fauna Surveys.....	20-14
20.2.4	Methodology for Assessment of Impacts and Effects	20-15
20.2.4.1	Identification of Target Receptors and Key Ecological Receptors	20-15
20.2.4.2	Valuing Ecological Receptors	20-15
20.2.4.3	Characterisation of Impacts and Effects	20-16
20.2.4.4	Determining the Significance of Effects	20-17
20.2.4.5	Incorporation of Mitigation.....	20-17
20.2.5	Annex IV species – requirement for Regulation 54 derogation	20-17
20.3	Consideration of data sources and quality.....	20-17
20.3.1	Desk Study.....	20-18
20.3.1.1	Designated Sites	20-18
20.3.1.2	NPWS Article 17 Reporting	20-24
20.3.1.3	Vascular plants.....	20-24
20.3.1.4	Bryophytes.....	20-24
20.3.1.5	National Biodiversity Data Centre (NBDC) Records.....	20-24
20.3.1.6	Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>)	20-28
20.3.1.7	Regional and Local Hydrology and Hydrogeology.....	20-28
20.3.1.8	Conclusions of the Desktop Study	20-29
20.4	Ecological Survey Results.....	20-30
20.4.1	Description of Habitats and Flora.....	20-30
20.4.1.1	Habitats within and adjacent to the Onshore Grid Connection	20-31
20.4.1.2	Habitats within and adjacent to the Onshore Compensation Compound	20-48
20.4.1.3	Habitats within and adjacent to Onshore Landfall Location	20-50
20.4.1.4	Habitats within and adjacent to Proposed passing bays between the OCC and the N67	20-50
20.4.2	Watercourse Assessment	20-51

20.4.2.1	Protected Habitats/Flora.....	20-53
20.4.3	Invasive Species.....	20-53
20.4.4	Fauna in the Existing Environment	20-61
20.4.4.1	Badger.....	20-61
20.4.4.2	Otter	20-61
20.4.4.3	Marsh Fritillary.....	20-61
20.4.4.4	Freshwater Pearl Mussel (FWPM)	20-61
20.4.4.5	Bats.....	20-61
20.4.4.6	Other Fauna	20-63
20.4.5	Identification of Key Ecological Receptors	20-64
20.5	Ecological Impact Assessment	20-67
20.5.1	Do-Nothing Effect	20-67
20.5.2	Likely Significant Effects During Construction Phase	20-67
20.5.2.1	Effects on Habitats During Construction.....	20-67
20.5.2.2	Effects on Fauna During Construction	20-72
20.5.3	Likely Significant Effects During Operation and Maintenance Phase	20-80
20.5.3.1	Effects on Habitats during Operation and Maintenance.....	20-80
20.5.3.2	Effects on Fauna during Operation and Maintenance	20-81
20.5.4	Likely Significant Effects During Decommissioning Phase	20-83
20.5.5	Effects on Designated Sites.....	20-83
20.5.5.1	European Designated Sites.....	20-83
20.5.5.2	Nationally Designated Sites	20-89
20.5.6	Invasive Species.....	20-89
20.5.7	Impacts of the Onshore Site in cumulation with the Offshore Site	20-90
20.6	Cumulative Impacts	20-91
20.6.1	Review of Plans.....	20-92
20.6.2	Review of Projects	20-102
20.6.2.1	Cumulative Effects with Energy Development.....	20-102
20.6.2.2	Cumulative Effects with Agriculture.....	20-102
20.6.2.3	Cumulative Effects with Forestry	20-103
20.6.2.4	Cumulative Effects with Other Development	20-103
20.6.2.5	Existing Habitats and Land Uses	20-103
20.6.3	Assessment of Cumulative Effects.....	20-104
20.7	Conclusion.....	20-104

21. TERRESTRIAL ORNITHOLOGY 21-1

1.1	Introduction.....	21-1
21.1.1	Description of the Project	21-2
21.1.2	Legislation, Guidance and Policy Context.....	21-2
21.1.3	Statement of Authority and Competence	21-3
21.2	Assessment Approach and Methodology	21-4
21.2.1	Desk Study.....	21-4
21.2.2	Consultation.....	21-4
21.2.2.1	Scoping and Consultation	21-4
21.2.3	Identification of Target Species and Key Ornithological Receptors (KORs)	21-5
21.2.4	Field Surveys	21-5
21.2.5	Receptor Evaluation and Impact Assessment.....	21-11
21.2.5.1	Potential Impacts Associated with the Onshore Site.....	21-11
21.2.5.2	Geographical Framework	21-11
21.2.5.3	Description of Effects.....	21-12
21.2.6	Assessment Justification.....	21-15
21.2.6.1	Survey Data.....	21-15
21.2.6.2	Mitigation	21-15
21.2.6.3	Consideration of Potential Limitations	21-15
21.3	Baseline Ornithological Conditions.....	21-16
21.3.1	Designated Sites within the Likely CSA of the Development.....	21-16
21.3.2	Breeding and Wintering Bird Atlas Records	21-18
21.3.3	National Biodiversity Data Centre Records	21-23
21.3.4	Irish Wetland Bird Survey Records	21-25
21.3.5	Rare and Protected Species Dataset	21-26
21.3.6	Field Survey Results	21-26

21.3.6.1	Chough.....	21-29
21.3.6.2	Cory's Shearwater.....	21-29
21.3.6.3	Dunlin	21-29
21.3.6.4	Golden Plover	21-30
21.3.6.5	Great Northern Diver	21-30
21.3.6.6	Hen Harrier.....	21-30
21.3.6.7	Kingfisher.....	21-30
21.3.6.8	Little Egret.....	21-30
21.3.6.9	Peregrine Falcon.....	21-31
21.3.6.10	Sandwich Tern	21-31
21.3.6.11	Bar-tailed Godwit.....	21-31
21.3.6.12	Black-headed Gull	21-31
21.3.6.13	Brent Goose	21-31
21.3.6.14	Cormorant	21-32
21.3.6.15	Curlew.....	21-32
21.3.6.16	Greenshank	21-32
21.3.6.17	Purple Sandpiper	21-32
21.3.6.18	Redshank.....	21-32
21.3.6.19	Ringed Plover	21-33
21.3.6.20	Sanderling.....	21-33
21.3.6.21	Shelduck.....	21-33
21.3.6.22	Turnstone	21-33
21.3.6.23	Common Snipe	21-33
21.3.6.24	Kestrel.....	21-34
21.3.6.25	Kittiwake	21-34
21.3.6.26	Oystercatcher.....	21-34
21.3.6.27	Razorbill.....	21-35
21.3.6.28	Buzzard	21-35
21.3.6.29	Sparrowhawk.....	21-35
21.3.7	Passerines (Red-listed)	21-35
21.4	Receptor Evaluation.....	21-35
21.4.1	Determination of Population Importance	21-35
21.4.1.1	Chough.....	21-36
21.4.1.2	Cory's Shearwater.....	21-36
21.4.1.3	Dunlin	21-36
21.4.1.4	Golden Plover	21-36
21.4.1.5	Great Northern Diver	21-37
21.4.1.6	Hen Harrier.....	21-37
21.4.1.7	Kingfisher.....	21-37
21.4.1.8	Little Egret.....	21-37
21.4.1.9	Peregrine Falcon.....	21-37
21.4.1.10	Sandwich Tern	21-38
21.4.1.11	Bar-tailed Godwit.....	21-38
21.4.1.12	Black-headed Gull	21-38
21.4.1.13	Brent Goose	21-38
21.4.1.14	Cormorant	21-38
21.4.1.15	Curlew.....	21-39
21.4.1.16	Greenshank	21-39
21.4.1.17	Purple Sandpiper	21-39
21.4.1.18	Redshank.....	21-39
21.4.1.19	Ringed Plover	21-40
21.4.1.20	Sanderling.....	21-40
21.4.1.21	Shelduck.....	21-40
21.4.1.22	Turnstone	21-40
21.4.1.23	Common Snipe	21-40
21.4.1.24	Kestrel.....	21-41
21.4.1.25	Kittiwake	21-41
21.4.1.26	Oystercatcher.....	21-41
21.4.1.27	Razorbill.....	21-41
21.4.1.28	Buzzard	21-42
21.4.1.29	Sparrowhawk.....	21-42

21.4.2	Identification of Key Ornithological Receptors	21-43
21.5	Potential Impacts	21-51
21.5.1	Do-Nothing Effect	21-51
21.5.2	Effects on Key Ornithological Receptors during Construction, Operation and Maintenance, and Decommissioning	21-51
21.5.2.1	Chough (All seasons)	21-53
21.5.2.2	Dunlin (All Seasons)	21-54
21.5.2.3	Hen Harrier (Winter)	21-56
21.5.2.4	Little Egret (All Seasons)	21-57
21.5.2.5	Peregrine (Wintering)	21-59
21.5.2.6	Sandwich Tern (Breeding)	21-60
21.5.2.7	Cormorant (All seasons)	21-61
21.5.2.8	Curlew (All seasons)	21-63
21.5.2.9	Ringed Plover (All seasons)	21-64
21.5.2.10	Turnstone (All seasons)	21-65
21.5.2.11	Common Snipe (Wintering)	21-66
21.5.2.12	Kestrel (All seasons)	21-68
21.5.2.13	Kittiwake (All seasons)	21-70
21.5.2.14	Oystercatcher (All seasons)	21-71
21.5.2.15	Sparrowhawk (Breeding)	21-72
21.5.3	Effects on Key Ornithological Receptors during Decommissioning	21-73
21.5.4	Effects on Designated Areas	21-75
21.6	Mitigation and Best Practice Measures	21-80
21.6.1	Design of the Onshore Site	21-80
21.6.2	Management of the Onshore Site Phases	21-80
21.6.2.1	Construction Phase	21-81
21.6.2.2	Operational and Maintenance Phase	21-81
21.6.2.3	Decommissioning Phase	21-81
21.7	Residual Effects	21-82
21.8	Cumulative Effects	21-82
21.8.1	Other Plans and Projects	21-83
21.8.1.1	Department of Agriculture, Food and the Marine Plans Considered in the Cumulative Impact Assessment	21-83
21.8.1.2	Projects Considered in the Cumulative Impact Assessment	21-83
21.8.2	Assessment of Cumulative Effects	21-83
21.9	Conclusion	21-84

22. LAND, SOILS AND GEOLOGY22-1

22.1	Introduction	22-1
22.1.1	Background and Objectives	22-1
22.1.2	Statement of Authority	22-1
22.1.3	Relevant Legislation	22-2
22.1.4	Relevant Guidance	22-2
22.2	Assessment Methodology	22-2
22.2.1	Desk Study	22-2
22.2.2	Baseline Monitoring and Site Investigations	22-3
22.2.3	Scoping and Consultation	22-3
22.2.4	Impact Assessment Methodology	22-4
22.2.5	Study Area	22-6
22.2.6	Consideration of Data Sources and Quality	22-7
22.3	Existing Environment	22-7
22.3.1	Onshore Site Description and Topography	22-7
22.3.1.1	Onshore Landfall Location	22-7
22.3.1.2	Onshore Grid Connection	22-7
22.3.1.3	Onshore Compensation Compound	22-8
22.3.2	Land and Land Use	22-8
22.3.3	Soils and Subsoils	22-9
22.3.3.1	Onshore Landfall Location	22-11
22.3.3.2	Onshore Grid Connection	22-13
22.3.3.3	Onshore Compensation Compound	22-16
22.3.4	Bedrock Geology	22-18
22.3.5	Geological Resource Importance	22-20

22.3.5.1	Onshore Landfall Location.....	22-20
22.3.5.2	Onshore Grid Connection.....	22-20
22.3.5.3	Onshore Compensation Compound.....	22-20
22.3.6	Geohazards	22-20
22.3.7	Soil Contamination.....	22-21
22.3.8	Geological Heritage Sites.....	22-21
22.3.9	Designated Sites and Protected Areas.....	22-21
22.3.10	Receptor Sensitivity and Importance.....	22-24
22.4	Characteristics of the Onshore Site	22-24
22.4.1	Onshore Landfall Location.....	22-24
22.4.2	Onshore Grid Connection.....	22-24
22.4.3	Onshore Compensation Compound	22-25
22.5	Likely Significant Effects and Associated Mitigation Measures	22-25
22.5.1	Do Nothing Scenario	22-25
22.5.2	Construction Phase - Likely Significant Effects and Mitigation Measures	22-25
22.5.2.1	Potential Effects on Land (Land-Take).....	22-25
22.5.2.2	Potential Effects from Peat, Soil, Subsoil and Bedrock Excavation	22-27
22.5.2.3	Potential Effects from Leakages and Spillages	22-29
22.5.2.4	Potential Effects from the Erosion of Exposed Soils and Subsoils During Construction Works	22-29
22.5.2.5	Potential Effects from the Erosion of Exposed Soils/Subsoils During Hedgerow and Tree Removal.....	22-30
22.5.2.6	Potential Effect on Designated Sites.....	22-31
22.5.3	Operation and Maintenance Phase - Likely Impacts and Mitigation Measures.....	22-32
22.5.3.1	Potential Effects due to Vehicle/Plant Use.....	22-32
22.5.3.2	Potential Effects Due to the Use of Oils in Transformers.....	22-32
22.5.4	Decommissioning Phase – Likely Significant Effects and Mitigation Measures.....	22-33
22.5.5	Risk of Major Accidents and Disasters.....	22-34
22.5.6	Human Health Effects	22-34
22.5.7	Cumulative Effects.....	22-34
22.6	Post Construction Monitoring.....	22-34
22.7	Conclusion.....	22-34

23. WATER 23-1

23.1	Introduction.....	23-1
23.1.1	Background and Objectives	23-1
23.1.2	Statement of Authority.....	23-1
23.1.3	Scoping and Consultation.....	23-2
23.1.4	Relevant Legislation.....	23-3
23.1.5	Relevant Guidance	23-3
23.2	Assessment Methodology.....	23-4
23.2.1	Desk Study.....	23-4
23.2.2	Baseline Monitoring and Site Investigations.....	23-4
23.2.3	Impact Assessment Methodology.....	23-5
23.2.4	Overview of Impact Assessment Process.....	23-7
23.2.5	Consideration of data sources and quality	23-8
23.2.6	Water Study Area	23-8
23.3	Receiving Environment	23-9
23.3.1	Onshore Site Description and Topography	23-9
23.3.1.1	Onshore Landfall Location.....	23-9
23.3.1.2	Onshore Grid Connection.....	23-9
23.3.1.3	Onshore Compensation Compound	23-9
23.3.2	Water Balance	23-10
23.3.3	Regional Hydrology.....	23-11
23.3.3.1	Onshore Landfall Location.....	23-11
23.3.3.2	Onshore Grid Connection.....	23-12
23.3.3.3	Onshore Compensation Compound.....	23-13
23.3.4	Surface Water Flows.....	23-16
23.3.5	Onshore Site Drainage	23-17
23.3.6	Summary Flood Risk Assessment	23-19
23.3.6.1	Onshore Landfall Location.....	23-19
23.3.6.2	Onshore Compensation Compound.....	23-19

23.3.6.3	Onshore Grid Connection.....	23-20
23.3.6.4	FRA Summary	23-20
23.3.7	Surface Water Quality	23-21
23.3.7.1	EPA Water Quality Monitoring.....	23-21
23.3.7.2	HES Water Quality Monitoring	23-21
23.3.8	Hydrogeology.....	23-25
23.3.8.1	Site-Specific Hydrogeology	23-25
23.3.9	Groundwater Hydrochemistry	23-28
23.3.10	Groundwater Vulnerability	23-28
23.3.11	Water Framework Directive Water Body Status & Objectives	23-31
23.3.11.1	Groundwater Body Status	23-31
23.3.11.2	Surface Water Body Status	23-31
23.3.12	Designated Sites and Habitats.....	23-33
23.3.12.1	Protected Areas.....	23-33
23.3.12.2	Wetlands.....	23-34
23.3.13	Water Resources	23-36
23.3.13.1	Groundwater Resources.....	23-36
23.3.13.2	Surface Water Resources.....	23-36
23.3.14	Receptor Sensitivity and Importance.....	23-38
23.4	Characteristics of the Onshore Site	23-38
23.4.1	Proposed Drainage Management	23-39
23.4.1.1	Proposed Surface Water Drainage Management at the Onshore Compensation Compound	23-39
23.4.1.2	Foulwater Management at the Onshore Compensation Compound	23-40
23.4.1.3	Water Supply at the Onshore Compensation Compound.....	23-40
23.5	Likely Significant Effects and Associated Mitigation Measures	23-41
23.5.1	Do Nothing Scenario	23-41
23.5.2	Construction Phase - Likely Significant Effects and Mitigation Measures	23-41
23.5.2.1	Potential Effects from Vegetation Clearance	23-41
23.5.2.2	Potential Effects from Earthworks Resulting in Suspended Solids Entrainment in Surface Waters.....	23-42
23.5.2.3	Potential Effects from Excavation Dewatering and Potential Effects on Surface Water Quality.....	23-48
23.5.2.4	Potential Effects on Groundwater Levels During Excavation Works	23-50
23.5.2.5	Potential Effects from the Release of Hydrocarbons during Construction and Storage	23-50
23.5.2.6	Potential Effects from the Release of Cement-Based Products.....	23-52
23.5.2.7	Potential Effects from Wastewater Disposal.....	23-54
23.5.2.8	Potential Effects from Morphological Changes to Surface Watercourses along the OGC	23-55
23.5.2.9	Potential Effects on Local Groundwater Wells	23-56
23.5.2.10	Potential Effects Associated with Surface Water Quality During Direction Drilling at Watercourse Crossings along the OGC	23-57
23.5.2.11	Potential Effects Due to Duct Installation in Peatland Areas.....	23-59
23.5.2.12	Potential Effects on Hydrologically Connected Designated Sites	23-61
23.5.2.13	Potential Effects on WFD Status/Objectives	23-63
23.5.2.14	Potential Effects on Wetlands	23-64
23.5.3	Operation and Maintenance Phase Likely Significant Effects and Mitigation Measures	23-65
23.5.3.1	Potential Effects Due to Progressive Replacement of Natural Surface with Lower Permeability Surfaces	23-65
23.5.3.2	Potential Effects on Surface Water Quality Due to Discharge From OCC.....	23-66
23.5.3.3	Potential Effects from Runoff Resulting in Contamination of Surface Waters During Maintenance Works	23-66
23.5.3.4	Potential Effects from the Release of Hydrocarbons	23-67
23.5.3.5	Potential Effects from Water Supply at OCC	23-68
23.5.3.6	Potential Effects on WFD Status/Objectives	23-69
23.5.4	Decommissioning Phase Likely Significant Effects and Mitigation Measures	23-69
23.5.5	Risk of Major Accidents and Disasters	23-70
23.5.6	Human Health Effects	23-70
23.5.7	Cumulative Effects.....	23-71

23.5.7.1	Cumulative Effects with Agriculture	23-71
23.5.7.2	Cumulative Effects with Forestry	23-71
23.5.7.3	Cumulative Effects with Other Development	23-72
23.5.8	Post Consent Monitoring.....	23-72
23.5.9	Conclusion	23-72

24. ONSHORE CULTURAL HERITAGE 24-1

24.1	Introduction.....	24-1
24.1.1	The Onshore Site.....	24-1
24.1.2	Statement of Authority.....	24-2
24.1.3	Relevant Guidance and Legislation	24-2
24.1.3.1	Guidance.....	24-2
24.1.3.2	Legislation	24-3
24.1.3.3	Granada Convention	24-3
24.1.3.4	Clare County Development Plan 2023-2029.....	24-4
24.1.4	Statutory Consultations	24-8
24.2	Assessment Methodology.....	24-8
24.2.1	Geographical Information Systems (GIS)	24-8
24.2.2	Desktop Assessment.....	24-9
24.2.2.1	Record of Monuments and Places, Sites and Monuments Record and National Monuments.....	24-9
24.2.2.2	Cartographic Sources and Aerial Photography	24-9
24.2.2.3	Topographical Files - National Museum of Ireland	24-9
24.2.2.4	Archaeological Inventory Series.....	24-10
24.2.2.5	Record of Protected Structures.....	24-10
24.2.2.6	Excavations Database.....	24-10
24.2.2.7	National Inventory of Architectural Heritage (NIAH)	24-10
24.2.2.8	Previous Assessments.....	24-10
24.2.3	Field Inspection.....	24-10
24.2.3.1	Limitations Associated with Fieldwork	24-11
24.2.4	Assessment of Likely Significant Effects	24-11
24.2.4.1	Types of Effect.....	24-11
24.2.5	Methodology for the assessment of effects on visual setting (indirect effects)	24-11
24.3	Existing Environment.....	24-12
24.3.1	Results of Field Inspection.....	24-12
24.3.2	Archaeological, Architectural and Cultural Heritage.....	24-12
24.3.2.1	UNESCO World Heritage Sites and those on Tentative List.....	24-13
24.3.2.2	National Monuments	24-13
24.3.2.3	Recorded Monuments	24-15
24.3.2.4	Previously Unrecorded Monuments.....	24-25
24.3.2.5	Excavations Database.....	24-25
24.3.2.6	Topographical Files of the National Museum of Ireland	24-25
24.3.2.7	Sub-Surface Archaeological Potential	24-26
24.3.2.8	Archaeological Landscapes.....	24-26
24.3.2.9	Architectural Conservation Areas	24-26
24.3.2.10	Protected Structures	24-26
24.3.2.11	NIAH Structures and Historic Gardens	24-29
24.3.2.12	Cartographic Evidence and Local Cultural Heritage	24-33
24.3.2.13	Townlands and administrative boundaries	24-42
24.4	Likely Significant Effects and Associated Mitigation Measures	24-43
24.4.1	Do Nothing Scenario	24-43
24.4.2	Construction Phase Potential Effects (Indirect).....	24-43
24.4.2.1	Features of Local Cultural Heritage Merit	24-43
24.4.3	Construction Phase Potential Effects (Direct)	24-43
24.4.3.1	UNESCO World Heritage Sites and those on Tentative List.....	24-44
24.4.3.2	National Monuments	24-44
24.4.3.3	Recorded Monuments	24-44
24.4.3.4	Sub-surface Archaeological Potential.....	24-45
24.4.3.5	Newly Recorded Monuments.....	24-46
24.4.3.6	Protected Structures	24-46
24.4.3.7	NIAH Structures and Historic Gardens	24-46
24.4.3.8	Features of Local Cultural Heritage Merit	24-46

24.4.4	Operation and Maintenance Phase Potential Effects (Indirect).....	24-47
24.4.4.1	UNESCO World Heritage Sites and those on Tentative List.....	24-47
24.4.4.2	National Monuments	24-47
24.4.4.3	Recorded Monuments	24-48
24.4.4.4	Newly Recorded Monuments.....	24-48
24.4.4.5	Sub-surface Archaeology	24-48
24.4.4.6	Protected Structures	24-48
24.4.4.7	NIAH Structures and Historic Gardens	24-49
24.5	Cumulative Effects	24-49
24.5.1	Cumulative Effects (Direct Effects – Construction stage)	24-49
24.5.1.1	Cumulative effects to UNESCO World Heritage sites, National Monuments in State Care, Recorded Monuments, NIAH and RPS.....	24-49
24.5.1.2	Cumulative effects on potential sub-surface archaeology	24-50
24.5.1.3	Cumulative Effects (Indirect Effects on setting – Construction Stage).....	24-50
24.5.1.4	Features of Local Cultural Heritage Merit	24-50
24.5.2	Cumulative Effects (Indirect Effects on Setting- Operation and Maintenance Stage)	24-50
24.5.2.1	UNESCO World Heritage Sites	24-51
24.5.2.2	National Monuments in State Care.....	24-51
24.5.2.3	Recorded Monuments	24-51
24.5.2.4	Protected Structures and NIAH.....	24-51
24.6	Decommissioning Phase	24-51
24.7	Conclusion.....	24-52

25. ONSHORE AIR QUALITY 25-1

25.1	Introduction.....	25-1
25.1.1	Statement of Authority.....	25-2
25.1.2	Relevant Guidance	25-3
25.2	Air Quality	25-3
25.2.1	Relevant Legislation.....	25-3
25.2.2	Air Quality Standards	25-4
25.2.2.1	Air Quality and Health.....	25-8
25.2.2.2	Clean Air Strategy for Ireland 2023.....	25-9
25.2.3	Methodology	25-11
25.2.3.1	Air Quality Zones.....	25-11
25.2.3.2	Air Quality Data Review	25-11
25.2.3.3	Dust.....	25-11
25.2.4	Baseline Air Quality	25-17
25.2.4.1	Sulphur Dioxide (SO ₂).....	25-17
25.2.4.2	Particulate Matter (PM ₁₀).....	25-17
25.2.4.3	Nitrogen Dioxide (NO ₂).....	25-18
25.2.4.4	Carbon Monoxide (CO).....	25-18
25.2.4.5	Ozone (O ₃).....	25-19
25.2.4.6	Dust.....	25-19
25.3	Likely Significant Effects and Associated Mitigation Measures	25-19
25.3.1	‘Do-Nothing Effect’	25-20
25.3.2	Construction Phase	25-20
25.3.2.1	Exhaust Emissions: Construction of the Onshore Site Infrastructure.....	25-20
25.3.2.2	Dust Emissions: Construction of the Onshore Site Infrastructure	25-21
25.3.3	Operation and Maintenance Phase	25-25
25.3.3.1	Exhaust Emissions	25-25
25.3.3.2	Dust Emissions.....	25-26
25.3.3.3	Air Quality	25-27
25.3.3.4	Human Health.....	25-27
25.3.4	Decommissioning Phase.....	25-28
25.3.4.1	Exhaust Emissions	25-28
25.3.4.2	Dust Emissions.....	25-29
25.3.5	Cumulative Assessment	25-32
25.3.5.1	Construction Phase.....	25-35
25.3.5.2	Operation and Maintenance Phase.....	25-36
25.3.5.3	Decommissioning Phase	25-36

25.4	Conclusion	25-36
------	------------------	-------

26. **ONSHORE NOISE AND VIBRATION** 26-1

26.1	Introduction	26-1
26.1.1	Statement of Authority	26-1
26.2	Legislation, Policy and Guidelines	26-2
26.2.1	Legislation	26-2
26.2.2	Policy	26-2
26.2.3	Guidance	26-2
26.3	Consultation	26-3
26.4	Assessment Methodology	26-4
26.4.1	Fundamentals of Acoustics	26-4
26.4.2	Assessment Criteria	26-6
26.4.2.1	Construction Phase Noise	26-6
26.4.2.1.1	Onshore Landfall Location and Onshore Compensation Compound – Fixed Site	26-6
26.4.2.1.2	Onshore Grid Connection- Linear Works	26-7
26.4.2.1.3	Construction Vehicular Activity- Noise	26-9
26.4.2.2	Construction Phase – Vibration	26-9
26.4.2.2.1	Cosmetic Damage to Buildings	26-9
26.4.2.2.2	Human Perception	26-10
26.4.2.3	Operational and Maintenance (O&M) Phase – Noise	26-11
26.4.2.3.1	BS 8233	26-11
26.4.2.3.2	EPA NG4	26-13
26.4.2.4	Operation and Maintenance (O&M) Phase – Vibration	26-14
26.4.3	Study Area	26-14
26.4.3.1	Construction Noise Study Areas	26-14
26.4.3.2	Construction Vibration Study Areas	26-15
26.4.3.3	Operational Study Area	26-15
26.5	Existing Environment	26-15
26.5.1	Baseline Noise Survey Measurement Locations	26-16
26.5.1.1	Survey Periods	26-19
26.5.1.2	Personnel and Instrumentation	26-19
26.5.1.3	Measurement Parameters	26-19
26.5.1.4	Survey Results	26-20
26.5.1.4.1	Attended Survey Results	26-20
26.5.1.4.2	Unattended Survey Results	26-22
26.5.1.5	Summary of Construction Noise Thresholds	26-23
26.5.1.6	Summary of Onshore Compensation Compound Operational Noise Criterion	26-24
26.5.2	Baseline Vibration	26-24
26.6	Likely Significant Effects and Associated Mitigation Measures	26-24
26.6.1	Do Nothing Scenario	26-24
26.6.2	Construction Phase Noise	26-24
26.6.2.1	Onshore Landfall Location and Onshore Compensation Compound	26-24
26.6.2.1.1	Onshore Landfall Location Construction	26-24
26.6.2.1.2	Onshore Compensation Compound Construction	26-26
26.6.2.2	OGC from OLL to OCC to the 220kV Moneypoint Substation	26-30
26.6.2.2.1	HDD Works	26-32
26.6.2.2.2	Open Cut Trenching Works	26-34
26.6.2.2.3	Connection at Moneypoint 220kV Substation	26-35
26.6.2.3	Temporary Construction Compound	26-35
26.6.2.4	Construction Vehicular Activity	26-36
26.6.3	Construction Phase Vibration	26-36
26.6.3.1	HDD Vibration Assessment	26-36
26.6.3.2	Mechanical Excavation Vibration Assessment	26-37
26.6.4	Operation and Maintenance Phase	26-38
26.6.5	Decommissioning Phase	26-40
26.6.6	Summary of Potential Significant Effects	26-41
26.7	Mitigation Measures	26-44
26.7.1	Construction Phase	26-44
26.7.1.1	Evening and Night-Time Period Noise Mitigation Measures	26-44
26.7.1.1.1	Selection of Quiet Plant	26-44

26.7.1.1.2	Noise Control at Source	26-44
26.7.1.1.3	Screening	26-45
26.7.1.1.4	Liaison with the Public.....	26-45
26.7.1.1.5	Reduction in Number of Plant Items Operating.....	26-47
26.7.1.1.6	Noise Monitoring.....	26-47
26.7.1.2	Vibration Mitigation Measures.....	26-47
26.7.1.2.1	Vibration Monitoring	26-48
26.7.2	Operation and Maintenance Phase	26-48
26.7.2.1	Fixed Plant at the OCC.....	26-48
26.7.3	Decommissioning Phase.....	26-49
26.8	Residual Effects	26-49
26.8.1	Construction Phase	26-49
26.8.2	Operation and Maintenance Phase	26-49
26.8.3	Decommissioning Phase.....	26-49
26.9	Cumulative Effects	26-49
26.9.1	Cumulative Construction Impacts	26-51
26.9.2	Cumulative Operational Impacts	26-51
26.10	Conclusion.....	26-52

27. LANDSCAPE AND VISUAL IMPACT ASSESSMENT27-1

27.1	Introduction.....	27-1
27.1.1	Statement of Authority.....	27-1
27.2	Legislation, Policy and Guidelines.....	27-1
27.3	Consultation.....	27-2
27.4	Assessment Methodology.....	27-2
27.4.1	Outline Methodology.....	27-2
27.4.2	Study Area	27-4
27.4.3	Assessment Criteria.....	27-5
27.4.3.1	Landscape Sensitivity	27-5
27.4.3.2	Landscape Impact Magnitude	27-7
27.4.3.3	Visual Receptor Sensitivity	27-8
27.4.3.4	Representative Viewpoint Selection	27-10
27.4.3.5	Visual Impact Magnitude.....	27-12
27.4.3.6	Significance of Landscape and Visual Effects	27-12
27.4.3.7	Quality and Timescale of Effects	27-14
27.5	Baseline Conditions.....	27-14
27.5.1	Onshore Landfall Location and Onshore Grid Connection.....	27-15
27.5.2	Onshore Compensation Compound	27-16
27.5.3	Connection Point	27-20
27.6	Likely Significant Effects and Associated Mitigation Measures	27-21
27.6.1	Do Nothing Scenario	27-21
27.6.2	Construction Phase Landscape and Visual Effects.....	27-21
27.6.2.1	Onshore Landfall Location and Onshore Grid Connection	27-22
27.6.2.2	Onshore Compensation Compound.....	27-23
27.6.3	Operation and Maintenance Phase Landscape Effects	27-24
27.6.3.1	Onshore Landfall Location and Onshore Grid Connection	27-24
27.6.3.2	Onshore Compensation Compound.....	27-24
27.6.4	Operation and Maintenance Phase Visual Effects	27-25
27.6.4.1	Zone of Theoretical Visibility (ZTV) Maps	27-26
27.6.4.2	Representative Viewpoints.....	27-28
27.6.4.3	Visual Impact Assessment at representative Viewpoints.....	27-29
27.6.5	Decommissioning Phase.....	27-36
27.7	Cumulative Effects	27-36
27.7.1	Cumulative Effects OGC	27-36
27.7.2	Cumulative Effects OCC	27-37
27.7.3	Cumulative Effects Summary.....	27-37
27.8	Conclusion.....	27-37

28. MATERIAL ASSETS 28-1

28.1	Introduction.....	28-1
28.1.1	Statement of Authority.....	28-1
28.2	Methodology and Guidance.....	28-2

28.3	Scoping and Consultation	28-3
28.4	Baseline Environment	28-5
28.4.1	The Onshore Site	28-5
28.4.1.1	Onshore Landfall Location	28-5
28.4.1.2	Onshore Grid Connection	28-5
28.4.1.3	Onshore Compensation Compound	28-6
28.4.2	Existing Services	28-6
28.4.2.1	Electricity	28-6
28.4.2.2	Telecommunications	28-7
28.4.2.3	Gas Network	28-7
28.4.2.4	Water Supply and Wastewater Infrastructure	28-7
28.4.3	Waste Management	28-7
28.4.4	Electromagnetic Fields (EMF)	28-8
28.4.5	ESB Moneypoint Power Generating Station, Co. Clare	28-8
28.5	Likely Significant Effects and Associated Mitigation Measures	28-8
28.5.1	'Do-Nothing' Scenario	28-8
28.5.2	Construction Phase	28-9
28.5.2.1	Existing Services	28-9
28.5.2.2	Waste Management	28-10
28.5.3	Operation and Maintenance Phase	28-11
28.5.4	Decommissioning Phase	28-11
28.5.5	Cumulative Impact Assessment	28-12
28.5.6	Conclusion	28-12

29. TRAFFIC AND TRANSPORTATION 29-1

29.1	Introduction	29-1
29.1.1	Background and Objectives	29-1
29.1.2	Statement of Authority	29-1
29.1.2.1	Guidance on Assessment of Effects	29-2
29.1.2.2	Scoping and Consultation	29-2
29.1.3	Method of Assessment	29-8
29.2	Receiving Environment	29-9
29.2.1	Site Location	29-9
29.2.2	Road Network for the Onshore Site	29-9
29.2.3	Existing and Future Traffic Volumes	29-11
29.2.4	Base Year 2024 Traffic Flows	29-15
29.2.5	Background Traffic Volumes for the Assumed Construction Year 2030	29-17
29.3	Proposed Permanent Changes to Road Infrastructure	29-19
29.3.1	Proposed access junction off L-6150 for OCC	29-19
29.3.2	Proposed passing bays on L-6150	29-19
29.4	Construction and Operation and Maintenance Phase Traffic	29-20
29.4.1	Construction Phase Traffic Generation - OGC	29-20
29.4.2	Construction Phase Traffic Generation - OCC	29-27
29.4.3	Operation and Maintenance Phase Traffic	29-28
29.4.4	Trip Generation During Decommissioning Phase	29-28
29.5	Local Traffic Impacts during OGC Construction	29-29
29.5.1	Road Widths and Proposed Traffic Management Measures	29-29
29.5.2	Impacts on Traffic Flows During Construction of Onshore Site	29-45
29.5.3	Traffic Impacts of O&M Port Facility in Rosaveel, County Galway	29-47
29.5.4	Provision for Sustainable Modes of Travel	29-48
29.5.4.1	Walking and Cycling	29-48
29.5.4.2	Public Transport	29-48
29.5.5	Likely and Significant Effects and Associated Mitigation Measures	29-49
29.5.5.1	'Do-Nothing' Scenario	29-49
29.5.5.2	Construction Phase Impacts	29-49
29.5.5.3	Residual Effects	29-52
29.5.5.4	Operation and Maintenance Phase Impacts	29-52
29.5.5.5	Decommissioning Phase	29-52
29.6	Cumulative Effects	29-53
29.6.1	Projects within 500m of the Onshore Grid Connection	29-53
29.6.2	Large Infrastructural Development within 50km buffer	29-54
29.7	Conclusion	29-55

30.	CLIMATE.....	30-1
30.1	Introduction.....	30-1
30.1.1	Background.....	30-1
30.1.2	Chapter Structure and Climate Study Areas.....	30-2
30.1.2.1	Baseline Environment of the Project.....	30-3
30.1.2.2	Carbon Assessment.....	30-3
30.1.2.3	Climate Change Risk Assessment.....	30-4
30.1.3	Statement of Authority.....	30-4
30.1.4	Scoping and Consultation.....	30-5
30.2	Climate Legislation, Policy, and Guidance.....	30-6
30.2.1	International Greenhouse Gas Emission and Climate Targets.....	30-7
30.2.2	National Greenhouse Gas Emission and Climate Targets.....	30-10
30.2.3	Local Greenhouse Gas Emission and Climate Targets.....	30-11
	Galway Local Authority Climate Action Plan 2024-2029.....	30-12
	Clare Local Authority Climate Action Plan 2024-2029.....	30-12
30.2.4	Relevant Guidance.....	30-12
30.3	Baseline Environment.....	30-13
30.3.1	Current Baseline Environment.....	30-13
30.3.1.1	Data Sources.....	30-13
30.3.1.2	Physical Environment.....	30-14
30.3.1.3	Biological and Socio-Economic Environment.....	30-23
30.3.1.4	Existing Greenhouse Gas Emissions.....	30-28
30.3.2	Future Baseline Environment.....	30-28
30.3.2.1	Data sources.....	30-29
30.3.2.2	Physical environment.....	30-30
30.3.2.3	Biological and Socio-Economic Environment.....	30-34
30.3.2.4	Greenhouse Gas Emissions Projections.....	30-39
30.4	Carbon Assessment.....	30-40
30.4.1	Biogenic Carbon Assessment.....	30-40
30.4.1.1	Offshore Site.....	30-40
30.4.1.2	Onshore Site.....	30-45
30.4.2	Non-Biogenic Carbon Assessment.....	30-48
30.4.2.1	Background.....	30-48
30.4.2.2	Methodology.....	30-49
30.4.2.3	Carbon Losses – Emissions Inventory.....	30-52
30.4.2.4	Carbon Savings.....	30-60
30.4.3	Summary.....	30-62
30.5	Climate Change Risk Assessment.....	30-64
30.5.1	Climate Resilience.....	30-64
30.5.1.1	Introduction.....	30-64
30.5.1.2	Assessment Methodology.....	30-64
30.5.1.3	Assessment of Climate Resilience.....	30-74
30.5.2	In-Combination Climate Impact Assessment.....	30-80
30.5.2.1	Assessment Methodology.....	30-80
30.5.2.2	ICCI assessment.....	30-82
30.6	Likely Significant Effects and Associated Mitigation Measures.....	30-95
30.6.1	‘Do-Nothing’ Scenario.....	30-95
30.6.2	Construction Phase.....	30-95
30.6.2.1	Greenhouse Gas Emissions.....	30-96
30.6.3	Operation and Maintenance Phase.....	30-98
30.6.3.1	Greenhouse Gas Emissions.....	30-98
30.6.4	Decommissioning Phase.....	30-101
30.7	Cumulative Assessment.....	30-102
30.7.1	Construction Phase.....	30-106
30.7.2	Operation and Maintenance Phase.....	30-107
30.7.3	Decommissioning Phase.....	30-107
30.8	Summary.....	30-108

31. MAJOR ACCIDENTS AND NATURAL DISASTERS..... 31-1

31.1	Introduction.....	31-1
31.1.1	Statement of Authority.....	31-3
31.2	Assessment Methodology.....	31-3
31.2.1	General	31-4
31.2.2	Legislative Context.....	31-4
31.2.2.1	Legislation	31-4
31.2.2.2	Guidance Documents	31-5
31.2.3	Categorisation of the Baseline Environment	31-5
31.2.4	Impact Assessment Methodology.....	31-5
31.2.4.1	Introduction	31-5
31.2.4.2	Site Specific Risk Assessment Methodology	31-6
31.3	Baseline Conditions.....	31-11
31.3.1	Offshore Site	31-11
31.3.2	Onshore Site	31-16
31.3.2.1	Location and Event Specific Risks in Co. Clare	31-18
31.3.2.2	Other Risks.....	31-21
31.4	Risk Assessment	31-25
31.4.1	Likely Significant Effects	31-25
31.4.1.1	Do-Nothing Scenario	31-25
31.4.1.2	Identification of Effects During Construction.....	31-25
31.4.1.3	Identification of Effect During Operation and Maintenance	31-27
31.4.1.4	Identification of Effect During Decommissioning	31-30
31.4.1.5	Assessment of Effects – Summary	31-32
31.4.1.6	Severe Weather during Construction, Operation and Maintenance, and Decommissioning (B1, P1,).....	31-36
31.4.1.7	Fire/Explosion during Construction, Operation and Decommissioning (F1)	31-36
31.4.2	Mitigation Measures.....	31-36
31.4.2.1	Mitigation – Severe Weather during Construction and Decommissioning	31-36
31.4.2.2	Mitigation – Fire/Explosion during Construction.....	31-37
31.4.3	Residual Effects.....	31-37
31.4.4	Monitoring.....	31-37
31.4.4.1	Monitoring During Construction	31-37
31.4.4.2	Monitoring During Operation and Maintenance	31-37
31.4.4.3	Monitoring During Decommissioning.....	31-38
31.4.5	Cumulative and In Combination Effects	31-38
31.5	Conclusion.....	31-38

32. INTERACTIONS 32-1

32.1	Introduction.....	32-1
32.1.1	Statement of Authority.....	32-2
32.2	Impact Interactions - Offshore.....	32-5
32.2.1	Population and Human Health.....	32-5
32.2.2	Marine Physical and Coastal Processes	32-7
32.2.3	Water and Sediment Quality	32-8
32.2.4	Benthic Ecology	32-10
32.2.5	Fish and Shellfish Ecology	32-10
32.2.6	Marine Ornithology.....	32-11
32.2.7	Marine Mammals	32-11
32.2.8	Commercial Fisheries	32-12
32.2.9	Shipping and Navigation.....	32-12
32.2.10	SLVIA.....	32-13
32.2.11	Other Users of the Marine Environment.....	32-13
32.3	Impact Interactions - Onshore.....	32-13
32.3.1	Terrestrial Biodiversity.....	32-13
32.3.2	Terrestrial Ornithology.....	32-14
32.3.3	Land, Soils and Geology.....	32-15
32.3.4	Archaeology and Cultural Heritage	32-15
32.3.5	Onshore Air Quality	32-16
32.3.6	Traffic and Transport	32-16
32.3.7	Vulnerability to Major Accidents and Natural Disasters.....	32-16

32.4	Project Interactions.....	32-17
32.4.1	SLVIA and Archaeology and Cultural Heritage	32-17
32.4.2	Benthic Ecology and Terrestrial Biodiversity	32-17
32.4.3	Marine Ornithology and Terrestrial Ornithology.....	32-17
32.4.4	Water and Water and Sediment Quality	32-17
32.4.5	Offshore Air Quality and Airborne Noise and Onshore Air Quality.....	32-17
32.4.6	Offshore Air Quality and Airborne Noise and Onshore Noise.....	32-18
32.5	Mitigation and Residual Impacts.....	32-18

33. SCHEDULE OF MITIGATION AND MONITORING PROPOSALS..... 33-1

33.1	Offshore Schedule of Mitigation Measures.....	33-2
33.2	Onshore Schedule Mitigation Measures	33-55
33.3	Onshore Monitoring Measures	33-106
33.4	Project Schedule of Mitigation Measures	33-117
33.5	Project Monitoring Measures	33-128

34. NATURE POSITIVE MEASURES 34-1

34.1	Introduction.....	34-2
34.2	Nature Positive Effects of the Project - Offshore site.....	34-2
34.3	Latest evidence from the PrePARED project	34-6
34.3.1	Applicability to Offshore Site.....	34-6
34.4	Nature Positive Effects of the Project - Onshore Site.....	34-7
34.5	Conclusion.....	34-8