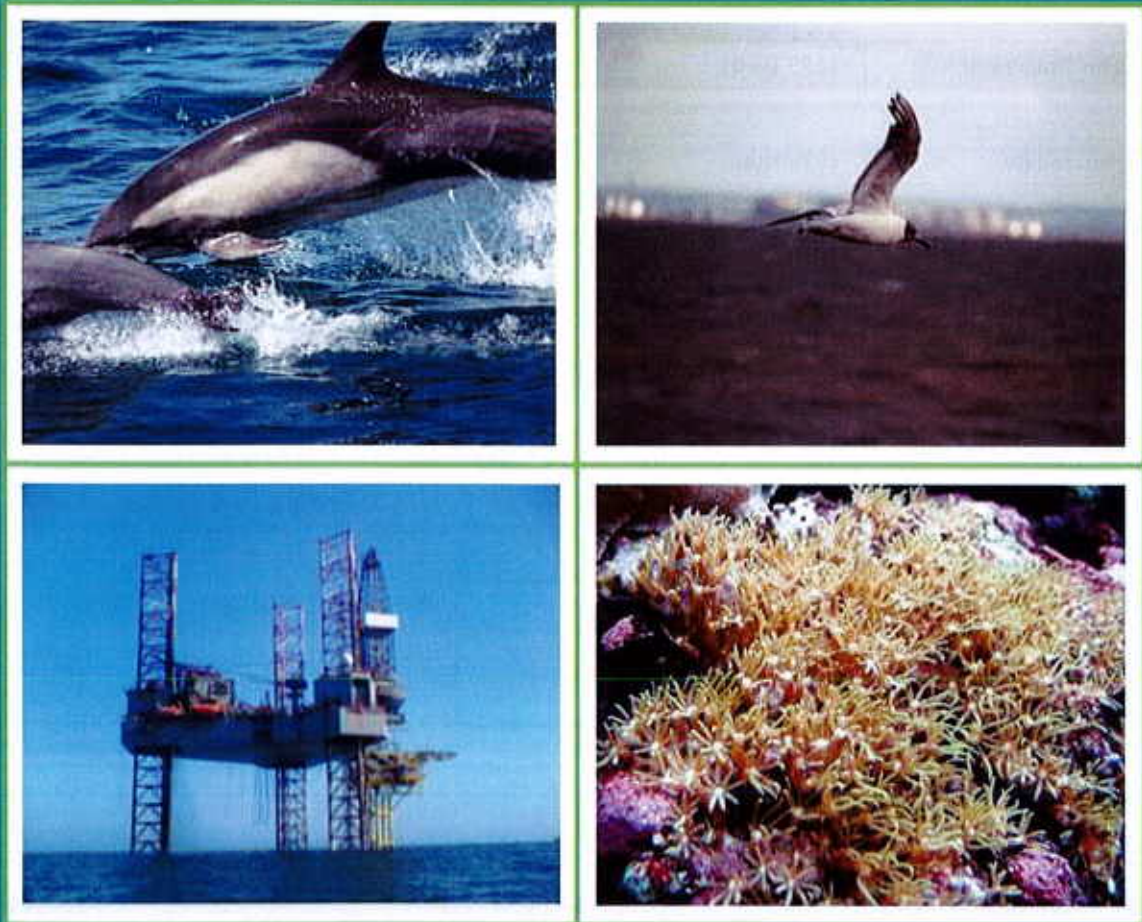


Colter (98/11-E) Exploration Well EIA Scoping Report



Doc Ref: P1179-04-01

Document Control Page

Client:	Corallian Energy Limited
---------	--------------------------

Report Title:	Colter (98/11-E) Exploration Well: EIA Scoping Report
---------------	---

Date:	September 2017
-------	----------------

Orbis Document Ref:	P1179-04-01
---------------------	-------------

Prepared By:	Fay Dobson Orbis Energy Limited 71- 75 Shelton Street Covent Garden London WC2H 9JQ E-mail: info@orbisltd.com www.orbisltd.com
--------------	--

Revision Record:					
DATE	REV NO.	DESCRIPTION	PREPARED	CHECKED	APPROVED
18/09/17	D00	Draft for Client Review	FD / SB	JG	-
27/09/17	F01	Final for Issue	FD	JG	DO'D

Table of Contents

Abbreviations	v
1 Introduction	1
1.1 Project Background	1
1.2 The Applicant	1
1.3 Objective of the Scoping Report	1
2 Regulatory and Policy Framework	4
2.1 EIA Regulations	4
2.2 The Habitats Regulations	4
2.3 Other Key Regulations	5
2.4 Marine Planning	5
2.5 Dorset Coast Strategy	6
3 Proposed Drilling Operations	7
3.1 Colter Prospect	7
3.2 Well Location	7
3.3 Schedule	7
3.4 MODU and Support Operations	7
3.5 Well Construction and Design	8
3.6 Check Shot Survey	10
3.7 Well Abandonment	10
3.8 Emissions, Discharges and Waste	10
4 Environmental Baseline	12
4.1 Introduction	12
4.2 Habitat Assessment and Environmental Baseline Survey	12
4.3 Physical Environment	12
4.4 Biodiversity	14
4.5 Marine and Coastal Protected Areas	16
4.6 Landscape and Seascape	21
4.7 Human Environment	21
5 Environmental Impact Assessment Methodology	23
5.1 Planned Events	23
5.2 Accidental Events	25
6 Potentially Significant Environmental Impacts	27
6.1 Physical Presence	27
6.2 Landscape, Seascape and Visual Impact	27
6.3 Seabed Disturbance	32
6.4 Underwater Noise	33

Colter (98/11-E) Exploration Well: EIA Scoping Report

6.5	Atmospheric Emissions	34
6.6	Marine Discharges	34
6.7	Accidental Hydrocarbon Releases	35
6.8	In-combination and Cumulative Impacts	35
6.9	Transboundary Impacts	35
7	Next Steps	36
8	References	37
	Appendix A: Preliminary Consultation Responses	41
	Appendix B: EIA Scoping Consultees	44
	Appendix C: Sites of Special Scientific Interest (SSSIs)	45
	Appendix D: LSVIA Methodology	49
	Appendix E: LSVIA Figures	59

Abbreviations

%	Per cent
AA	Appropriate Assessment
AONB	Area of Outstanding Natural Beauty
BOP	Blowout Preventer
BSL	Benthic Solutions Limited
C-SCOPE	Combining Sea and Coastal Planning in Europe
CH ₄	Methane
CHARM	Chemical Hazard Assessment and Risk Management
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
Corallian	Corallian Energy Limited
Corfe	Corfe Energy Limited
dB (peak-peak) re 1 µPa at 1 m	Decibel value peak-to-peak relative to one micropascal at a distance of one metre
DCLG	Department for Communities and Local Government
DCS	Dorset Coast Strategy
DECC	Department for Energy and Climate Change
DEFRA	Department for Environment, Food & Rural Affairs
DREAM	Dose-related Risk and Effects Assessment Model
DTI	Department for Trade and Industry
DTM	Digital Terrain Model
EBS	Environmental Baseline Survey
ED50	European Datum 1950
EIA	Environmental Impact Assessment
ELC	European Landscape Convention
ERRV	Emergency Rescue and Recovery Vessel
ES	Environmental Statement
GLVIA	Guidelines for Landscape and Visual Impact Assessment
HRA	Habitats Regulations Assessment
HSC	Historic Seascape Characterisation
Hz	Hertz
IEMA	Institute of Environmental Management and Assessment
JV	joint venture

Colter (98/11-E) Exploration Well: EIA Scoping Report

kg	Kilogram
KHz	Kilohertz
km	Kilometre
km ²	Square Kilometre
LAT	Lowest Astronomical Tide
LI	Landscape Institute
LSCA	Landscape and Seascape Character Assessment
LSVIA	Landscape, Seascape and Visual Impact Assessment
m	Metre
m ²	Square Metre
m ³	Cubic Metre
MCA	Marine Character Area
MCZ	Marine Conservation Zone
MEI	Major Environmental Incident
MESH	Mapping European Seabed Habitats
MMO	Marine Management Organisation
MODU	Mobile Offshore Drilling Unit
MPS	Marine Policy Statement
NCA	National Character Areas
NHPP	National Heritage Protection Plan
NO ₂	Nitrous Oxide
NO _x	Oxides of Nitrogen
NRA	Navigational Risk Assessment
OGA	Oil and Gas Authority
OPEP	Oil Pollution and Emergency Plan
OPRED	Offshore Petroleum Regulator for Environment and Decommissioning
Orbis	Orbis Energy Limited
OWF	Offshore Wind Farm
pSPA	Potential Special Protection Area
SAC	Special Area of Conservation
SCT	Seascape Character Type
SEA	Strategic Environmental Assessment
SO ₂	Sulphur Dioxide
SOSI	Sea Seabird Oil Sensitivity Index
SPA	Special Protection Area

Colter (98/11-E) Exploration Well: EIA Scoping Report

SSSI	Site of Special Scientific Interest
VOC	Volatile Organic Compound
UK	United Kingdom
UK-APIS	UK Air Pollution Information System
UKCS	United Kingdom Continental Shelf
UTM	Universal Transverse Mercator
WBM	Water-Based Mud
WHS	World Heritage Site
ZTV	Zone of Theoretical Visibility

1 Introduction

1.1 Project Background

Corallian Energy Limited (hereafter referred to as 'Corallian') and their joint venture (JV) partner, Corfe Energy Limited (hereafter referred to as 'Corfe'), are planning to drill an offshore oil exploration / appraisal well in Seaward Production Licence P1918, located within United Kingdom Continental Shelf (UKCS) Block 98/11, approximately 6 kilometres (km) east-northeast from Studland, on the Dorset coast (Figure 1.1). This location is in territorial waters (defined as waters extending seaward for 12 nautical miles (approximately 22 km) from the low water limit).

The proposed well (numbered 98/11-E) will be a vertical well targeting the Colter prospect, located to the south of the Wytch Farm oilfield. The prospect was initially targeted in 1983 by the 98/11-1 well, and again in 1986, when the 98/11-3 well encountered oil in the Sherwood Sandstone.

The 98/11-E well will be drilled from a Mobile Offshore Drilling Unit (MODU), with operations planned to commence sometime in early 2018, subject to regulatory consent and rig availability. It is anticipated that the MODU will be on location for up to 45 days. The well will not be flow tested. At the end of the proposed operations, the well will be plugged and abandoned. Wells 98/11-1 and 98/11-3 were both located within 1.5 km of the proposed 98/11-E location, and both were drilled using MODUs.

The 98/11-E well is located within the Solent and Dorset Coast potential Special Protection Area (pSPA), proposed to protect important foraging areas used by seabirds colonies from within adjacent, already classified Special Protection Areas (SPAs). Given the sensitivity of the area and the well's proximity to the coast, an Environmental Statement (ES) will be submitted to the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) in advance of the proposed drilling operations for approval under The Offshore Petroleum Production and Pipelines (Assessment of Environmental Effects) Regulations 1999 (as amended). The ES will document the findings of the Environmental Impact Assessment (EIA) undertaken to determine whether the project is likely to have any significant effects on the environment.

This document is the EIA Scoping Report for the 98/11-E well which has been produced at an early stage in the project planning and design process. It sets out the proposed scope and content of the EIA and the method by which it is intended to be carried out. The report has been prepared by Orbis Energy Limited (hereafter referred to as 'Orbis') on behalf of Corallian, with assistance from Nicholas Pearson Associates (a Landscape Institute Registered Practice).

1.2 The Applicant

Corallian is a privately owned UK oil and gas exploration and production company, incorporated in October 2015. The company's core focus is on high quality exploration and appraisal assets in UKCS waters.

Corallian is the operator and holds 60% equity in Seaward Production Licence P1918, which grants Corallian the exclusive rights to "search, bore for and get petroleum" within the boundaries of the licence illustrated in Figure 1.1. Corfe holds the remaining 40% interest in the licence.

Under The Offshore Petroleum Licensing (Offshore Safety Directive) Regulations 2015, the JV partners propose to appoint a third party well operator to undertake the 98/11-E well operations. This appointment will be subject to approval by the Oil and Gas Authority (OGA).

1.3 Objective of the Scoping Report

This EIA scoping report has been prepared to invite early input from stakeholders in the identification of key issues, areas of concern and additional environmental data that may be available to inform the EIA process for the 98/11-E well.

The main objectives of the report are to:

- Summarise the regulatory and policy framework that is relevant to the project (Section 2);
- Provide a summary of the proposed drilling operations (Section 3);

Corallian Energy	Doc Ref: Orbis P1179-04-01 Rev F01	Page No: 1
------------------	------------------------------------	------------

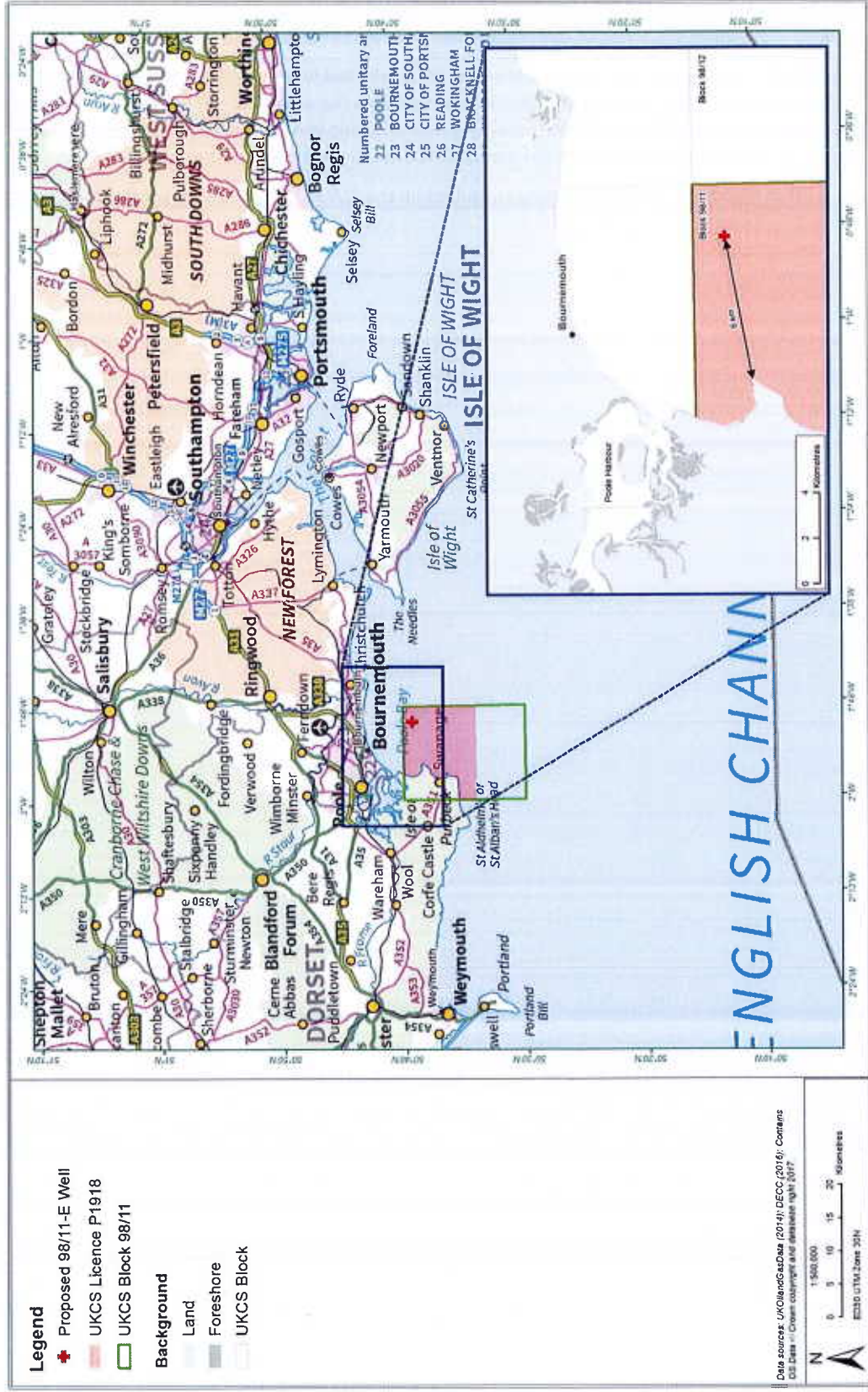
Colter (98/11-E) Exploration Well: EIA Scoping Report

- Present an overview of the environment in the project area (Section 4);
- Outline the assessment methodology to be used for the EIA (Section 5);
- Outline the scope of each of the topic specific ES assessment chapters (Section 6).

Of note, in late 2016, preliminary consultations were held with a number of stakeholders who would be involved in the permitting and consents process for the proposed 98/11-E well. The organisations contacted and a summary of the issues raised are provided in Appendix A. Where relevant, these issues have been taken into consideration during the early planning stage of the project.

A list of organisations who are being consulted on this EIA Scoping Report is presented in Appendix B.

Figure 1.1. Proposed Location of the 98/11-E Well



Data sources: UKOilandGasData (2014); DECC (2016); Contains OS Data © Crown copyright and database right 2017

2 Regulatory and Policy Framework

The Petroleum Act 1998 establishes the regulatory regime which applies to oil and gas exploration and production in the UK. The primary enabling legislation designed to manage the potential environmental impacts of the industry is then enforced under this Act.

2.1 EIA Regulations

The EIA Directive, Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment, as amended in 1997, 2003 and 2009, codified in Directive 2011/92/EU and further amended by Directive 2014/52/EU of 16 April 2014, is designed to ensure that projects likely to have significant effects on the environment are subject to a comprehensive assessment of environmental effects prior to consent being given.

The EIA Directive requirements were implemented in relation to offshore hydrocarbon related projects on the UKCS through the Offshore Petroleum Production and Pipelines (Assessment of Environmental Effects) Regulations 1999 (as amended¹). The Offshore Petroleum Production and Pipe-lines (Environmental Impact Assessment and other Miscellaneous Provisions) (Amendment) Regulations 2017 transpose the requirements of Directive 2014/52/EU and came into force on 16th May 2017.

Under these regulations, applications for EIA Directions that an ES need not be prepared are normally submitted for projects such as this, where consent is sought for the deep drilling of a well or borehole for the purpose of, or in connection with the getting or storage of petroleum. However, an ES should be prepared if it is considered possible that a project could have a significant effect given the sensitive nature of the receiving environment. As the proposed 98/11-E well is located approximately 6 km from the coast, is within a pSPA and lies in close proximity to a number other designated sites for nature conservation (Section 4.5), Corallian proposes to submit an ES to OPRED for approval.

2.2 The Habitats Regulations

The Conservation of Habitats and Species Regulations (2010) (as amended) consolidate all of the various amendments made to the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) in England and Wales (hereafter referred to as the 'Habitats Regulations'). The Habitats Regulations transpose the requirements of the EU Habitats Directive (Council Directive 92/43/EEC) and apply in inshore waters (out to 12 nautical miles from the baseline). The provisions of the Birds Directive are largely implemented in the inshore waters of England and Wales through the Wildlife & Countryside Act 1981 (as amended), as well as other legislation related to the uses of land and sea including the Conservation (Natural Habitats, &c.) Regulations 2010 (as amended) (JNCC, 2015a; 2017d).

In accordance with the Habitats and Wild Birds Directives, competent authorities must undertake a formal assessment of the implications of new plans or projects that may have an effect on the designated interest features of European Sites before deciding whether to permit or authorise a plan or project. This assessment comprises several distinct stages, which are conveniently and collectively described as a 'Habitats Regulations Assessment' (HRA). For all plans and projects that are not wholly directly connected with, or necessary to, the conservation management of the site's qualifying features, this will include formal screening for any likely significant effects (either alone or in combination with other plans or projects). Where these effects cannot be excluded, assessing them in more detail through an appropriate assessment (AA) is required to reach a conclusion as to whether an adverse effect on the integrity of the site can be ruled out.

As the proposed 98/11-E well is located within a pSPA and lies in close proximity to a number of other European Sites (refer to Section 4.5), Corallian will ensure sufficient information is provided within the ES to enable the competent authority (OPRED) to undertake a HRA to satisfy the requirements of the Habitats and Wild Birds Directives.

¹ Amending instruments include the Offshore Petroleum Production and Pipe-lines (Assessment of Environmental Effects) (Amendment) Regulations 2007, the Pollution Prevention and Control (Fees) (Miscellaneous Amendments and Other Provisions) Regulations 2015 (Article 8) and the Energy (Transfer of Functions, Consequential Amendments and Revocation) Regulations 2016.

2.3 Other Key Regulations

Other key regulations, pertinent to the project include:

- Crown Estate Act 1961;
- Energy Act (2008) (as amended);
- The Marine and Coastal Access Act 2009;
- The Merchant Shipping (Oil Pollution Preparedness, Response and Cooperation) Regulations 1998 (as amended);
- The Offshore Chemicals Regulations 2002 (as amended);
- The Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001 (as amended)
- The Offshore Installations (Emergency Pollution Control) Regulations 2002;
- The Offshore Installations (Offshore Safety Directive) (Safety Case etc.) Regulations 2015;
- The Offshore Petroleum Licensing (Offshore Safety Directive) Regulations 2015;
- The Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations 2005 (as amended).

2.4 Marine Planning

The 98/11-E well is located within the South Marine Plan area, which aims to enable sustainable economic growth, whilst respecting local communities and protecting the marine environment. A draft of this marine plan was published for comment in 2016 (MMO, 2017).

During the EIA, consideration will be given as to whether the proposed 98/11-E drilling operations are in accordance with the following relevant Marine Plan objectives and their associated policies:

- **Objective 1: Co-Existence** - To promote effective use of space to support existing, and facilitate future sustainable economic activity through the encouragement of co-existence, mitigation of conflicts and minimisation of development footprints;
- **Objective 5: Displacement** - To avoid, minimise, mitigate displacement of marine activities, particularly where of importance to adjacent coastal communities, and where this is not practical to ensure significant adverse impacts on social benefits are avoided;
- **Objective 7: Climate Change** - To support the reduction of the environmental, social and economic impacts of climate change, through encouraging the implementation of mitigation and adaptation measures that: avoid proposals' indirect contributions to climate change; reduce vulnerability; improve resilience to climate and coastal change; and consider habitats that provide related ecosystem services;
- **Objective 8: Heritage Assets** - To identify and conserve heritage assets that are significant to the historic environment of the south marine plan areas;
- **Objective 9: Seascape and Landscape** - To consider the seascape and its constituent marine character and visual resource and the landscape of the South Marine Plan areas;
- **Objective 10: Marine Protected Areas** - To support the objectives of marine protected areas and the delivery of a well-managed ecologically coherent network by ensuring enhanced resilience and the capability to adapt to change;
- **Objective 11: Marine Strategy Framework Directive and Water Framework Directive** - Activities within and adjacent to the South Marine Plan areas must contribute to the achievement or maintenance of Good Environmental Status under the Marine Strategy Framework Directive (and Good Ecological Status under Water Framework Directive) with respect to descriptors on marine litter, non-indigenous species and underwater noise,

particularly where current measures need to be reconsidered or enhanced and where new measures are under development;

2.5 Dorset Coast Strategy

The Dorset Coast Strategy (DCS) for 2011 -2021 (Dorset Coastal Forum, 2011) promotes sustainable coastal and marine management. According to the DCS, the vision for the future of the Dorset Coast is “In 2050, the Dorset coast and marine environment, its landscapes and seascapes, cultural heritage and rich biodiversity, are protected and enhanced for current and future generations. Communities living there are healthy, resilient and living in harmony with natural processes, whilst a diverse and thriving coastal economy which uses natural resources sustainably supports those communities. Both residents and visitors alike are using the coast responsibly for enjoyment, education and inspiration.”

During the EIA, consideration will be given as to whether the proposed 98/11-E drilling operations are in accordance with the following relevant objective of the DCS 2011-2021 and its associated policies:

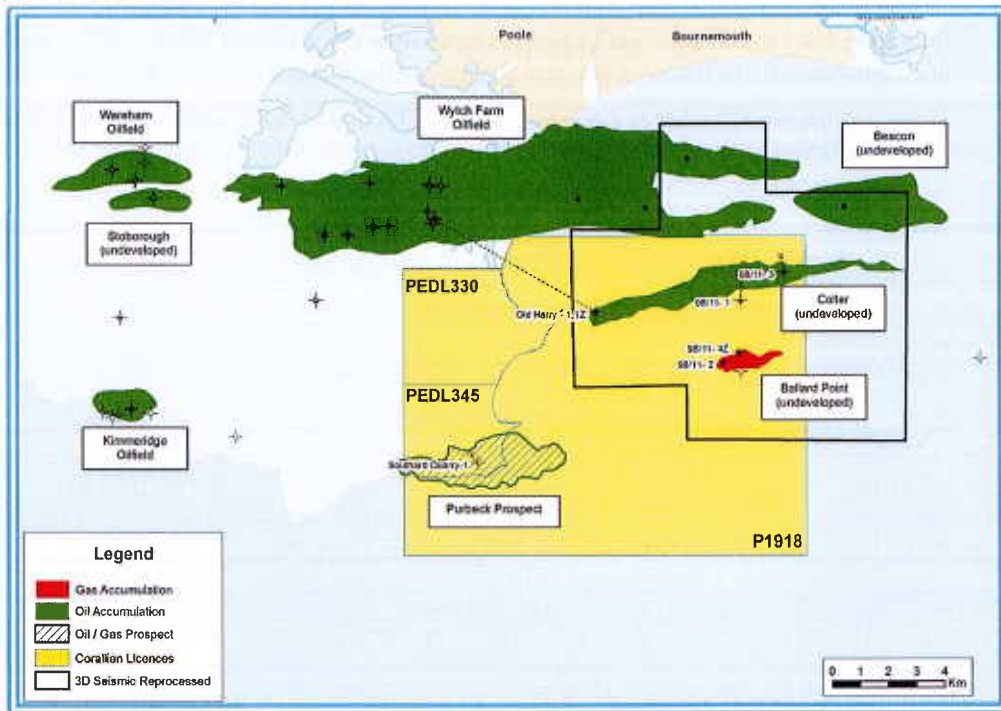
- **Objective 1:** A coast that is at least as beautiful, and as rich in wildlife and cultural heritage, as it is now.

3 Proposed Drilling Operations

3.1 Colter Prospect

The primary objective of the 98/11-E well is to evaluate the potential for oil to be produced from the Colter prospect, which lies to the south of the Wytch Farm oilfield (Figure 3.1). The Colter prospect was discovered in 1986 by the drilling of the 98/11-3 well, which recovered 41.9°API oil from the Triassic Sherwood Sandstone geological formation. Recently merged and reprocessed 3D seismic data has identified up to 100 metres (m) mapped vertical relief up-dip of the discovery well.

Figure 3.1. The Coulter Prospect



3.2 Well Location

The surface location of the well is currently assumed to be the same as the 98/11-1 well (50° 39' 14.3" N; 01° 49' 55.6" W; ED50 UTM Zone 30N) which was drilled, and subsequently plugged and abandoned, in 1983. However, once detailed well planning has been undertaken the location could move by up to 500 m.

The current location allows for a vertical well to be drilled, which is considered to be the most cost effective design as it minimises the duration of the drilling programme compared to that of a directionally drilled well. Environmentally, it will also result in fewer emissions, discharges and waste.

3.3 Schedule

Subject to obtaining all necessary permits and consents, the proposed drilling operations would be undertaken during early 2018. It is anticipated that the MODU would be on location for around 30 to 45 days.

3.4 MODU and Support Operations

The exact MODU is yet to be confirmed, however, due to the relatively shallow water at the proposed 98/11-E well location, a jack-up rig would be used. The premise of a jack-up rig is that it is self-elevating; once on location the legs are stationed on the seabed and the drilling equipment is jacked up above the water's surface, as illustrated in Figure 3.2. Jack-up rigs typically have a hull dimension in the region

of 90 m by 100 m by 10 m and three legs. Depending on the model of jack-up being used the highest part of the rig would be either the top of the legs or the top of the derrick, which are anticipated to be between 300 and 400 feet (91 - 121 m) above sea level.

Figure 3.2. Indicative Jack-up Drilling Rig (Ensco 92) (ENSCO Plc, 2017)



In the event that scour is encountered around the spud cans of the MODU, it may be necessary to perform remedial seabed stabilisation. In the event it is required, the maximum amount of stabilisation material that would be deposited is estimated to be up to 1,000 tonnes of gravel/rock per leg of the MODU.

For the duration of the drilling programme, an Emergency Rescue and Recovery Vessel (ERRV) will be stationed in the vicinity of the MODU to assist in the event of an emergency.

The MODU will also be supported by a supply vessel used to transport drilling equipment and materials to the well location from the supply base, which will either be at Portland Harbour, Poole Harbour or Southampton. It is currently anticipated that up to four supply vessel visits per week will be required during the proposed drilling operations.

Personnel will be transferred to the MODU via helicopter. Typically around six scheduled flights will be made to the MODU per week from Southampton.

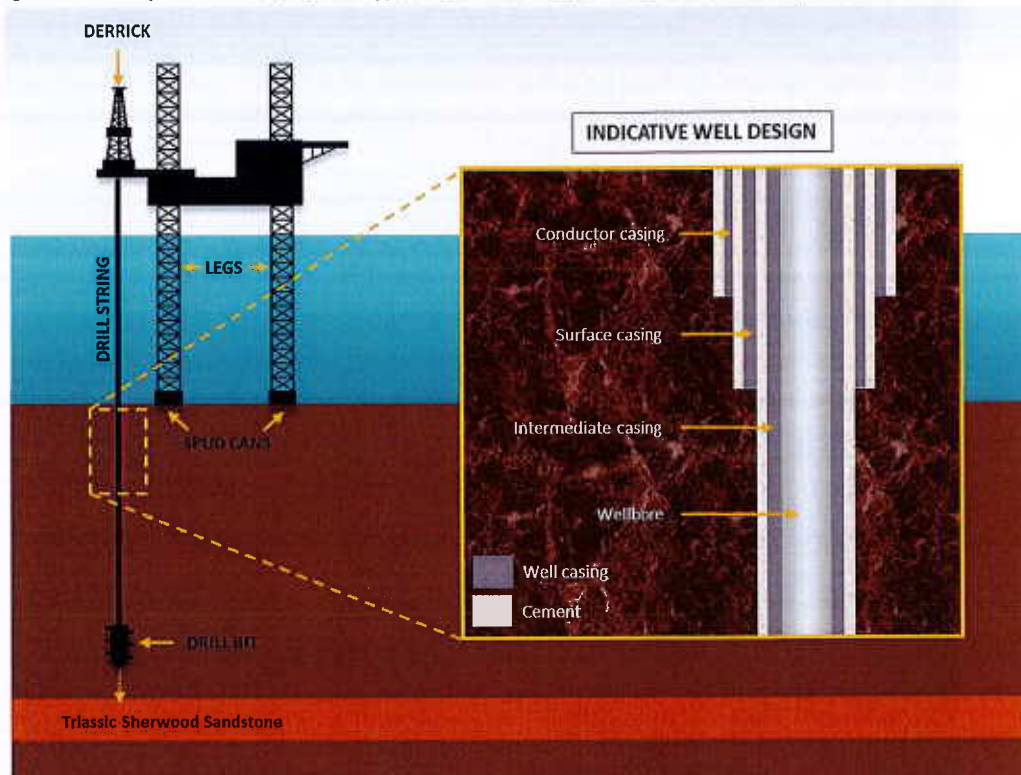
3.5 Well Construction and Design

Figure 3.3 presents a simplified schematic of indicative well construction and design.

The 98/11-E well will be a 1,800 m vertical well drilled using lengths of steel pipes and tools which comprise the drill string. A drill bit will be situated at the end of the drill string which rotates to penetrate the seabed and the underlying geological formations. The drill string is hollow in order for drill fluids (termed 'muds') to be circulated into the wellbore in front of the drill bit. Drilling mud serves a number of functions including cooling the drill bit, circulating rock fragments (termed 'cuttings') back up to the drilling rig, maintaining hydrostatic pressure within the wellbore, and lubricating the drill bit and drill string.

The well will be drilled in sections, with each section decreasing in diameter towards the reservoir section. Once each section of the well is completed, the drill string and drill bit will be lifted from the wellbore and protective steel casing will be lowered into the well and cemented into place. The cement forms a seal between the casing and the rock formation.

Figure 3.3. Simplified Schematic of Typical Well Construction and Design (not to scale)



The proposed profile for the 98/11-E well is detailed in Table 3.1.

Currently it is anticipated that the well would be drilled with water-based mud (WBM) only. It is expected that most, if not all, WBM chemicals will comprise naturally occurring products (such as barite and bentonite) that are either biologically inert or readily dispersible or biodegradable, posing little or no threat to the environment.

The top-hole section (36 inch) of the proposed well will be drilled without a connection between the wellbore and the drilling rig. As such, all drill cuttings and fluids from this section will be deposited on the seabed directly around the wellbore. The excess cement used to ensure the conductor and surface casing are fully secured in the well will also be deposited on the seabed.

Following the completion of the top-hole section the wellbore will be connected to the rig via the conductor (and subsequent casing strings) and a device used to seal, control and monitor oil and gas wells to prevent the uncontrolled release of hydrocarbons. For the 17.5 inch section this will be in the form of a low pressure device known as a diverter and for the 12.25 inch section onwards a high pressure blowout preventer will be utilised

Cuttings and WBM from the 17.5 inch section onwards will therefore be returned to the drilling rig, where they will pass through the shale shaker systems. Here, cuttings will be separated from the drilling mud and passed through the cuttings cleaning system. The drill cuttings will then be discharged to sea from the drilling rig just below the sea surface.

Colter (98/11-E) Exploration Well: EIA Scoping Report

Table 3.1. Proposed 98/11-E Well Profile

Interval of Well Depth (m)	Length of Well Interval (m)	Volume of Cuttings (m ³)	Weight of Cuttings (tonnes)
36	96	63.04	196,687
17.5	382	59.28	184,943
12.25	487	37.03	115,531
8.5	835	30.57	95,373
Total Cuttings:		189.92	592,535
<i>Total discharged to seabed:</i>		<i>63.04</i>	<i>196,687</i>
<i>Total discharged at sea surface:</i>		<i>126.88</i>	<i>395,847</i>

3.6 Check Shot Survey

Check shot surveys are seismic borehole surveys that are designed to gather high-resolution data on the subsurface geology within the wellbore itself. It is anticipated that a check shot survey may be carried out once the proposed drilling operations have been completed. This will utilise a single seismic source (air gun source) deployed from the MODU and will be short in duration (typically less than one day).

Airguns emit high intensity low frequency noise between 0.005 kilohertz (kHz) to 20 kHz (Genesis, 2011). The noise emitted by airguns increases with gun volume. Noise levels for a single airgun, with a volume of 40 cubic inches, have been recorded at around 186 decibel value peak-to-peak relative to one micropascal at a distance of one metre (dB (peak-peak) re 1 µPa at 1 m) (Genesis, 2011).

3.7 Well Abandonment

On completion of drilling operations, the 98/11-E well will be permanently plugged and abandoned in accordance with Oil and Gas UK, Guidelines for the Abandonment of Wells (OGUK, 2015).

3.8 Emissions, Discharges and Waste

Table 3.2 provides a worst-case estimate of the emissions to atmosphere arising from routine operations associated with the proposed 98/11-E drilling operations.

Table 3.2. Estimated Atmospheric Emissions Generated During Drilling Operations

Total Fuel (tonnes)	Typical Fuel Use	Fuel (tonnes)	Total Emissions (tonnes) ¹						
			CO ₂	CO	NO _x	NO ₂	SO ₂	CH ₄	VOC
MODU	8 tonnes / day	360 ³	1,152	5.65	21.38	0.08	1.44	0.06	0.72
ERRV	2 tonnes / day	90	288	1.41	5.35	0.02	0.36	0.02	0.18
Supply vessel	5 tonnes / day	130 ⁴	416	2.04	7.72	0.03	0.52	0.02	0.26
Helicopter	0.655 tonnes / hour ²	10 ⁵	34	0.05	0.13	0.00	0.04	0.00	0.01
Total	-	5,102	1,890	9.15	34.58	0.13	2.36	0.1	1.17

Notes

¹ Emissions factors from DECC (2008).

² Based on speed of 262.6 km per hour (Eurocopter, 2009).

Colter (98/11-E) Exploration Well: EIA Scoping Report

³ Assumes MODU / ERRV is on location for 45 days.

⁴ Assumes the supply vessel visits the MODU 4 times a week during the proposed drilling operations.

⁵ Assumes three return flights to Southampton per week of 100 km per flight.

Table 3.3 provides a summary of the estimated main marine discharges and solid waste generated during routine operations associated with the proposed 98/11-E drilling operations.

Table 3.3. Estimated Marine Discharges and Waste Generated During Drilling Operations

Discharge / Waste		Estimated Quantity	Fate
WBM	Drilling fluids ¹	1,155,000 kg	Discharged to sea
	Cuttings	592,535 kg	Discharged to sea
Cement and additives ²		80,000 kg	Discharged to sea
Wastewater (greywater and blackwater) ³		810 m ³	Discharged to sea
Solid waste (bulk waste e.g. garbage, scrap etc.) ⁴		60,000 kg	Returned to shore

¹ Quantity provided is indicative only and subject to change during detailed well planning.

² Quantity provided is indicative only and subject to change during detailed well planning.

³ Assumes 200 litres of greywater and blackwater generated per person per day and based on MODU with average of 90 persons on board.

⁴ Based on an estimated average solid waste production of 30 tonnes (30,000 kg) per month.

Black (sewage) and grey water will be collected, treated to meet the requirements of MARPOL and UK Regulations prior to being discharged to sea. Food waste will also be disposed of to meet the requirements of MARPOL and UK Regulations.

4 Environmental Baseline

4.1 Introduction

The EIA process requires a comprehensive review of the existing environment in order to provide a basis for assessing the potential interactions between a project and the receiving environment.

The description of the baseline environment documented in the ES for the 98/11-E well will be based on a combination of site specific survey data (as described in Section 4.2) and existing published literature, including the OPRED (formerly DECC) Offshore Strategic Environmental Assessment (SEA) Reports (2005-2016). The proposed 98/11-E well is located within 'Regional Sea 3' as defined within the Offshore Energy SEA3. Reference will also be made to the AA carried out for UKCS Blocks 97/13 and 98/12b in the Central English Channel, which was undertaken as part of the 27th Licensing Round (DECC, 2013).

A high level summary of the known environmental sensitivities in the vicinity of the proposed 98/11-E well location is provided below.

4.2 Habitat Assessment and Environmental Baseline Survey

During July 2017 a habitat assessment and environmental baseline survey (EBS) was undertaken by Benthic Solutions Limited (BSL), on behalf of Corallian, within a 2 km by 1 km survey area encompassing the provisional 98/11-E well location (Figure 4.1).

Environmental stations were selected based upon depth, sediment and habitat changes as delineated during the acoustic survey (side scan sonar and multibeam echo sounder), to provide benthic data of all habitats recorded within the survey area. A total of 21 environmental survey stations were investigated (Figure 4.1), including the addition of three locations (ENV19, ENV20 and ENV21) for further investigation of the potential presence of *Sabellaria spinulosa* reefs.

For underwater imagery, a camera system was deployed at all 21 sampling locations to acquire approximately 100 m transect with no less than five good quality still images (as far as practicable) and two minutes of high definition video. Following subsea camera operations, a 0.1 square metre (m²) Day grab or Hamon grab (dependent on seabed composition) was deployed at 13 of the 21 sampling locations to recover one seabed samples for physico-chemistry analysis and three for macrofaunal determination (BSL, 2017). Grab samples were not acquired at eight stations; five (ENV17, ENV18, ENV19, ENV20 and ENV21) due to the presence of potential *Sabellaria spinulosa* reefs, in order to avoid damage to this feature of interest, and three (ENV12, ENV15 and ENV16) due to the presence of hard substrata (bounders or gravels) (BSL, 2017).

The preliminary results from the habitat assessment and EBS are summarised below, where relevant. Full details will be provided within the ES.

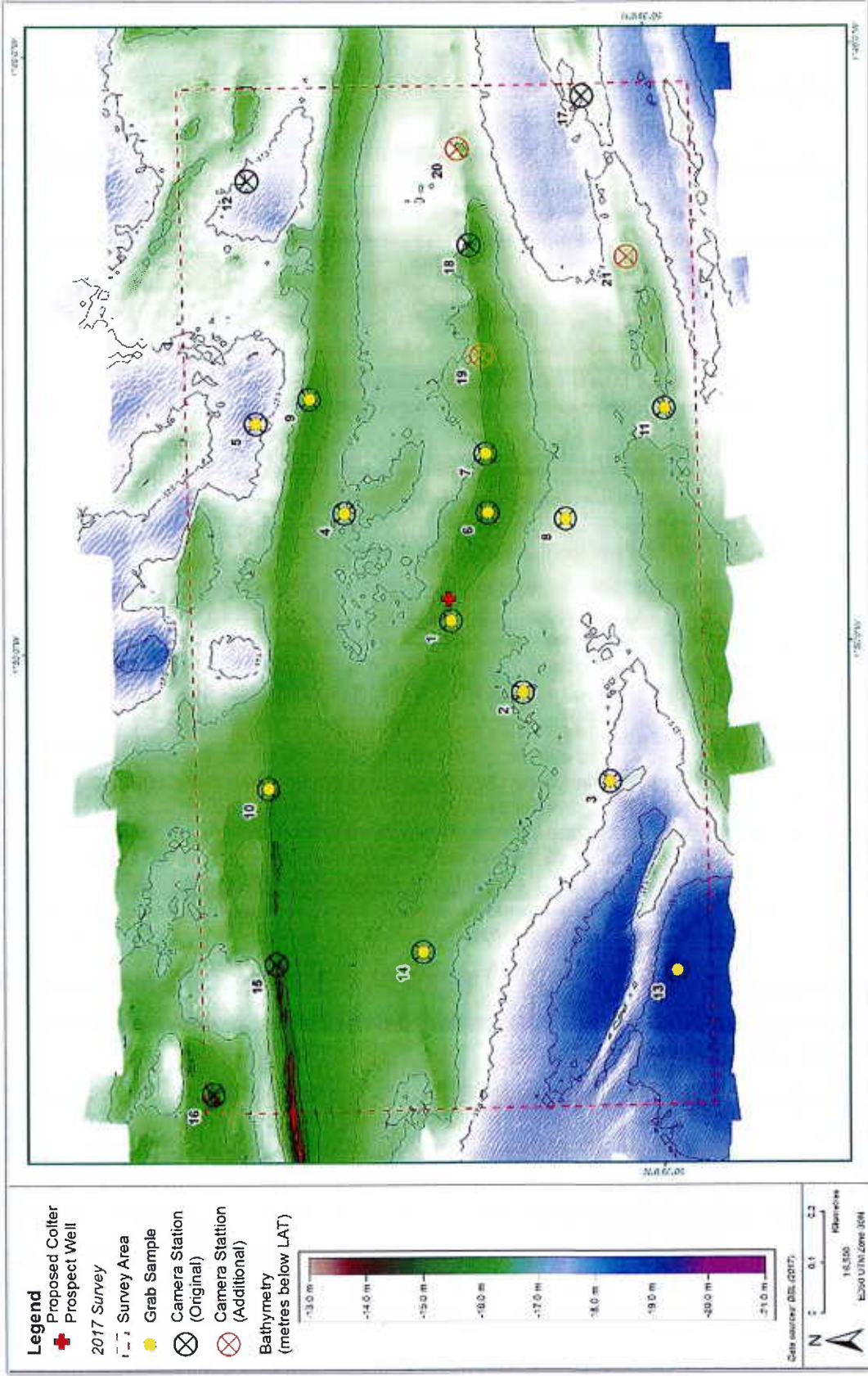
4.3 Physical Environment

The proposed 98/11-E well is located in UKCS Block 98/11 in the Central English Channel, approximately 6 km east-northeast of the nearest coastline at Studland and approximately 8 km south of Bournemouth, on the Dorset coastline (refer to Figure 1.1). The nearest transboundary line, which is between the UK and France, is located approximately 90 km to the south.

4.3.1 Bathymetry and Seabed Sediments

Water depths in the vicinity of the proposed 98/11-E well range between 14 and 18.5 m below Lowest Astronomical Tide (LAT) (Figure 4.1; BSL, 2017). In addition, two 'ridges' were noted in the south-east corner of the Colter survey area (BSL, 2017).

Figure 4.1. Summary of Environmental Operations with Station Locations (BSL, 2017)



Seabed sediments in the vicinity of the 98/11-E well are heterogeneous with a background sediment of rippled sand (BSL, 2017). The deeper section of the survey area was mainly composed of small gravel over a sandy matrix, while the majority of features targeted on ridges were mainly composed of boulders, cobbles and pebbles over a gravelly sand matrix (BSL, 2017).

A review of the contaminant status of the SEA 8 area, within which the 98/11-E is located, has demonstrated that levels of contaminants (pollutants) are relatively low compared to other coastal waters around the UK (CEFAS, 2007). This is largely due to a comparably reduced riverine input into the coastal waters, reduced level of oil and gas activity, and a stronger influence of North Atlantic waters in the English Channel that leads to increased water flux and elevated dilution and dispersion of contaminants (CEFAS, 2007). The results of the sediment sample analysis from the 2017 EBS will, however, be fully detailed in the ES.

4.3.2 Tides and Currents

Currents in the Central English Channel tend to move in an easterly direction towards Dover (DECC, 2009) with the tidal streams in the area flooding eastwards and ebbing westwards (DECC, 2016). Typical tidal current speeds in the English Channel reach up to 1.25 m per second, but can be higher around topographical features that focus surface flow, such as headlands (Tyrell, 2004). The tidal range off the coast of Bournemouth is relatively high, reaching a mean of between 1.01 and 2.00 m during spring tides (DECC, 2016).

4.4 Biodiversity

4.4.1 Plankton

The collective term plankton refers to the plants (phytoplankton) and animals (zooplankton) that live freely in the water column and drift passively with the water currents (Lalli and Parsons, 1993). Plankton are key producers (phytoplankton) and primary consumers (zooplankton) and therefore form the base of the food chain (DECC, 2016). The shallow, well-mixed waters of the English Channel leads to a plankton community that is quite distinct compared to other areas around the UK. Plankton biomass is lower than the rest of the coastal UK, and is dominated by diatoms throughout most of the year with dinoflagellates being abundant in July and August (DECC, 2016). Key zooplankton taxa include *Acartia*, *Rhizosolenia* and *Chaetoceros*, which are widely found in UK waters however, the English Channel differs to other offshore waters due to a markedly low biomass of the calanoid copepods *Calanus helgolandicus* and *C. finmarchicus* (DECC, 2016).

4.4.2 Seabed Communities

The Mapping European Seabed Habitats (MESH) project has classified seabed habitats around the UK and North Sea areas according to its physical characteristics to infer keystone species that are likely to be associated with each habitat. These communities are termed biotopes. The following seabed biotope classifications and associated benthic communities are present in Block 98/11 (JNCC, 2015b; EMODnet, 2016):

- **Circalittoral Coarse Sediment:** this habitat is characterised by robust infaunal polychaete worms, mobile crustacea and bivalves. Certain species of sea cucumber (holothurians) may also be present;
- **Circalittoral Muddy Sand:** this habitat supports an animal-dominated community characterised by a wide variety of polychaete worms, bivalves and echinoderms including brittlestars and seastars;
- **Circalittoral Fine Sand:** generally clean fine sands with a low clay / silt content, this habitat is characterised by a wide range of echinoderms including the pea urchin, as well as polychaetes and bivalves.

The preliminary findings of the 2017 habitat assessment and EBS noted few conspicuous fauna on initial inspection of the camera and grab samples. The majority of environmental stations recorded sandy substrata, which is not favourable to the settlement of dense communities of epifauna or infauna. The

majority of boulders, cobbles and pebbles were encrusted mainly by seaweeds, bryozoans (*Flustra foliacea*) and Porifera (sponges) communities (BSL, 2017).

Seabed surveys undertaken for the Navitus Bay offshore wind development in Poole Bay, approximately 14 km to the south east of the proposed 98/11-E well location, identified that the coarse seabed sediments were dominated by polychaete worms and amphipods and areas of gravel supported the invasive and established slipper limpet (*Crepidula fornicata*) (DECC, 2016).

A potential environmentally sensitive habitat was encountered during the 2017 survey as the tube building polychaete worm, *Sabellaria spinulosa*, was evident within the Colter survey area which could be considered as Annex I reef habitat under the Habitats Directive (BSL, 2017). *Sabellaria spinulosa* reefs are also listed on the OSPAR List of Threatened and/or Declining Species & Habitats (OSPAR, 2017). The potential for *Sabellaria spinulosa* reefs was observed at five stations (ENV17, ENV18, ENV19, ENV20 and ENV21), all of which were located on ridges, orientated in a west southwest to east northeast direction, in the south east corner of the survey area (refer to Figure 4.1). These ridges were noted to show clear concentrations of potential *Sabellaria spinulosa* reefs (BSL, 2017). Further analysis of the potential presence of this sensitive habitat within the survey area is currently being undertaken (BSL, 2017) and full details will be provided within the ES.

4.4.3 Fish and Shellfish

A number of fish species use the waters around Block 98/11 as spawning and / or nursery grounds at various times of the year. Species that spawn within Block 98/11 include cod, plaice, sandeels, sole and sprat (Coull *et al.*, 1998; Ellis *et al.*, 2012). Species that use the waters around Block 98/11 as nursery grounds include mackerel, plaice, sole, thornback ray, tope shark and the undulate ray (Coull *et al.*, 1998; Ellis *et al.*, 2012). In addition to the thornback and undulate ray and tope shark, a number of other elasmobranch species (shark, skates and rays) may be present including the starry smooth-hound and lesser and greater spotted dogfish (Farrell *et al.*, 1995; DECC, 2016).

Diadromous fish (that migrate between fresh and salt waters) are present within Poole Harbour and a number of connecting river systems into the Dorset and Hampshire coasts are designated for the presence of Annex II Atlantic salmon (*Salmo salar*) including the River Avon and River Itchen (refer to Table 4.1: DECC, 2013; 2015; JNCC, 2017a). Individuals are more likely to be present during the adult migrations between May and September (Navitus Bay, 2014) and post-smolt (juveniles) between April and May (DECC, 2013). In addition, the river lamprey (*Lampetra fluviatilis*) and Atlantic salmon are found in a number of riverine systems that feed into the Dorset Coast where they are not a qualifying species for designation (JNCC, 2017a; 2017b). Eels are also known to be present within Pool Harbour and a number of the connecting river systems.

Significant scallop harvesting grounds are located along the coast of Dorset and cockles, mussels, periwinkles and whelks are found on almost all shorelines within Regional Sea 3 (DECC, 2016). In addition, crabs and lobsters are abundant around rocky substrata in the region, with brown crabs found further offshore than lobsters. Native oysters are also a conservation feature of the Poole Rocks Marine Conservation Zone (MCZ), located approximately 4 km to the north west of the proposed well location, and are therefore found in the area (Natural England, 2013).

4.4.4 Seabirds

The waters and coastline of the English Channel are not considered to be as important for seabird and waterbird species compared to elsewhere around the UK (DECC, 2016). Seabird abundance is consequently low, which is largely due to a lack of suitable nesting habitat for seabirds. Species that may visit the area include fulmar, gannets, common gull, lesser black-backed gull and herring gull (DECC, 2016). These species are more abundant during the winter months when they move into the English Channel from the North Sea (DECC, 2016). However, a number of sites in the area are designated as Special Protection Areas (SPAs) under the Wild Birds Directive and / or Ramsar Sites, wetlands of international importance designated under the Ramsar Convention.

The proposed 98/11-E well lies within the boundary of the Solent and Dorset coast pSPA, which is being considered for designation for internationally important populations of common tern, Sandwich tern

and little tern. The pSPA covers important foraging areas at sea used by breeding terns from colonies within adjacent, already classified SPAs during April to September (Natural England, 2016a).

Poole Harbour SPA / Ramsar Site is located approximately 9 km to the north west of the proposed 98/11-E well, which is designated for its common tern and Mediterranean gull populations (DECC, 2016). A proposal to extend this site for Sandwich terns and little egrets is currently under consideration.

The Dorset Heathlands Ramsar site is location approximately 8.5 km to the north west of the proposed 98/11-E well, which is designated for its wet heathland habitat. Noteworthy bird species include Dartford warbler during the breeding season and hen harrier and merlin over winter (JNCC, 2008).

Important habitats for waterbirds are also present around Poole Harbour and support avocet, black-tailed godwit and shelduck (DECC, 2016).

In the unlikely event of an accidental release of hydrocarbons during drilling operations for the 98/11-E well, seabirds are particularly susceptible to oil pollution on the sea surface. An assessment of the median Sea Seabird Oil Sensitivity Index (SOSI) scores for UKCS Block 98/11 indicates that the sensitivity of seabirds to oil pollution is low throughout the year (Webb *et al.*, 2016).

4.4.5 Marine Mammals

Cetacean abundance (whales, dolphins and porpoises) in the English Channel is relatively low in terms of numbers of individuals and diversity (DECC, 201a). None of the nine species of cetacean recorded in the Atlas of Cetacean Distribution in North-West European Waters have been recorded within Block 98/11 (Reid *et al.*, 2003) therefore there is little information on the seasonal abundance and distribution of cetaceans in the vicinity of the proposed 98/11-E well. Other surveys have identified that, within the Regional Sea 3 area, bottlenose dolphins are the most frequently sighted species, particularly during the summer and autumn around the Dorset coast to the Isle of Wight (Hammond *et al.*, 2008; DECC, 2016) and preliminary consultation with NE has identified that coastal bottlenose dolphins are present in this area (refer to Appendix A). Harbour porpoises are also sighted in the English Channel, albeit in low occurrences, where it is thought that they move in from the southern North Sea but retract back to the North Sea and Western Channel by the autumn (DECC, 2016). Further offshore, occasional sightings of long-finned pilot whales and common dolphins have occurred, but in far fewer numbers compared to the Western Channel and North Sea (DECC, 2016).

The English Channel and adjacent coastline are not considered to be important habitats for seals, with no major colonies present and very little at-sea usage by any seal species (SCOS, 2015; Jones *et al.*, 2016; DECC, 2016).

4.5 Marine and Coastal Protected Areas

Internationally and nationally designated marine and coastal protected areas within 40 km of the proposed 98/11-E well are summarised in Table 4.1 and illustrated in Figure 4.2 (note Site of Special Scientific Interest (SSSIs) are listed separately in Appendix C).

Colter (98/11-E) Exploration Well: EIA Scoping Report

Table 4.1. Marine and Coastal Protected Areas within 40 km of the Proposed 98/11-E well (JNCC, 2017c; Natural England, 2017a; Natural England, 2017c; Wildlife Trusts, 2017; Natural England and DEFRA, 2016; Dorset Wildlife Trust, 2016) ¹

Site Name	Distance / Bearing	Designating Features
Isle of Portland to Studland Cliffs Special Area of Conservation (SAC)	6.5 km W	Annex I habitats include vegetated sea cliffs of the Atlantic and Baltic Coasts and semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (important orchid sites). Annex II species found at this site include the early gentian (an annual plant occurring in calcareous grassland).
Studland to Portland Site of Community Importance (SCI)	7 km SW	Annex I rocky reefs are present and support a diverse epifauna and flora community. Areas of limestone outcrops form seabed caves, deep gullies and overhangs that support a diverse epifaunal assemblage. Mussel beds also occur in high densities on exposed bedrock.
Dorset Heaths (Purbeck and Wareham) and Studland Dunes SAC	7 km W	Annex I habitats include embryonic shifting dunes, white dunes, Atlantic decalcified fixed dunes, humid dune slacks, oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflora</i>), Northern Atlantic wet heaths with <i>Erica tetralix</i> , temperate Atlantic wet heaths with <i>Erica ciliaris</i> and <i>Erica tetralix</i> , European dry heaths, Depressions on peat substrates of the <i>Rhynchosporion</i> (bog habitats) and bog woodland. The Annex II southern damselfly is also a qualifying feature of this site.
Dorset Heaths SAC	9 km NE and 10 km W	Annex I habitats include Northern Atlantic wet heaths with <i>Erica tetralix</i> (cross-leaved heath), European dry heaths and Depressions on peat substrates of the <i>Rhynchosporion</i> (bog habitat). The Annex II listed southern damselfly is also a qualifying feature of this site.
River Avon SAC	10 km NE	Annex I watercourses of plane to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation. Annex II species present at this site include: Desmoulin's whorl snail, sea lamprey, brook lamprey, Atlantic salmon and bullhead.
St. Albans Head to Durlston Head SAC	11 km SW	Annex I habitats include vegetated sea cliffs of the Atlantic and Baltic Coasts and semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (important orchid sites). The Annex II annual plant, the early gentian, is also found at this site.
South Wight Maritime SAC	15 km E	Annex I habitats include subtidal chalk, limestone and sandstone reefs, vegetated sea cliffs of the Atlantic and Baltic Coasts and submerged or partially submerged sea caves that host a number of rare algae species.
Solent Maritime SAC	20 km NE	Annex I habitats including estuaries of various types, <i>Spartina</i> swards (seagrass beds) and Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>). A number of Annex I habitats are also present, but are not qualifying features for its designation including; sandbanks, intertidal mudflats, coastal lagoons, annual vegetation of drift lines, perennial vegetation of stony banks, <i>Salicornia</i> and other annuals colonising mud and sand, and shifting dunes. The Annex II listed Desmoulin's whorl snail is also present at this site.
Isle of Wight Downs SAC	23 km E	Annex I habitats include vegetated sea cliffs of the Atlantic and Baltic Coasts, European dry heaths and semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (important orchid sites). The Annex II annual plant, the early gentian, is also found at this site.

Colter (98/11-E) Exploration Well: EIA Scoping Report

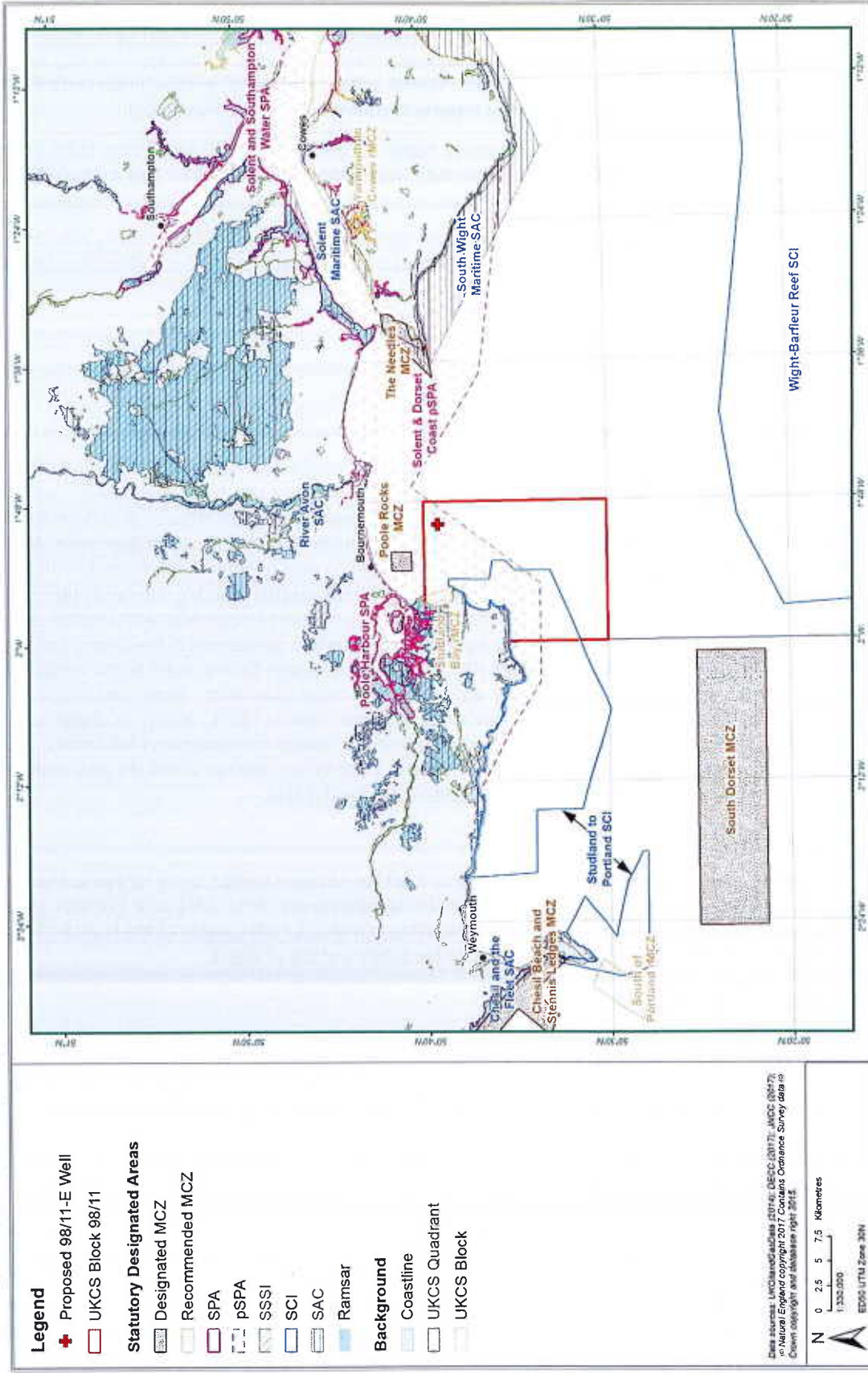
Site Name	Distance / Bearing	Designating Features
Solent and Isle of Wight Lagoons SAC	24 km NE	Annex I habitats including coastal lagoons (a priority feature) that support a number of rare species such as the foxtail stonewort, lagoon sand shrimp and starlet sea anemone.
Wight-Barfleur Reef SCI	30 km S	Annex I bedrock and stony reef and supports a diverse range of reef fauna.
Solent and Dorset Coast pSPA	Within	The site is proposed to protect important foraging areas at sea used by qualifying interest features from colonies within adjacent, already classified SPAs. Qualifying interest features: common tern, Sandwich tern and little tern.
Poole Harbour Extension pSPA	9 km NW	This extension is proposed due to existing qualifying interest features of the Poole Harbour SPA foraging and roosting in areas currently outside of the boundary of the SPA. Existing qualifying interest features: shelduck, pied avocet, black-tailed godwit, Mediterranean gull, common tern, and the overwintering water bird assemblage. It is also proposed to also add three new qualifying features to the site: breeding Sandwich terns and non-breeding little egrets and Eurasian spoonbills.
Poole Harbour SPA / Ramsar Site	9 km NW	Supports populations of European importance of breeding common tern and Mediterranean gull and passage and overwintering avocet and little egret and overwintering black-tailed godwit and shelduck. This site also regularly supports at least 20,000 waterfowl.
Solent and Southampton Water SPA / Ramsar Site	20 km NE	Supports populations of European importance of breeding common tern, little tern, Mediterranean gull, roseate tern and Sandwich tern and overwintering black-tailed godwit, dark-bellied Brent goose, ringed plover and teal. This site also regularly supports at least 20,000 waterfowl.
Dorset Heathlands Ramsar Site	8.5 km NW	Supports populations of European importance of breeding Dartford warbler, nightjar, woodlark and overwintering hen harrier and merlin.
Poole Rocks Marine Conservation Zone (MCZ)	4 km NW	This site is designated to protect a small area of rock-forming patch reefs within the sediment-dominated Poole Bay. Habitats include subtidal mixed sediments and rocky outcrops, which support a diverse faunal community. This site also supports the rare Couch's goby. In addition, nesting black bream is being considered by UK Government ministers for inclusion as a designated feature for this site.
Studland Bay recommended MCZ (rMCZ)	7 km W	This site is considered for designation due to a variety of important habitats including intertidal sand and muddy sand, mud, moderate energy intertidal rock, intertidal coarse sediment, subtidal sand and mixed sediments, seagrass beds, subtidal macrophyte-dominated sediment. This site also hosts the native oyster, the endangered undulate ray and the long and short snouted seahorse. This site is also a nursery area for a number of commercial finfish such as pollack, black bream and bass.
The Needles MCZ	15 km E	This site supports a number of rare and fragile habitats including rock, chalk, seagrass beds, and muddy, gravelly and coarse sediments. This site also hosts the stalked jellyfish, Peacock's tail and native oyster.

Colter (98/11-E) Exploration Well: EIA Scoping Report

Site Name	Distance / Bearing	Designating Features
Broad Beach to Kimmeridge Bay rMCZ	22 km SE	Important habitats include intertidal coarse sediment and intertidal rock. This site also supports the Peacock's tail seaweed and sea snail and a number of fish species.
Yarmouth to Cowes rMCZ	23 km ENE	This site was recommended due to the presence of a variety of seabed habitats including rocky and biogenic reefs, sands, muds and coarse sediments, underboulder communities, seagrass beds, chalk and peat and clay exposures. The site also supports the black seabream, lagoon sand shrimp, native oysters, tentacled lagoon worm and features of geological interest.
South Dorset MCZ	29 km SW	This site is designated due to the presence of moderate energy circalittoral rock, subtidal coarse sediments and subtidal chalk (forming chalk reefs) and subsequently supports a diverse epifaunal community and a number of chalk-boring species.

Note 1: SSSIs are listed separately in Appendix C.

Figure 4.2. Marine and Coastal Protected Areas in the Vicinity of the Proposed 98/11-E Well



In addition, Corallian are aware of the following potential sites that are being considered by UK Government ministers, however a decision is not expected until spring 2018 (Natural England, 2017c):

- Purbeck Coast New Site Option: is being considered for the inclusion of Maerl beds, which occur to the east of Studland Bay rMCZ, approximately 4 km to the west of the proposed 98/11-E well location. This feature is also listed under OSPAR and is a habitat of principal importance for the purpose of conserving biodiversity as listed in Section 41 of the NERC Act (2006);
- The Purbeck Coast 'third-party proposed highly mobile species MCZ' for nesting black bream, which lies approximately 10.5 km to the south west of the proposed 98/11-E well location (Natural England, 2016b);
- The Southborne Rough 'third-party proposed highly mobile species MCZ' for nesting black bream, which lies approximately 2.8 km to the north east of the proposed 98/11-E well location (Natural England, 2016b).

4.6 Landscape and Seascape

Refer to Section 6.2.2.

4.7 Human Environment

4.7.1 Commercial Fisheries

Fishing activity in the Regional Sea 3 area is moderate to low compared to areas such as the North Sea (DECC, 2016), with a slight increase in effort recorded from March to August and in November (Marine Scotland, 2016). The proposed 98/11-E well is located in an area of important inshore fisheries with the majority of fishing activity being undertaken by small vessels (DECC, 2016). Demersal fish species are the primary fisheries targeted in the area, caught using trammel and gill nets, with shellfish species also targeted using static gears. Sole are a particularly important component of the fishery during the spring, along with plaice, turbot and brill (DECC, 2016). The pelagic fishery sector is not significant in this region with herring, mackerel and sprat caught in small quantities. Poole and Christchurch Harbours support licenced salmon and sea trout seine net fisheries (DECC, 2016). In addition, Poole Bay is a designated Shellfish Water and Poole Harbour is a mollusc harvesting area for oysters, clams, scallops, mussels and cockles (DEFRA, 2017). Consequently fishery landings within the area tend to be dominated by shellfish species (DECC, 2016; Marine Scotland, 2016).

4.7.2 Shipping

Commercial shipping activity within Block 98/11 itself has not been ranked, but is ranked as low in the surrounding blocks (OGA, 2016a). A number of ferries operate out of Poole Harbour to France and the Channel Islands and a number of recreational sailing and leisure craft operate in the English Channel, particularly around Poole Harbour and around the Solent and Isle of Wight.

4.7.3 Offshore Oil & Gas Activity

Offshore oil and gas activity within the Regional Sea 3 area is generally low, however, there is some nearshore activity off the Dorset coast, which includes Western Europe's largest onshore oilfield at Wytch Farm located on the Studland coast, approximately 10 km north west of the proposed 98/11-E well (UK Oil & Gas Data, 2017). Within Block 98/11, oil and gas activity is low with only four wells having previously being drilled. All of these wells have been plugged and abandoned (UK Oil & Gas Data, 2017).

4.7.4 Other Offshore Activities

There are a number of Practice and Exercise Areas for army and naval operations in the English Channel and Poole and Christchurch Harbours (DECC, 2016). As such, there is the potential for interaction between oil and gas activities and MoD activities. A licence condition is attached to Block 98/11 for defence related activity that stipulates that no surface drilling or infrastructure development may occur within the block (OGA, 2016b) however, preliminary consultations have confirmed that the MoD has no safeguarding concerns with the proposed activities in Block 98/11 (refer to Appendix A).

Colter (98/11-E) Exploration Well: EIA Scoping Report

There are no operational Offshore Wind Farms (OWFs) in the English Channel (Crown Estate, 2017a). The Rampion (Southern Array) OWF, off the Sussex coast and approximately 104 kilometres east of the proposed 98/11-E well, is currently under construction, this is operated by E.ON Renewables. Of note is that the Navitus Bay OWF was refused consent by the British Government in 2015 (The Planning Inspectorate, 2015). This development would have comprised 105 turbines in an area off the Dorset coast, approximately 15 km south east of Swanage and 16 km south of Christchurch; however, Navitus Bay has confirmed that they will not challenge this refusal and do not intend to progress the project further (Navitus Bay, 2015).

There is interest in tidal energy in the coastal waters of the English Channel. The Portland Bill wave and tidal turbine is currently in development and is located approximately 50 km south west of the proposed 98/11-E well. The Perpetuus Tidal Energy Centre, also under development, is located south of the Isle of Wight, approximately 40 km south east of the proposed 98/11-E well (Crown Estate, 2017a).

There are no submarine cables in the vicinity of the proposed 98/11-E well (KIS ORCA, 2017).

There are no active dredging sites or dredge disposal sites within Block 98/11 however, there are a number of licenced dredge areas in Blocks 98/12, 98/13 and 98/17 that lie within the South Coast Region active dredge zone (Crown Estate, 2017b). The nearest area ('South West Isle of Wight') is approximately 9 km to the south east of the proposed 98/11-E well location and is operated by Tarmac Marine Limited.

4.7.5 Archaeology

There are a large number of wrecks in the Regional Sea 3 area although only a small number are charted (DECC, 2016). There are two protected wrecks within Block 98/11, the Swash Channel wreck, a 17th century armed cargo vessel located 7 km north west of the proposed 98/11-E well, and the Studland Bay wreck, also an armed cargo vessel but from the 16th century, is located 6 km to the north west (DECC, 2016; MALSF, 2016). No wrecks were identified within the Colter survey area during 2017 habitat assessment and environmental baseline survey.

4.7.6 Tourism and Leisure

Coastal tourism is a major source of regional income for Dorset (DECC, 2016). The Jurassic Coast World Heritage Site is the only UNESCO World Heritage Site in England and attracts large numbers of tourists as well as interested students. Bathing waters are also located along the Dorset coast (METOC, 2007). In addition, water sports including sailing, sea kayaking, windsurfing and surfing, particularly around Bournemouth are popular recreational activities (METOC, 2007). A number of scuba diving spots are also located around the rocky shores of Studland and in the seagrass beds around Poole Harbour, where seahorses can be observed (DECC, 2016). The wreck of the Betsy Anna, an 808 ton collier which sank in 1926, is also a popular diving spot and lies approximately 4 km to the south east of the proposed 98/11-E well (iCoast, 2012). Recreational sea fishing and river angling are also popular in the region (DECC, 2016).

5 Environmental Impact Assessment Methodology

The EIA process requires the identification and assessment of all potentially significant environmental effects arising from the proposed project (from both planned and accidental events). The process commences with the identification of potential project issues (or aspects) that could impact the environment or other users of that environment. Once identified these aspects are assessed to determine the significance of the potential impact so that, where necessary, measures can be taken to remove or reduce such impacts through design or operational measures (mitigation). The impact that is predicted to remain once mitigation measures have been designed into the intended activity is referred to as the residual impact.

5.1 Planned Events

For planned events, the significance of environmental effects will be categorised using a series of matrices describing the sensitivity of receptors and resources which have the potential to be impacted by the project and the magnitude of any impacts that are likely to arise (impacts can be either beneficial or adverse). The sensitivity of receptors and resources and magnitude of impact will be cross-referenced to give an overall significance of effect for any potential impact. Where it is not possible to quantify impacts, qualitative assessments will be carried out, based on available knowledge and professional judgement.

In order to provide a consistent approach, the assessments will generally use the terminology outlined below in Tables 5.1 to 5.3; however, in practice the approaches and criteria applied across different assessment topics may vary. One of example of this is the assessment approach which will be followed for the landscape and seascape visual impact assessment (LSVIA), which is outlined in full in Appendix D. Any other specific criteria used during the EIA process will be clearly identified and explained within the relevant topic specific assessment chapter of the ES.

Table 5.1. Determining Sensitivity

Sensitivity	Definition
High	Receptor / resource is of high value or is of international importance (e.g. SAC, SPA, Ramsar site). Limited tolerance / ability to adapt to effect. Recovery not expected for an extended period or that cannot be readily rectified.
Medium	Receptor / resource has some value or is of national or local importance (e.g. MCZ). Some tolerance / ability to adapt to effect. Recovery to an acceptable status over the short to medium term.
Low	Receptor / resource of low value or importance (e.g. a habitat or species which is abundant and not of conservation significance). Generally tolerant of effect. Immediate recovery and easily adaptable to changes.

Colter (98/11-E) Exploration Well: EIA Scoping Report

Table 5.2: Determining Magnitude of Impact

Magnitude	Definition
Large	Permanent or long-term substantial change in baseline environmental conditions. Impact may be experienced over a wide area. Routine exceedance in quality standards / threshold limits.
Medium	Medium-term discernible change in baseline environmental conditions. Impact may be regional or local in scale. Occasional exceedance in quality standards / threshold limits. No permanent impacts are predicted.
Small	Short-term discernible change in baseline environmental conditions within a localised area. Impact would not result in relevant quality standards / threshold limits to be exceeded.
Negligible	Immeasurable, undetectable or within the range of normal natural variation.

Table 5.3: Significance Evaluation Matrix

		Magnitude of Impact			
		Negligible	Small	Medium	Large
Sensitivity of Receptor / Resource	Low	Negligible	Minor	Minor	Moderate
	Medium	Negligible	Minor	Moderate	Major
	High	Negligible	Moderate	Major	Major

Significance Definitions

Major	An impact of major significance is considered to be unacceptable. Additional mitigation measures are required to move the significance to the lower categories (e.g. design out the significance, put plans and procedures in place).
Moderate	An impact of moderate significance is considered to be within applicable standards, however, it is best practice to demonstrate that these impacts have been reduced to a level that is as low as reasonably practicable (ALARP). This does not necessarily mean that it has to be reduced to an impact of minor significance, but that moderate impacts are being managed effectively and efficiently.
Minor	An impact of minor significance is considered to be well within applicable standards and is therefore acceptable. A receptor / resource will experience a noticeable effect, but the impact magnitude is sufficiently small (with or without additional mitigation measures) and/or the receptor / resource is of low sensitivity.
Negligible	An impact of negligible significance is one where a resource / receptor will essentially not be affected in any way by a particular activity or the predicted effect is deemed to be 'imperceptible' or is indistinguishable from natural background variations.

5.2 Accidental Events

For accidental events, such as accidental hydrocarbon releases, significance will be determined using the following oil and gas industry standard risk assessment approach:

$$\text{Risk} = \text{Likelihood of Occurrence (Frequency / Probability)} \times \text{Magnitude of Impact (Consequence)}$$

The likelihood of event occurring, the magnitude of impact and the overall risk will be defined using the terminology outlined below in Tables 5.4 to 5.6.

Table 5.4: Determining Likelihood of Occurrence

Likelihood	Definition
Remote	Event is extremely unlikely to occur during the project given the industry best practises and procedures that are in place
Possible	Event has occurred in a minority of similar projects, but is unlikely to occur during the project
Likely	Event could easily occur during the project
Very Likely	Event is almost certain to occur during the project

Table 5.5: Determining Magnitude of Impact

Magnitude	Definition
Severe	Widespread, long-term or potentially irreversible effects on the ecosystem.
	Persistent severe environmental and socio-economic damage that will lead to loss of commercial or recreational use over a wide area for an extended period of time.
	Major transboundary effects expected. Intervention by national and international governmental bodies.
Major	Major, medium-term effects on the ecosystem at a regional or national level.
	Loss of commercial or recreational use from localised areas.
	Transboundary effects expected. Possible intervention by national governmental bodies.
Moderate	Moderate, short to medium-term effects on the ecosystem at a regional or local level.
	Transboundary effects possible. Regional / local public concerns at the community or broad interest or group level.
Minor	Short-term, limited effects on the ecosystem at a local level.
	Unlikely to result in transboundary effects. Limited stakeholder concern or public interest.
Negligible	Immeasurable, undetectable or within the range of normal natural variation.

Table 5.6: Risk Matrix for Accidental Events

		Likelihood			
		Remote	Possible	Likely	Very Likely
Consequence	Negligible	Low	Low	Low	Low
	Minor	Low	Low	Medium	Medium
	Moderate	Medium	Medium	Medium	Medium
	Major	Medium	Medium	High	High
	Severe	High	High	High	High

Significance of Risk Definitions

High	Considered to be a highly significant risk: the level of risk is unacceptable. Additional mitigation measures are required to move the risk to lower risk categories.
Medium	Considered to be a significant risk: the level of risk is considered to be within applicable standards, however, it is best practice to demonstrate that these impacts have been reduced to a level that is as low as reasonably practicable (ALARP).
Low	Not considered to be a significant risk: the level of risk is considered to be broadly acceptable, although commitment to continuous improvement in environmental performance is still required.

6 Potentially Significant Environmental Impacts

This section outlines the scope of each of the topic specific ES assessment chapters and identifies the potentially significant environmental impacts that may arise during the drilling operations for the proposed 98/11-E well; their level of significance will be assessed in full during the EIA process. It also identifies the further assessment work, such as modelling studies, that Corallian proposes to commission to inform the EIA process. Potential standard operating measures have been identified where appropriate. The need or otherwise for further, project specific mitigation measures will be addressed within the ES.

6.1 Physical Presence

6.1.1 Identification and Assessment of Potentially Significant Environmental Impacts

This chapter of the ES will assess the potential for the physical presence of the MODU and associated support vessels to interfere with the activities of other users of the sea (specifically shipping, fishing and recreation vessels). While the MODU is on location, a 500 m safety exclusion zone will be in place. This equates to an area of 0.8 square kilometres at the sea surface that will temporarily be unavailable to other sea users (up to 45 days). Vessels may have to re-route around the drilling location and could therefore be displaced.

Corallian is proposing to commission Anatec Limited, a leading service provider in risk based decision making, to conduct a Navigational Risk Assessment (NRA) to support the EIA. This will include vessel traffic survey (real time data analysis, including seasonal assessment of shipping and recreational vessel movements), collision risk assessment for the MODU, change in ship to ship collision risk from base case risk, review of effect on navigation, review of impacts on local ports and assessment of any cumulative issues. Key navigational stakeholders will be consulted, including the Maritime and Coastguard Agency (MCA), Trinity House, Chamber of Shipping and local ports.

In addition to the above, the use of artificial lights onboard the MODU and support vessels have the potential to disorientate seabirds. Given the location of the 98/11-E well within the Solent and Dorset Coast pSPA, this aspect will also be assessed.

6.1.2 Mitigation Measures

The following standard operating measures will be taken into account during the initial assessment of impact:

- Consent to Locate will be in place for the MODU under Part 4A of the Energy Act 2008;
- 500 m safety exclusion zone will be designated around the MODU;
- Dedicated ERRV will be present to monitor movements of other vessels in the area and prevent them entering the 500 m safety exclusion zone;
- Notifications made to 'regular runners' and local fisheries organisations via Notices to Mariners, Kingfisher, NAVTEX / NAVAREA warnings and fisheries notices.

6.2 Landscape, Seascape and Visual Impact

This chapter of the ES will assess the potential landscape, seascape and visual impacts of the proposed MODU during the drilling of the 98/11-E exploration well. The assessment will be undertaken by a Chartered Landscape Architect employed by Nicholas Pearson Associates. Nicholas Pearson Associates is also a Landscape Institute Registered Practice.

6.2.1 Proposed Methodology

The assessment will be prepared using a methodology (see Appendix D) developed by Nicholas Pearson Associates with reference to publications, including:

Colter (98/11-E) Exploration Well: EIA Scoping Report

- Landscape Institute and Institute of Environmental Management and Assessment (2013) Guidelines for Landscape and Visual Impact Assessment. 3rd Edition;
- Natural England (2014) An Approach to Landscape Character Assessment;
- Natural England (2012) An Approach to Seascape Character Assessment;
- English Heritage (2012) National Heritage Protection Plan (NHPP);
- English Heritage (2008) Historic Seascape Characterisation (HSC) and Method Statement.

The assessment process will involve desk study and field surveys. The magnitude of impacts and their significance will be defined in accordance with the methodology.

The landscape/seascape planning policy context will be described with reference to:

- HM Government (2011) UK Marine Policy Statement (MPS);
- Department for Communities and Local Government (DCLG) (2012) National Planning Policy Framework;
- Marine Management Organisation (MMO) (2016) South Marine Plan. Draft for consultation (refer to Section 2.4);
- Dorset Coast Forum (2011) Dorset Coast Strategy 2011-2021 (refer to Section 2.5);
- Key relevant Local/Mineral Planning Authority Development Plans and National Park / Area of Outstanding Natural Beauty (AONB) Management Plans.

The following strategic environmental assessments will also inform the assessment:

- Department for Trade and Industry (DTI) (2007) Technical Report on the Other Users of the SEA8 Area;
- Department for Energy and Climate Change (DECC) (2009) UK Offshore Energy Strategic Environmental Assessment (including Appendix 3x Landscape and Seascape);
- DECC (2016) Offshore Energy SEA3 (including Appendix 1c Landscape and Seascape).

6.2.2 Identification and Evaluation of Baseline Conditions

Study Area

A core study area of 20 km has been defined, extended up to 35 km as appropriate, for example, where there may be receptors of high sensitivity.

A core 20 km study area is considered to be appropriate as DECC (2016) indicates that the visual range for southern England in spring is 19.5 km. However, Scottish Natural Heritage Guidance on Visual Representation of Wind Farms (2017) indicates that the initial Zone of Theoretical Visibility (ZTV) distance for a wind turbine 101-130 m high should be 35km. Whilst not a wind turbine, the MODU used to drill the 98/11-E well would fall within this height band (refer to Section 3.4). It is acknowledged that the theoretical maximum viewable distance of a structure of this height could be in excess of 35 km, although at such distances it is considered that any effects would not be significant.

The UK Marine Policy Statement indicates that, *“For any development proposed within or relatively close to nationally designated areas the marine plan authority should have regard to the specific statutory purposes of the designated areas.”*

The following relevant designated areas have been identified within the extended study area:

- Dorset AONB;
- Isle of Wight AONB;
- Cranborne Chase & West Wiltshire Downs AONB;
- New Forest National Park;

Colter (98/11-E) Exploration Well: EIA Scoping Report

- Dorset and East Devon Coast World Heritage Site (WHS);
- Tennyson Heritage Coast;
- Hamstead Heritage Coast;
- Purbeck Heritage Coast;
- Registered Parks and Gardens, including the Upper, Central and Lower Pleasure Gardens, and Coy Pond Gardens in Bournemouth.

These designations are identified on Figure 6.1 in Appendix E.

There are also numerous public rights of way along the coast, including the South West Coast Path, and areas of open access land.

The Dorset and East Devon Coast WHS is identified on Figure 6.1 (Appendix E). Impacts on the WHS and its setting will, however, be scoped out of the assessment and not be considered further. This decision has been informed by Section 4.2 of the Dorset and East Devon Coast World Heritage Site Management Plan 2014-2019 which considers the impacts of national energy policy on the WHS. Referring to the proposed Navitus Bay wind farm (now withdrawn), the Management Plan states:

"In respect of developments of this type, the chance of negative impacts on the OUV of the Site are low, as new developments are unlikely to be proposed within the heavily designated boundary itself; for instance the proposed Navitus Bay Wind Farm is approximately 14km offshore at its closest point. ... Many people believe that the boundary of the Site is more than just the narrow coastal strip, and also that the Site was designated for reasons of landscape and natural beauty, rather than its geology and geomorphology. Whilst neither of which is true, the World Heritage status is perceived by some as a means by which developments in the setting can be stopped, even if this is not the case."

Landscape and Seascape Character

The UK Marine Policy Statement indicates that, *"In considering the impact of an activity or development on seascape, the marine plan authority should take into account existing character and quality, how highly it is valued and its capacity to accommodate change specific to any development. Landscape Character Assessment methodology may be an aid to this process."*

In terms of seascape character, the proposed 98/11-E well is located within 'Regional Sea 3' as defined within the Offshore Energy SEA3. It is also within Marine Character Area (MCA) 4 'Poole and Christchurch Bays' as defined by the Marine Management Organisation (MMO) and described within the Seascape Assessment for the South Marine Plan Areas (2014). Adjacent MCAs include MCA 5 'The Solent', MCA 6 'South Wight' and MCA 3 'Portland, Weymouth Bay and Lulworth Banks'. These are identified on Figure 6.2 (Appendix E).

The Dorset Coast Landscape and Seascape Character Assessment (LDA Design, 2010) defines a number of Coastal & Seascape Character Types along the coast. The proposed 98/11-E well location falls with 'Active Coastal Waters'. Within the Seascape Character Assessment it is noted that:

"Any proposals to initiate the extraction of oil in coastal waters should be planned and managed to protect sensitive marine environments and visual and perceptual qualities of the seascape including the considerable recreational value of these coastal waters. The impact on seascape character of any rigs offshore would need to be assessed..."

Within the extent of the study area, the following Seascape Character Types are also present:

- Natural harbour;
- Sandy beaches;
- Shingle beaches and spits;
- Slumped cliffs;
- Hard rock cliffs
- Intertidal rock ledges;

Colter (98/11-E) Exploration Well: EIA Scoping Report

- Man-made harbour;
- Coastal waters
- Inshore waters.

In terms of landscape character, the study area includes the following National Character Areas (NCA), as defined by Natural England and shown on Figure 6.2 in Appendix E:

- NCA 127 'Isle of Wight';
- NCA 131 'New Forest';
- NCA 135 'Dorset Heaths'; and
- NCA 136 'South Purbeck'.

Relevant AONB/County/District Landscape Character Areas/Types will also be identified, i.e. those with a coastal character or coastal views. The Dorset and Hampshire Landscape Character Types are identified on Figure 6.3 in Appendix E.

Relevant Landscape Character Assessments include:

- Dorset County Council, Dorset Landscape Character Assessment;
- Hampshire County Council, Hampshire Integrated Character Assessment;
- Dorset AONB (2008) Conserving Character Landscape Character Assessment & Management Guidance for the Dorset AONB;
- East Dorset District Council (2008) East Dorset Landscape Character Assessment;
- Purbeck District Council (2008) Draft Landscape Character Assessment and Management Guidance (Non-AONB Areas) Purbeck;
- Christchurch Borough Council (2003) Christchurch Borough-wide Character Assessment;
- Isle of Wight AONB (2014) Isle of Wight AONB Management Plan 2014 – 2019. Appendix B Landscape Character Types of the Isle of Wight AONB;
- West Wight Landscape Partnership (2005) West Wight Landscape Character Assessment;
- New Forest National Park (2013) Draft New Forest National Park Landscape Character Assessment.

In addition, there are a number of relevant Coastal and Land Based Natural Areas. The proposed 98/11-E well location falls within Coastal Natural Area 109 – Solent – Poole Bay. Adjacent Coastal Natural Areas include 110 – South Dorset Coast.

Land Based Natural Areas along the coast include:

- 076 - Isle of Wight;
- 077 - New Forest;
- 081 - Dorset Heaths;
- 082 - Isles of Portland and Purbeck.

The LSVIA will set out the relevant characteristics of the above areas and any relevant development or management principles.

Historic Seascape Characterisation

The following Historic Seascape Characterisations will be referred to:

- Seazone (2011) Historic Seascape Hastings to Purbeck and Adjacent Waters;

- Hampshire and Wight Trust for Maritime Archaeology/Bournemouth University/Southampton University (2007) England's Historic Seascapes: Solent and Isle of Wight Pilot Project – Technical Report.

In relation to the latter, the site is located within the Poole Bay Seascape Character Area. The following Seascape Character Areas are adjacent:

- Poole Harbour;
- Swanage Bay;
- Offshore Wight SW;
- Christchurch Harbour;
- The Needles.

Landscape / Seascape Receptors

Consideration of the baseline landscape and seascape character studies will inform the selection of the Landscape Receptors which will be used to assess the level of effect resulting from the proposed MODU.

Visual Baseline

The visual context is determined by a combination of the site's elevation in relation to the surrounding area and the nature of the development and land cover within the study area.

The Offshore Energy SEA3 (DECC, 2016) notes that, "*The visibility of structures at distance from the coast is dependent upon a series of compounding factors including atmospheric/meteorological conditions (haze, precipitation, fog), the chromatic contrast of structures at sea and their surroundings (i.e. sea and sky), the arrangement/complexity of offshore activities, and also the structure height (dipping height) of offshore objects which may be above the level of a given horizon.*"

The context will be established via desk study of mapping. A digitally produced Zone of Theoretical Visibility (ZTV) has been prepared to identify potential locations from which the MODU could be seen, see Figure 6.4 in Appendix E. Field survey is proposed to further test and photograph potential views to the proposed MODU.

The ZTV has been generated with the following parameters:

- Digital terrain model (DTM) resolution: 50 m (Terrain 50);
- Ground surface: Bare
- Observer height: 1.6 m;
- Height to top of proposed structure: 121 m above sea level;
- Haze coefficient: 0.2 (DECC, 2016);
- Curvature of the earth: factored in;
- Study area: core study area 20 km, extended to 35 km.

Following field survey, a number of representative viewpoints from publically accessible land will be selected to represent the views to the proposed MODU for visual receptor groups. The viewpoint locations will be discussed and agreed with relevant stakeholders. Visually verified montages will be prepared for selected viewpoints, the locations of which will again be agreed with relevant stakeholders.

As noted in the description of Marine Character Area 4: Poole and Christchurch Bays (MMO, 2013) extensive views are generally restricted to within 10 km of the coastline, including the settlements of Swanage, Bournemouth and Christchurch. Views to MCA4 from inland locations include Ashley Down on the Isle of Wight, Clearbury Down within the Cranborne Chase and West Wiltshire Downs AONB,

and Blandford Forest and Cerne Abbas within the Dorset AONB. These locations will be reviewed in the context of the proposals.

The coastline is valued for its scenic and heritage qualities, as well as its tourism and recreational attractions. Views are largely panoramic, open views of the coastal landscape and out to sea. Views are generally across Poole Bay, framed by the Isle of Purbeck to the west and Isle of Wight to the east.

Visual Receptor Groups

Visual receptors mainly comprise the residents, employees and visitors of the numerous coastal settlements and the natural and urban attractions, and the commercial and recreational users of the sea itself.

Consideration of the baseline visual context will inform the identification of Visual Receptor Groups. The visual effects of the proposed MODU will be assessed using these Receptor Groups.

6.2.3 Identification and Assessment of Potential Environmental Impacts

The MODU would be towed to and away from the proposed 98/11-E well location. The LSVIA will, therefore, focus on the exploration phase when the MODU is in place.

Exploration Phase

Landscape, seascape and visual impacts will be assessed during the exploration phase as a result of:

- The short-term presence of the MODU (30-45 days during early 2018), with associated lighting. The MODU would operate 24-hours a day and would be lit.
- Air (helicopter) and sea (support vessel) movements between the site and Portland Harbour, Poole Harbour or Southampton.

Night-Time Effects

An assessment will be made of the effects of the proposed MODU at night.

6.2.4 Mitigation Measures

No specific mitigation measures have been defined due to the nature and short duration of the proposed exploration activity.

6.3 Seabed Disturbance

6.3.1 Identification and Assessment of Potentially Significant Environmental Impacts

This chapter of the ES will assess the potential for the temporary siting of the MODU, the discharge of drill cuttings, muds and cements, and the deployment of rig stabilisation material (to prevent scour, if required) to cause disturbance to the seabed.

Disturbance to the seabed can have wide ranging effects, including decline in water quality due to increased turbidity, smothering of organisms and habitats, the loss of habitat attributed to change in substrate characteristics (i.e. from a soft to hard substratum type), toxicity effects from chemical components, pollution to the seabed sediments and water column and potential decrease in local oxygen levels due to the presence of increased organic components. These changes can have direct effects on marine fauna, or indirect effects by habitat degradation or avoidance and loss or redistribution of prey.

As discussed in Section 4.2, Corallian has undertaken a habitat assessment and EBS to identify features of conservation importance and investigate the 'baseline' or background condition of the seabed sediments and associated benthic faunal communities in the vicinity of the drilling location. The presence of potential *Sabellaria spinulosa* reefs was noted at five environmental stations during the 2017 survey (refer to Section 4.4.2). *Sabellaria spinulosa* is known to be moderately sensitive to substratum loss and displacement, but is thought to be capable of high recovery rates (MarLIN, 2017).

Disturbance to the seabed also has the potential to indirectly impact terns foraging within the Solent and Dorset Coast pSPA. Terns are known to prey on species including sandeels (Natural England, 2016), which are considered to be the most important fish species for terns during the breeding season (APEM, 2015). As identified in Section 4.4.3, sandeels may spawn in the vicinity of the proposed 98/11-E well and egg hatching success and recruitment can be adversely affected by activities that disturb seabed sediments.

To determine the significance of the impact of the proposed drilling operations on the seabed the worst-case footprint of each aspect will be estimated and the impact duration of each aspect will be considered. This will then be assessed in light of the sensitivity, resilience and extent of the seabed communities and individual species that could be affected. The potential impact to nearby marine protected areas (Section 4.5) will also be considered.

To estimate the area of seabed disturbed by the drilling muds and cuttings, Corallian proposes to commission environmental dispersion modelling using SINTEF's Dose-related Risk and Effects Assessment Model (DREAM) programme, with utilisation of relevant module ParTrack, for calculation of dispersion and deposition of drill cuttings and mud.

6.3.2 Mitigation Measures

The following standard operating measure will be taken into account during the initial assessment of impact:

- A full Chemical Hazard Assessment and Risk Management (CHARM) assessment of the proposed chemicals to be used and discharged, as required under the Offshore Chemicals Regulations 2002 (as amended), will be undertaken during the permitting process prior to drilling operations commencing.

6.4 Underwater Noise

6.4.1 Identification and Assessment of Potentially Significant Environmental Impacts

This chapter of the ES will assess the potential for underwater noise from the MODU, support vessels and check shot survey to disturb, or cause injury to, sensitive marine fauna, specifically marine mammals and fish, including migratory salmonids and eels. It will also consider whether the proposed drilling operations have the potential to affect a European Protected Species (EPS).

In addition, it will assess the potential for underwater noise to impact on tern species foraging within the Solent and Dorset pSPA, both directly (i.e. avoidance of the area) and indirectly (i.e. disturbance to their prey). Terns prey on species including sandeels and clupeids (such as herring and sardine) (Natural England, 2016); of which, herring is considered to be the most sensitive to underwater noise (Subacoustech Environmental, 2013). By comparison, sandeels have poor sensitivity to sound (Subacoustech Environmental, 2013).

To assess the potential impact to sensitive marine fauna, it is proposed that noise propagation modelling will be undertaken; utilising the model proposed by Richardson *et al.* (1995), which assumes spherical spreading, to calculate the propagation of underwater sound, as shown below:

$$\text{Transmission Loss} = 20\text{Log}(R/R_0) \text{ dB}$$

Spherical spreading is assumed.

R₀ = the reference range, usually 1 metre.

R = the distance from the reference range.

This provides a measure of sound given to a 1-m reference distance, but is based on a number of assumptions; sound transfer is through a homogenous medium (i.e. no attenuation due to variations in temperature, salinity, bathymetry etc.) and infinite space for the sound wave to spread. This method provides a conservative estimate of sound propagation with distance as it struggles to extrapolate sound attenuation in the near field (within tens of metres of the noise source), due to interference between sound waves and reverberation and therefore generally overestimates transmission of sound

from the source. As such, it is considered sufficient to examine a 'worst-case' scenario for noise impacts on marine fauna.

Modelling results will be compared to known thresholds for disturbance and injury to fish (Turnpenny and Nedwell, 1994) and marine mammals (Southall *et al.* 2007) to identify potential zones of impact.

6.4.2 Mitigation Measures

The following standard operating measure will be taken into account during the initial assessment of impact:

- Adherence to JNCC (2017e) guidelines for minimising the risk of injury to marine mammals from geophysical surveys.

6.5 Atmospheric Emissions

6.5.1 Identification and Assessment of Potentially Significant Environmental Impacts

This chapter of the ES will assess the potential for atmospheric emissions from the combustion of hydrocarbons for power generation by the MODU, support vessels and aircraft (refer to Section 3.8) to impact upon air quality and effect sensitive receptors, such as designated nature conservation sites. Consideration will also be given to the impact on global warming and the ozone layer.

Existing ambient air quality and baseline conditions will be reviewed using available air quality data. A project specific baseline monitoring survey is not considered necessary.

A simple dispersion model (assuming spherical spreading) will be used to estimate the spreading of atmospheric gases emitted from power generation during the proposed drilling operations, under calm atmospheric conditions. It is not proposed to use ADMS (Atmospheric Dispersion Modelling Software) for dispersion modelling.

6.5.2 Mitigation Measures

The following standard operating measures will be taken into account during the initial assessment of impact:

- Use of fuel oil with a sulphur content of no more than 0.1% in accordance with MARPOL and UK regulatory requirements;
- Vessels and contractors will have UK/International Air Pollution Prevention Certificates.

6.6 Marine Discharges

6.6.1 Identification and Assessment of Potentially Significant Environmental Impacts

This chapter of the ES will assess the potential for planned operational discharges of drill cuttings, drilling mud and associated chemicals to impact marine flora and fauna.

The majority of chemicals in WBM pose little or no risk to the marine environment; however, the discharge of drill cuttings can cause a temporary plume in the water column that may have short-term localised impact on plankton and pelagic fish species and could adversely impact nearby marine protected areas (Section 4.5).

As noted in Section 6.3, Corallian proposes to commission environmental dispersion modelling using SINTEF's Dose-related Risk and Effects Assessment Model (DREAM) programme, with utilisation of relevant module ParTrack, for calculation of dispersion and deposition of drill cuttings and mud.

6.6.2 Mitigation Measures

The following standard operating measures will be taken into account during the initial assessment of impact:

- A full CHARM analysis assessment of the proposed chemicals to be used and discharged, as required under the Offshore Chemicals Regulations 2002 (as amended), will be undertaken during the permitting process prior to drilling operations commencing.

6.7 Accidental Hydrocarbon Releases

6.7.1 Identification and Assessment of Potentially Significant Environmental Impacts

This chapter of the ES will assess the potential risk of a major hydrocarbon spill occurring from the proposed drilling operations; namely loss of containment on the MODU due to collision or other major event or a well blow-out resulting in an uncontrolled release of hydrocarbons from the well that can only be stopped by drilling a relief well, and the potentially significant environmental and socio-economic impacts that could occur in the event of a major spill. It will also confirm whether any of the impacts have the potential to constitute a Major Environmental Incident (MEI).

In order to determine the fate of a major hydrocarbon spill in the marine environment, Corallian proposes to commission modelling using RPS ASA's OILMAP modelling package. OILMAP provides rapid predictions of the fate and transport of spilled oil and can calculate the probability of key areas being impacted.

All modelling will be undertaken in accordance with the requirements outlined in Appendix B of the OPRED Guidance Notes for Preparing Oil Pollution Emergency Plans for Offshore Oil & Gas Installations and Relevant Oil Handling Facilities (Revision 3: December 2016).

6.7.2 Mitigation Measures

In planning its activities, a primary focus of Corallian is to ensure that all practicable measures are taken to prevent the occurrence of accidental events and, should they occur, mitigate their effects. The risk of an accidental release occurring from the proposed drilling operations will be minimised through the implementation of a number of measures including:

- Following a risk assessed and independently reviewed drilling programme that adheres to the latest well design and well integrity guidelines including the Offshore Installation & Wells (Design & Construction, etc.) Regulations 1996 and the Oil & Gas UK Well Life Cycle Integrity Guidelines (issue 2 2014);
- Use of competent personnel to perform and supervise all aspects of the operation.

Measures to respond to a spill from the MODU will be covered in an approved oil pollution and emergency plan (OPEP), which will be prepared in advance of activities commencing offshore.

6.8 In-combination and Cumulative Impacts

There are no known existing, consented or planned activities in the vicinity of the proposed 98/11-E well that are likely to result in significant in-combination or cumulative impacts. This will be confirmed in consultation with relevant stakeholders.

6.9 Transboundary Impacts

As the proposed 98/11-E well lies approximately 90 km north of the France/UK transboundary line, potentially significant transboundary impacts are considered unlikely; however, where relevant, transboundary impacts will be considered during the EIA process.

7 Next Steps

Corallian is proposing to formally submit the ES for the 98/11-E well to OPRED at the end of November 2017. In advance of this, Corallian would welcome comments from stakeholders on the scope of the ES, particularly if a stakeholder believes that there are additional issues or likely significant environmental impacts that should be considered during the EIA process or if a stakeholder is aware of any relevant data that may be of interest to Corallian and the EIA team.

Comments and recommendations received during this scoping exercise shall inform the EIA process and will be documented in the ES. Please note, consultation will not be limited to the scoping phase of the project, but will be ongoing as part of the EIA process.

Any comments can be e-mailed directly to Fay Dobson (Principal Consultant at Orbis) at: fay@orbisltd.com.

8 References

- APEM (2015) *Navitus Bay Wind Park: Tern Foraging and Underwater Noise HRA Technical Note*. APEM. Report No. 512854 – 14b. Available at: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010024/EN010024-005622-Navitus%20Bay%20Response%20to%20Deadline%20VI%20-%20Appendix%201%20Tern%20Foraging%20and%20Underwater%20Noise%20HRA%20Technical%20Note.pdf> [Accessed September 2017].
- BSL (2017) *Survey Report: Geophysical and Environmental Services for the Colter (98/11 e) Well Environmental Baseline Survey*. (Technical Report) July 2017, Revision 0, Report No. 1727_FR.
- CEFAS (2007) *A Review of the Contaminant Status of SEA 8 covering the Western Approaches, Celtic Sea and English Channel*. Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/197007/SEA8_Tech_Rep_Contaminants.pdf [Accessed August 2017].
- Coull, K.A., Johnstone, R. and Rogers, S.I. (1998) *Fisheries Sensitivity Maps in British Waters*. Aberdeen: UKOOA Ltd.
- Crown Estate (2017a) *The Crown Estate Offshore Activity Map*. Available from: <https://www.thecrownestate.co.uk/media/552601/ei-all-offshore-activity-uk-a2.pdf> [Accessed December 2016].
- Crown Estate (2017b) *Active Dredge Zones for the South Coast Region: Issue 30 - correct as of 31/07/17*. Available from: <https://www.thecrownestate.co.uk/media/855305/ei-south-active-area.pdf> [Accessed August 2017].
- Davis, M.L. and Cornwell, D.A. (1991) *Introduction to Environmental Engineering*. McGraw-Hill International. Page 459
- DECC (2009) *UK Offshore Energy Strategic Environmental Assessment. Future Leasing for Offshore Wind Farms and Licensing for Offshore Oil & Gas Storage. Environmental Report*. Aberdeen: Department of Energy and Climate Change (DECC).
- DECC (2013) *Offshore Oil & Gas Licensing 27th Seaward Round: Central English Channel. Habitats Regulations Assessment – Appropriate Assessment*. Available from: <https://www.gov.uk/government/consultations/27th-seaward-licensing-round> [Accessed August 2017].
- DECC (2015) *Navitus Bay Wind Park – Habitats Regulations Assessment. September 2015*. Available from: <https://infrastructure.planninginspectorate.gov.uk/projects/south-east/navitus-bay-wind-park/?ipcsection=overview> [Accessed August 2017].
- DECC (2016) *UK Offshore Energy Strategic Environmental Assessment 3 (OESEA3)*. Aberdeen: Department of Energy and Climate Change (DECC). Available from: <https://www.gov.uk/government/consultations/uk-offshore-energy-strategic-environmental-assessment-3-oesea3> [Accessed August 2017].
- DEFRA (2017) *MAGIC Mapping Portal*. Available from: <http://magic.defra.gov.uk/home.htm> [Accessed August 2017].
- Dorset Coastal Forum (2011) *Dorset Coast Strategy 2011 -2021*. Available from: https://www.dorsetforyou.gov.uk/media/195169/Dorset-Coast-Strategy-2011-2021/pdf/Dorset_Coast_Strategy_finallow_res.pdf [Accessed September 2017].
- Dorset Wildlife Trust (2016) *Last Chance to Create Network of Marine Conservation Zones in Dorset*. Available from: <https://www.dorsetwildlifetrust.org.uk/last-chance-for-marine-network.html> [Accessed September 2017].
- Ellis, J.R., Milligan, S.P., Readdy, L., Taylor, N. and Brown, M.J. (2012) *Spawning and nursery grounds of selected fish species in UK waters*. Lowestoft: Centre for Environment, Fisheries and Aquaculture Science (CEFAS). Report No. 147.

Colter (98/11-E) Exploration Well: EIA Scoping Report

EMODnet (2016) *Mapping European Seabed Habitats (MESH) Project*. European Marine Observation and Data Network (EMODnet). Available from: <http://www.emodnet-seabedhabitats.eu/> [Accessed August 2017].

ENSCO Plc (2017) *EnSCO 92*. Available at: <http://www.enscoplc.com/global-operations/rig-fleet/default.aspx> [Accessed September 2017].

Eurocopter (2009) *EC225 Technical Data*. Available from: http://airbushelicoptersinc.com/images/products/ec225/ec225-tech_data_2009.pdf [Accessed September 2017].

Farrell, E., McCully, S. and Ellis, J. (2015) Hound sharks (Triakidae). IN: H.J.L. Heessen, H. Daan & J.R. Ellis (2015) *Fish Atlas of the Celtic Sea, North Sea and Baltic Sea*. The Netherlands: Wageningen Academic Publishers, 76-80.

Genesis (2011) *Review and assessment of underwater sound produced by oil and gas activities and potential reporting requirements under the Marine Strategy Framework Directive*. Aberdeen: Genesis Oil and Gas Consultants. Report No. J71656-Final Report-G2.

Hammond, P.S. Northridge, S.P., Thompson, D., Gordon, J.C.D., Hall, A.J., Murphy, S.N. and Embling, C.B. (2008) *Background information on marine mammals for Strategic Environmental Assessment 8. Report to DECC*. St Andrews: Sea Mammal Research Unit. Available from: <https://www.gov.uk/government/publications/strategic-environmental-assessment-8-supporting-documents> [Accessed August 2017].

iCoast (2012) *iCoast Map*. Available from: <http://www.icoast.co.uk/map/> [Accessed September 2017].

JNCC (1999) *Seabird Vulnerability in UK Waters: Block Specific Vulnerability*. Aberdeen: Joint Nature Conservation Committee.

JNCC (2008) *Information Sheet on Ramsar Wetlands (RIS) - Dorset Heathlands*. Available from: <http://jncc.defra.gov.uk/pdf/RIS/UK11021.pdf> [Accessed September 2017].

JNCC (2015a) *The Wildlife and Countryside Act 1981*. Available at: <http://jncc.defra.gov.uk/page-1377> [Accessed September 2017].

JNCC (2015b) *The Marine Habitat Classification for Britain and Ireland. Version 15.03*. Available from: jncc.defra.gov.uk/MarineHabitatClassification [Accessed August 2017].

JNCC (2017a) *SAC Selection: 1106 Atlantic Salmon (Salmo salar)*. Available from: <http://jncc.defra.gov.uk/protectedsites/SACselection/species.asp?FeatureIntCode=S1106> [Accessed August 2017].

JNCC (2017b) *SAC Selection: 1099 River Lamprey (Lampetra fluviatilis)*. Available from: <http://jncc.defra.gov.uk/ProtectedSites/SACselection/species.asp?FeatureIntCode=S1099> [Accessed August 2017].

JNCC (2017c) *UK Protected Sites*. Available from: <http://jncc.defra.gov.uk/page-4> [Accessed August 2017].

JNCC (2017d) *The Directive 2009/147/EC on the conservation of wild birds (codified version)*. Available from: <http://jncc.defra.gov.uk/page-1373> [Accessed September 2017].

JNCC (2017e) *JNCC guidelines for minimising the risk of injury to marine mammals from geophysical surveys (August 2017)*. Peterborough: Joint Nature Conservation Council (JNCC). Available online: http://jncc.defra.gov.uk/marine/seismic_survey [Accessed August 2017].

Jones, E.L., Morris, C. D., Smout, S. and McConnell, B. J. (2016) *Population scaling in 5 km x 5 km grey and harbour seal usage maps. St. Andrews: Sea Mammal Research Unit*. Available from: http://www.smru.st-andrews.ac.uk/smrudownloader/uk_seal_usage_of_the_sea [Accessed August 2017].

KIS-ORCA (2017) *Offshore Interactive Map. Kingfisher Information Service - Offshore Renewable & Cable Awareness project*. Available from: <http://www.kis-orca.eu/map#.WaaYG8iGNPY> [Accessed August 2017].

Colter (98/11-E) Exploration Well: EIA Scoping Report

Lalli, C. and Parsons, T. (1993) *Biological Oceanography: An Introduction*. Oxford: Elsevier Butterworth Heinemann.

LDA Design Consulting (2010) *Dorset Coast Landscape and Seascape Character Assessment*. Oxford: LDA Design Consulting LLP. Available from: http://www.cscope.eu/_files/MSP_Dorset/Land-and-Seascape_Character_Assessment.pdf [Accessed September 2017].

MALSF (2016) *South Coast REC Interpretation and Analysis WebGIS*. Marine Aggregate Levy Sustainability Fund (MALSF). Available from: <http://www.southcoastrecgis.org.uk/sc/> [Accessed August 2017].

Marine Scotland (2016) *Fishing Effort, Quantity and Value of Landings by ICES Rectangle – 2009 to 2013*. Available from: www.scotland.gov.uk/Topics/Statistics/Browse/Agriculture-Fisheries/RectangleData [Accessed August 2017].

MarLIN (2017) *Species (A-Z)*. Available from: <http://www.marlin.ac.uk/species/az/scientific> [Accessed September 2017].

METOC (2007) *Technical Report on the Other Users of the SEA 8 Area*. Report to UK Department of Trade and Industry by Metoc plc. Report No. R1673, Rev 1. Available from: <https://www.gov.uk/government/publications/strategic-environmental-assessment-8-supporting-documents> [Accessed August 2017].

MMO (2013) *Seascape Assessment for the South Marine Plan Areas, MCA 4: Poole and Christchurch Bays*. Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/321932/1037d.pdf [Accessed September 2017].

MMO (2017) *South Marine Plans*. Newcastle upon Tyne: Marine Management Organisation (MMO). Available from: <https://www.gov.uk/government/collections/south-marine-plans> [Accessed August 2017].

Natural England (2013) *Poole Rocks MCZ Factsheet (MCZ041)*. Department for Environment Food and Rural Affairs (DEFRA). Available from: <http://publications.naturalengland.org.uk/publication/5580836816551936> [Accessed August 2017].

Natural England (2016a) *Departmental Brief: Solent and Dorset Coast potential Special Protection Area (pSPA)*. Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/560622/solent-dorset-departmental-brief.pdf [Accessed September 2017].

Natural England (2016b) *Dorset Marine Conservation Zones Update*. Presentation given at Dorset Coast Forum Annual Meeting 2016, Swanage, 17th November 2016. Available from: <https://www.dorsetforyou.gov.uk/dorset-coast-forum/events> [Accessed September 2017].

Natural England (2017a) *Marine Conservation Zone Designations*. Available from: <http://publications.naturalengland.org.uk/category/6742552893980672> [Accessed August 2017].

Natural England (2017b) *Designated Sites View*. Available from: <https://designatedsites.naturalengland.org.uk/SiteSearch.aspx> [Accessed August 2017].

Natural England (2017c) *Discretionary Advice Service (Charged Advice) (DAS/207942)* in relation to the Colter Prospect (98/11-E), Dorset Coast (Personal communication, March 2017).

Natural England and DEFRA (2016) *Solent and Dorset Coast Potential Special Protected Area: comment on proposals*. Available from: <https://www.gov.uk/government/consultations/solent-and-dorset-coast-potential-special-protection-area-comment-on-proposals> [Accessed August 2017].

Navitus Bay (2014) *Navitus Bay Wind Park - Clarification note on matters relating to migrating adult salmon (Salmo salar)*. Navitus Bay Development Limited. Available from: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010024/EN010024-004643-Navitus%20Bay%20Response%20to%20Deadline%20III%20>

Colter (98/11-E) Exploration Well: EIA Scoping Report

%20Appendix%2034%20Matters%20Relating%20to%20Migrating%20Adult%20Salmon%20clarificatio
n%20note.pdf [Accessed August 2017].

Navitus Bay (2015) *Navitus Bay Wind Park*. Available from: <http://www.navitusbaywindpark.co.uk/> [Accessed August 2017].

OGA (2016a) *29th Licensing Round Information – Levels of Shipping Activity*. Available from: https://www.ogauthority.co.uk/media/1419/29r_shipping_density_table.pdf [Accessed August 2017].

OGA (2016b) *29th Licensing Round Information – Other Regulatory Issues*. Available from: https://www.ogauthority.co.uk/media/2213/other_regulatory_issues-230816.pdf [Accessed August 2017].

OGUK (2015) *Guidelines for the Abandonment of Wells, Issue 5, July 2015*. London; Oil & Gas UK.

OGUK (2016) *Environment Report 2016*. Aberdeen: UK Oil and Gas Industry Associated Limited. Available from: <http://oilandgasuk.co.uk/environment-report.cfm> [Accessed September 2017].

OSPAR (2017) *List of Threatened and/or Declining Species & Habitats*. Available from: <http://www.ospar.org/work-areas/bdc/species-habitats/list-of-threatened-declining-species-habitats> [Accessed August 2017].

Reid, J.B., Evans, P.G.H. and Northridge, S.P. (2003) *Atlas of Cetacean distribution in north-west European waters*. Peterborough: Joint Nature Conservation Committee (JNCC).

Richardson, W.J., Greene, C.R. Jr., Malme, C.I. and Thomson, D.H. (1995) *Marine Mammals and Noise*. San Diego: Academic Press.

SCOS (2015) *Scientific advice on matters related to the management of seal populations: 2015*. St. Andrews: Special Committee on Seals (SCOS). Available from: <http://www.smru.st-andrews.ac.uk/research-policy/scos/> [Accessed August 2017].

Southall, B.L., Bowles, A.E., Ellison, W.T., Finneran, J.J., Gentry, R.L., Greene Jr., C.R., Kastak, D., Ketten, D.R., Miller, J.H., Nachtigall, P.E., Richardson, W.J., Thomas, J.A. and Tyack, P.L. (2007) Marine mammal noise exposure criteria: initial scientific recommendations. *Aquatic Mammals*. 33: 411–521.

Subacoustech Environmental (2013) *Modelling of subsea noise during the proposed piling operations at the Dudgeon Wind Farm*. Hampshire: Subacoustech Environmental Ltd. Report No. E438R0106. Available from: [http://dudgeonoffshorewind.co.uk/about/consenting_docs/4.1%20Underwater%20Noise%20Modelling%20\(Subacoustech%20Environmental%20Ltd\).pdf](http://dudgeonoffshorewind.co.uk/about/consenting_docs/4.1%20Underwater%20Noise%20Modelling%20(Subacoustech%20Environmental%20Ltd).pdf) [Accessed September 2017].

The Planning Inspectorate (2015) *Press Release: Navitus Bay Wind Park decision - refused development consent*. Available from: <https://www.gov.uk/government/news/navitus-bay-wind-park-decision-refused-development-consent> [Accessed August 2017].

Turnpenny, W. H. and Nedwell J. R. (1994) *The Effects on Marine Fish, Diving Mammals and Birds of Underwater Sound Generated by Seismic Surveys*. Southampton: Fawley Aquatic Research Laboratories Ltd / Subacoustech Ltd.

Tyrell, D. (2004) *DTI Strategic Environmental Assessment Area 8 (SEA8): Oceanography and Hydrography. Final Report, March 2004*. Available from: <https://www.gov.uk/government/publications/strategic-environmental-assessment-8-supporting-documents> [Accessed August 2017].

UK Oil & Gas Data (2017) *ArcGIS Map*. Available from: https://www.ukoilandgasdata.com/dp/controller/PLEASE_LOGIN_PAGE [Accessed August 2017].

Webb, A., Elgie, M., Irwin, C., Pollock, C. and Barton, C. (2016) *Sensitivity of offshore seabird concentrations to oil pollution around the United Kingdom: Report to Oil & Gas UK*. Available from: <http://jncc.defra.gov.uk/page-7373> [Accessed August 2017].

Wildlife Trusts (2017) *We Need More Marine Conservation Zones*. Available from: <http://www.wildlifetrusts.org/mczs> [Accessed August 2017].

Appendix A: Preliminary Consultation Responses

Organisation	Issues Raised
<p>The Crown Estate</p>	<p>Permission from The Crown Estate (TCE) is required to undertaken works on the territorial seabed therefore, a licence must be in place prior to drilling. A conservative lead-time to secure consent from TCE is six months. Of note is that there is no standard form of consent for drilling activities. TCE can grant an Option Agreement in advance if the JV group would like additional certainty over the terms on which TSE would grant rights.</p> <p>Note that to grant rights for an activity, TCE requires assurance that the applicant has the necessary expertise and resources (or plans to obtain them) to progress the project to a successful outcome and that due regard has been made to other seabed interests.</p> <p>The Small Works Consent has been recently renamed as the 'Seabed Survey Licence' and concerns temporary works with no lasting effects.</p>
<p>Department for Business, Energy and Industrial Strategy (BEIS)</p>	<p>The normal permitting regime would apply as for any other offshore well located outside of the 12 nautical mile limit. All permits would be submitted via the UK Oil Portal. However, an Appropriate Assessment (AA) would be required given the proximity to a number of protected areas and the proximity to the coast. A robust Environmental Impact Assessment (EIA) would therefore be required in order to allow BEIS (as the competent authority) to carry out the AA efficiently. Permit applications should be submitted as early as possible due to the sensitivity of the area.</p> <p>BEIS would not impose any project-specific restrictions on any discharges for the proposed well that would not be applicable to any other well unless they are likely to have a significant impact on the receiving environment. No restrictions would be placed on the discharge of food waste and sewage provided it was treated and macerated prior to discharge, as the rig will be beyond the 3 nautical miles limited where MARPOL prohibits discharge. In addition, a number of drilling rigs that drill in shallow waters nearshore have suitable holding tanks to retain all sewage and food waste, thereby allowing for discharge in open waters in transit.</p> <p>BEIS would not impose any restrictions on the use and discharge of drilling fluids. However, cuttings modelling would be required if discharging water-based mud (WBM) and associated cuttings to demonstrate that the discharge would not have a significant impact on any of the nearby statutory designations and their qualifying features. Modelling would need to incorporate the tidal flow in the area.</p> <p>Finally it was noted that if the JV group still need to appointment a well operator, this process would need to be done through the Oil & Gas Authority (OGA) and can take up to three months.</p>
<p>The Centre for Environment, Fisheries and Aquaculture Science (CEFAS)</p>	<p>CEFAS provides advice to BEIS regarding the environmental risks associated with the use of offshore chemicals in drilling operations; under The Offshore Chemicals Regulations 2002 (as amended). This advice, and the risk assessment, would therefore be covered by the Drilling Operations Permit submitted via the UK Oil Portal. CEFAS also advised that they are not part of the approval process for other issues surrounding the submission of the relevant Drilling Operations Permit and that any other issues would be the responsibility of the BEIS EMT.</p>

Colter (98/11-E) Exploration Well: EIA Scoping Report

Organisation	Issues Raised
<p>Natural England (NE)</p>	<p>NE has confirmed that there are a number of designated sites in the area which would need to be taken into account during the impact assessment for the project. These sites include the Studland and Godlingston Heaths SSSI, Studland Cliffs SSSI, Poole Bay Cliff SSSI, Poole Harbour and South Dorset Coast SSSI, The Needles Marine Conservation Zone, Studland to Portland cSAC and Poole Rocks Marine Conservation Zone. In addition, the full scope of the next tranche of marine conservation zones is yet to be decided and, as such, NE recommended that they are re-contacted in the next couple of months for an update on this process.</p> <p>Consultations have also recently occurred on Solent and Dorset Coast pSPA and Poole Bay SPA extension. There are also a number of designated sites around the Isle of Wight coast which may warrant consideration.</p> <p>Additionally NE has advised that impacts on marine mammals should be taken into account and mitigated for as required, particularly coastal bottlenose dolphin in this area.</p> <p>It was noted that NE offer a discretionary advice service for pre-application advice, refer to https://www.gov.uk/guidance/developers-get-environmental-advice-on-your-planning-proposals. The JV group may want to utilise this service as the project progresses due to the proximity of the proposed well location to designated sites of nature conservation, landscape, green infrastructure gains and potential for biodiversity enhancements. It should be noted, however, that NE charge a fee for this service.</p>
<p>Environment Agency (EA)</p>	<p>EA noted that the works fall outside the normal regulatory regime that the EA would provide advice for however, they considered the following environmental sensitivities should be considered in any future assessment for the proposed works:</p> <ul style="list-style-type: none"> Protected sites including (but not limited to): Studland to Portland SAC (reef and mussel beds are sensitive to pollutants / contaminants), River Frome SSSI (salmonids – see below), River Avon SAC (salmonids), Studland Bay to Hengistbury Head Bathing Water and Poole Harbour Shellfish Waters designation; Migratory salmonids are present within Poole Harbour and the connecting river systems and use the Dorset Coast as their migratory route. Migratory salmonids are sensitive to noise and vibration and will avoid moving through areas where noise / vibration of certain frequencies are present. Sufficient evidence should be provided pertaining to the expected un-weighted sound pressure level and sound exposure level for all phases of the project to determine whether there is likely to be significant effect on salmonids; Eels are known to be present within Pool Harbour and a number of the connecting river systems. The applicant is expected to illustrate that this development will not have a significant impact on eel populations; The applicant must ensure that the project will not have a significant impact on the Water Framework Directive (WFD) status of this water body and any water bodies connected to this system. For example, there is a risk that activities resulting in noise / vibration could cause an effective barrier to salmonid migration. If this were to occur it would likely result in a deterioration in WFD status. There is a screening process that the applicant should undertake to determine if there is a risk of impact on WFD water bodies. If the screening assessment shows that there is a risk, full WFD assessment will be required. Additional information is available from the EA if needed;

Colter (98/11-E) Exploration Well: EIA Scoping Report

Organisation	Issues Raised
	<ul style="list-style-type: none"> The risk of contamination through leakage and accidental damage resulting in significant impacts on the surrounding ecosystem are considered a risk with this project. The EA would expect the applicant to produce a detailed management and mitigation plan detailing the likely impacts of this risk and how it will be managed. It was also noted that a Habitats Regulatory Assessment (HRA) may be required unless the applicant can illustrate that there are no impact pathways from the project to the adjacent protected areas. <p>The MoD has confirmed that they have no safeguarding concerns with regards to the proposed drilling operations within Block 98/11.</p>
Ministry of Defence (MoD)	
Oil & Gas Authority (OGA)	<p>OGA were contacted due to the following licence condition attached to UKCS 98/11: <i>'MoD has informed OGA of defence related operations in the block. Any production licence granted for the block will specify that no surface drilling or infrastructure development may occur within the block, which means that the subsurface will only be accessible from adjacent areas'</i>. However, the OGA has since stated that the MoD would have the final decision regarding restrictions on offshore oil and gas operations within their designated training areas and should therefore be contacted directly (see above).</p>
Marine Management Organisation (MMO)	<p>Confirmed that the proposed drilling activities would be exempt from requiring a marine licence under Part 4, Chapter 2 of the Marine and Coastal Access Act (2009). Recommended that discussions are also held with the National Federation of Fishermen's Organisations (NFFO) and that a Notice to Mariners be issued to notify all marine users of the proposed activities.</p>
National Federation of Fishermen's Organisations (NFFO)	<p>The JV group should be aware that there is extensive static fisheries in this area, which will undoubtedly be encountered within the vicinity of the proposed drilling location. Early consultation is key, three months would be recommended for a project such as this. The timing of the operations may also need to be considered, as in winter the shellfish fishery tends to move into colder shallower water and during the summer it moves out into deeper cooler waters.</p> <p>The NFFO would also recommend the presence of a Fisheries Liaison Officer (FLO) on board any survey vessel(s) as this would allow engagement with the local fishery, but would also provide an 'insurance policy' for the JV group against claims of errant / damage to fishing gear from any operations.</p>

Appendix B: EIA Scoping Consultees

The following organisations have been sent a copy of this EIA Scoping Report:

- Borough of Poole
- Bournemouth Borough Council
- Centre for Environment, Fisheries and Aquaculture Science (CEFAS)
- Christchurch Borough Council
- Dorset and Isle of Wight AONB Partnerships
- Dorset County Council
- Dorset Coast Forum
- Environment Agency (EA)
- Hampshire County Council
- Isle of Wight Council
- Joint Nature Conservation Committee (JNCC)
- Maritime and Coastguard Agency (MCA)
- Ministry of Defence (MoD)
- National Federation of Fishermen's Organisations (NFFO)
- National Trust
- Natural England (NE)
- New Forest District Council;
- New Forest National Park Authority
- Offshore Petroleum Regulator for Environment and Decommissioning (OPRED)
- Purbeck District Council
- Royal Society for the Protection of Birds (RSPB)
- Royal Yachting Association (RYA)
- Southern Inshore Fisheries and Conservation Authority (IFCA)
- The Crown Estates (TCE)
- Trinity House

Appendix C: Sites of Special Scientific Interest (SSSIs)

Nationally designated Sites of Special Scientific Interest (SSSIs) within 40 km of the proposed 98/11-E well are summarised in Table C.1 below.

Table C.1. SSSIs within 40 km of the Proposed 98/11-E Well (*Natural England, 2017b*)

Site Name	Distance / Bearing	Designating Features
Studland Cliffs SSSI	6.5 km WSW	This site forms part of the Dorset Heritage Coast and is an Area of Outstanding Natural Beauty (AONB). It contains features of geological and palaeontological importance and is recognised as important for studying coastal geomorphology. The site also includes a strip of maritime cliff-top grassland and the Studland Wood, which support a rich invertebrate faunal assemblage.
Purbeck Ridge (East) SSSI	7.5 km WSW	The site forms part of the Dorset Heritage Coast and AONB. The site contains a number of geological formations of interest (including three Geological Conservation Review (GCR) Sites) and extensive areas of high quality chalk with important lower plant communities. Ancient broadleaf woodland is also found here and supports a diverse flora, along with chalk heath and grassland communities, ferns and meadows. Butterflies and other invertebrate communities are also a key feature of this site.
Poole Bay Cliffs SSSI	7.5 km N	The site includes the Bournemouth Freshwater Beds which are important for studying river system sedimentology. The beds have a diverse fossil flora and areas of cliff support heath and dune-like vegetation.
Studland and Godlingston Heaths SSSI	8 km WNW	The site forms part of the Dorset Heritage Coast and AONB. This site is considered a key site for its coastal geomorphology. The range of habitats at this site, including an expanse of heathland with many rare animals, makes this area of outstanding importance for nature conservation. The site supports a rich invertebrate fauna including dragonfly, grasshoppers, moths and beetles and the smooth snake. Dunes are also present with associated grassland habitat, bog pools and acidic dune systems.
Avon River System SSSI	9 km NE	The River Avon and its tributaries are of national and international importance for their wildlife communities. The system supports wild populations of migratory sea trout <i>Salmo trutta</i> , brown trout and Atlantic salmon <i>Salmo salar</i> . The system also supports eel <i>Anguilla Anguilla</i> and sea lamprey <i>Petromyzon marinus</i> , the latter of which has particularly important spawning areas in the upper reaches. Also evidence of otter <i>Lutra lutra</i> .
Poole Harbour SSSI	9 km NW	Poole Harbour is one of the largest natural harbours in the world and its extensive intertidal marshes and mudflats and permanent channels support large numbers of wintering wildfowl and waders. The fringing heathland, grassland and islands support scarce and restricted flora and fauna. This site is also designated as a SPA and Ramsar site due its bird populations (refer to Table 4.1).
South Dorset Coast SSSI	9 km SW	The site forms part of the Dorset Heritage Coast and AONB and is of geological interest and also supports a range of wildlife habitats and species. The coastal cliffs expose a complete section through the Upper Jurassic and Cretaceous rock succession. Many of the formations are of international importance for their fossil assemblages.

Colter (98/11-E) Exploration Well: EIA Scoping Report

Site Name	Distance / Bearing	Designating Features
Christchurch Harbour SSSI	9 km NE	This site supports a variety of habitats including saltmarsh, wet meadows, drier grassland, heath, sand dune, woodland and scrub. The site is also of geological and ornithological interest. The Harbour is also regarded an important nursery ground for a number of fish species including bass, mullet and Pollack.
Avon Valley (Bickton to Christchurch) SSSI	10 km NE	The River Avon shows a greater range of habitats and a more diverse flora and fauna than any other chalk river valley in Britain. The river important populations of migratory Atlantic salmon <i>Salma salar</i> and brown trout <i>Salma trutta</i> and supports a small population of otters <i>Lutra lutra</i> . It is also an important area for birds.
Moors River System SSSI	12 km N	The Moors River is part of a national series of river SSSIs and is a Nature Conservation Review site, and includes the River Crane and Leaden Stour. River Crane is dominated by brown trout <i>Salmo trutta</i> , with a high proportion of the anadromous sea trout. Eel <i>Anguilla anguilla</i> occur extensively along these headwaters. In addition, breeding otter <i>Lutra lutra</i> are present in the Moors.
Highcliffe to Milford Cliffs SSSI	13 km NE	This site comprises steep coastal slopes and cliffs intersected by deep ravines. There are a number of fossil-rich geological formations of international importance.
Arne SSSI	14.5 km NW	The Arne Peninsula lies on the southern shore of Poole Harbour and holds an extensive area of lowland heathland on the Bagshot Beds with diverse plant and animal communities. There are fine transitions from heathland into saltmarsh, reed swamp, coniferous and deciduous woodland and the site contains a geological exposure of high fossil plant interest.
Headon Warren and West High Down SSSI	17 km E	This site comprises Tertiary geological formations and chalk ridges. Headon Warren supports mainly acid, heath vegetation and West High Down supports species-rich chalk grassland. The eroded chalk formations are of great geological interest in this area. The cliff habitat also supports colonies of gulls, cormorants, fulmar, kittiwakes and shags.
Holton and Sandford Heaths SSSI	17.5 km NW	The site lies to the north west of Poole Harbour and consists of heathland and wetland habitats along the Sherford River and fringing Poole Harbour. The site is important for habitats including river valley and coastal wetlands as well as for a number of rare or scarce species associated with all of these habitats.
River Frome SSSI	19.5 km W	The River Frome is the most westerly example of a major chalk stream in Great Britain. This site supports species including eel <i>Anguilla anguilla</i> , sea lamprey <i>Petromyzon marinus</i> , smelt <i>Osmerus esperlanus</i> , brown trout <i>Salmo trutta</i> (including sea trout) and Atlantic salmon <i>Salmo salar</i> . The latter two species spawn within the SSSI section of the river. Otter <i>Lutra lutra</i> have also been recorded in the River Frome.
Hurst Castle and Lymington River Estuary SSSI	20 km NE	This site extends along the north-west of the River Solent and hosts a range of coastal habitats, not commonly found in the area, and is of biological and geomorphological importance. Habitats include intertidal mud flats, seagrass and saltmarsh and a series of saline lagoons with important brackish water communities. These support internationally important breeding populations of seabirds and foraging waders and waterfowl.

Colter (98/11-E) Exploration Well: EIA Scoping Report

Site Name	Distance / Bearing	Designating Features
Colwell Bay SSSI	21 km ENE	This site is designated for its geological formations and for its rich, predominantly molluscan fauna (marine and brackish to freshwater). This site is also important for its sparse but significant flora fossils.
Lymington River SSSI	22 km NE	The Lymington River system is the largest in the New Forest, and the SSSI includes two contrasting tributaries: the Ober Water and Highland Water. The river supports lampreys <i>Lampetra</i> species, brown trout <i>Salmo trutta</i> and otters <i>Lutra lutra</i> .
Compton Downs SSSI	23 km E	This site is regarded as the best example of chalk grassland under maritime influence in Britain. The site's grassy habitats support a rich flora, including a number of orchid species. The Downs terminate in chalk sea cliffs on the western side and support a number of rare crevice plant species. This site is also great entomological importance.
Yar Estuary SSSI	24 km ENE	The Yar Estuary supports a range of coastal and estuarine habitats including extensive saltmarsh, intertidal mudflats, freshwater marsh, reed beds and artificial tide banks. These habitats are used by a number of overwintering wildfowl and waders. At high water, a number of fish feed in the estuary, which in turn attract foraging birds.
Compton Chine to Steephill Cove SSSI	25 km E	This site is notified for its vegetated maritime cliffs and slopes, species-rich chalk grassland, nationally rare plant species, an assemblage of nationally scarce plants and invertebrates, exposed and moderately exposed rocky shores and nationally important coastal geomorphology.
Bouldnor and Hamstead Cliffs SSSI	26 km ENE	This site is of geological importance as it possesses complete succession through the series of Oligocene rock. The cliffs are also important due to the rich fossil fauna including reptiles, birds and insects of Oligocene age. This site is also of ecological importance for its variety of habitat types including woodland and scrub communities.
Newtown Harbour SSSI	31 km ENE	The site includes extensive areas of estuarine mudflats and saltmarsh that forms a pattern of tidal creeks that make up the Newtown Estuary. The site is bordered to the north by the Solent Shore, which consists of rapidly eroding vegetated cliffs, sand and shingle spits, beaches and large areas of intertidal mud, sand and shingle which are important geomorphological features. The harbour includes a saline lagoon that supports a specialised invertebrate community including nationally rare species.
North Solent SSSI	31 km NE	This site possesses a diversity of habitats including coastal mudflats, saltmarshes, shingle beaches and spits, fresh and brackish marshland and pools, maritime grassland. As such, it supports a rich flora and insect fauna. The site is also of international importance due to its overwintering and migratory wildfowl and wader populations and breeding gulls, terns and waders.
Thorness Bay SSSI	34 km ENE	This site comprises areas of soft maritime cliff with large expanses of intertidal sand and shingle interspersed with rocky outcrops or ledges and two small areas of brackish marsh. The invertebrate fauna and flora support large numbers of overwintering wildfowl and waders along with the adjacent Newtown Harbour SSSI and thus contributes to the important bird populations of the Solent (refer to Table 4.1).
Eling and Bury Marshes SSSI	36 km NE	This site comprises two dissimilar saltmarshes and associated intertidal mudflats at the head of Southampton Water.

Colter (98/11-E) Exploration Well: EIA Scoping Report

Site Name	Distance / Bearing	Designating Features
Dibden Bay SSSI	38 km NE	This site is notified for its nationally important assemblage of invertebrates (including beetles, bees, wasps and flies) and is one of the richest sites around the Solent for nationally-rare and nationally-scarce species. It is also notified for being one of the few sites for breeding lapwing.
Lower Test Valley SSSI	38.5 km NE	The site comprises the upper estuary of the River Test and exhibits a gradation from salt through brackish to freshwater conditions. The brackish grassland in the south of the site supports a varied flora with several species characteristic of salt marsh habitat. The site is also important for wetland breeding birds and as a wader and duck feeding and roosting ground.
Hythe to Calshot Marshes SSSI	39 km NE	This site embraces the most extensive remaining areas of saltmarsh and mudflats in Southampton Water. Southampton Water also supports nationally important numbers of migratory and overwintering waders and wildfowl (refer to Table 4.1).
Medina Estuary SSSI	40 km ENE	This site comprises a relatively narrow tidal channel flanked by intertidal mudflats and saltmarsh and supports internationally important over-wintering migratory populations of wildfowl and wading birds, and importance breeding populations of waders, gulls and terns.
River Test SSSI	40 km NE	The Test and its adjoining vegetation provides valuable habitat for wetland birds. Fishing for sea trout, salmon and coarse fish takes place along the lower reaches. The rivers runs of salmon <i>Salmo salar</i> fluctuate markedly. Otters <i>Lutra lutra</i> have been reported from certain parts of the site, but the Test no longer has an established population.

Appendix D: LSVIA Methodology

D.1 Introduction

The purpose of the Landscape, Seascape and Visual Impact Assessment (LSVIA) is to understand the potential effects of the proposals on the landscape and visual context and explain these in a logical way.

The content of the assessment will follow guidance set out in 'Guidance for Landscape and Visual Assessment'² (LI and IEMA 2013 3rd Ed). Further guidance also considered is provided within 'An Approach to Landscape Character Assessment' 2014³, produced by Natural England.

The selection of viewpoints and the taking of photographs for inclusion in the assessment will be undertaken with consideration of the Landscape Institute Advice Note 01/11 - Use of Photography and Photomontage in Landscape and Visual Assessment⁴.

The documents referenced above are not intended as a prescriptive set of rules or an exhaustive manual of techniques, but are accepted as establishing certain principles that help to achieve consistency, credibility and effectiveness in the landscape, seascape and visual impact assessment process.

There is no legal definition for seascape in the UK but Article 1 of the European Landscape Convention⁵ (ELC) defines landscape character as "...an area, as perceived by people, whose character is the result of the action and interpretation of natural and/or human factors" (2000). Landscape character therefore draws upon the distinct and recognisable patterns of elements in the landscape that give a locality its sense of place, and which makes it different from its neighbouring areas. Taken together these patterns of elements form a collective 'landscape character area' which can be used to define the locality. An evaluation of these character areas is made in the LSVIA to identify the qualities, values and sensitivities, which could potentially be affected by the proposed development.

In accordance with the UK Marine Policy Statement (2011), references to seascape should be taken as meaning "*landscapes with views of the coast or seas, and coasts and the adjacent marine environment with cultural, historical and archaeological links with each other.*"

Visual considerations relate specifically to the views of a landscape/seascape afforded by people in the context of the sensitivity of those views – influenced by a number of factors which may include location of the view, the susceptibility of the view to accommodate change, the extent of view, or duration (static or transient, permanent or temporary). Sensitivity also takes into account any values attached to views, such as might relate to cultural references.

An evaluation of the potential changes to views for key visual receptors, together with the potential effects on landscape character, helps to provide an understanding of the significance of the scheme's impact on the landscape and the way that it is perceived.

The LSVIA report summarises a 3-stage assessment process, leading to an overall conclusion, as follows:

- **Baseline description** of receptors: landscape/seascape receptors and visual receptors;
- Appreciation of **scheme design and mitigation** and enhancement measures;
- Assessment of **potential effects** on receptors; including the nature of the receptor (sensitivity) and nature of change (magnitude of impact), and a judgement of the level of effect resulting from the proposed scheme;
- A conclusion is drawn on whether overall the effect would be significant.

² Landscape Institute and Institute of Environmental Management & Assessment (2013) Guidelines for Landscape and Visual Impact Assessment. 3rd ed. Abingdon: Routledge

³ An Approach to Landscape Character Assessment (2014) Christine Tudor, Natural England

⁴ Landscape Institute Advice Note 01/11 – Use of Photography and Photomontage In Landscape Assessment, March 2011

⁵ Council of Europe 2000, European Landscape Convention.

D.2 Study Area and Zone of Theoretical Visibility (ZTV)

The extent of the study area is determined by the anticipated visual envelope of the proposed development. The visual envelope is defined as the area in which the proposed scheme is potentially visible. To determine this field of visibility a Zone of Theoretical Visibility (ZTV) is calculated using QGIS specialist computer software, via the Viewshed Analysis plugin. The ZTV is prepared using a 'digital terrain model' (DTM) with a resolution of 50 m. A height and area is given for the proposed development, in accordance with the level of information available, to act as input values to calculate the ZTV.

D.3 Landscape/Seascape Planning Policy Context

Desk studies are undertaken to identify relevant landscape/seascape planning policies which may affect the proposed development; these may include formal designation and other planning policy which are intended to protect landscape/seascape and visual aspects.

D.4 Baseline Conditions and Receptors

Desk studies are undertaken to review international, national or local landscape designations and existing landscape/seascape character assessments at a national and local administration level. This is then verified by a site visit. Appropriate landscape/seascape character areas are described and, where necessary, supplemented with a description of site-level landscape/seascape elements where these combine to form a unique landscape/seascape character. In addition to designated landscapes, each character area is considered as a receptor which may theoretically be affected by the proposed scheme. Where no effects can reasonably be anticipated, these receptors are scoped out from further assessment.

Visual receptor groups are identified in the first instance by a review of the ZTV to determine groups of people who may experience common views within the study area, including the proposed development. Whilst it is acknowledged that every person will have an individual relationship with views towards the site, the assessment combines visual receptors into groups that may reasonably be expected to share common experiences with the landscape in order to form a manageable process of assessment. These typical groups are categorised as follows:

- Recreational users of public rights of way or accessible landscapes/seascapes, e.g. walkers, horse riders, boat users;
- Residents and visitors of/to settlements;
- Road users;
- Visitors to specific viewpoints of recognised value;
- Visitors to tourist attractions of heritage assets valued for their visual setting.

Within an individual visual receptor group, people may experience a range of varying views towards the site. Where relevant therefore, groups may be further sub-divided so that the assessment relates to commonly-shared visual experiences, either through geographic or topographic consistency.

Specific viewpoints and representative viewpoints from publically accessible land are selected for key visual receptor groups and their locations agreed with relevant stakeholders. For each viewpoint, a description of the existing view and the context of the site within the view are provided.

D.5 The Proposed Development

A description of the proposed development is provided for elements of the scheme which may have the potential to have an effect on the landscape/seascape character or visual receptors. Descriptions are taken from material submitted by the applicant.

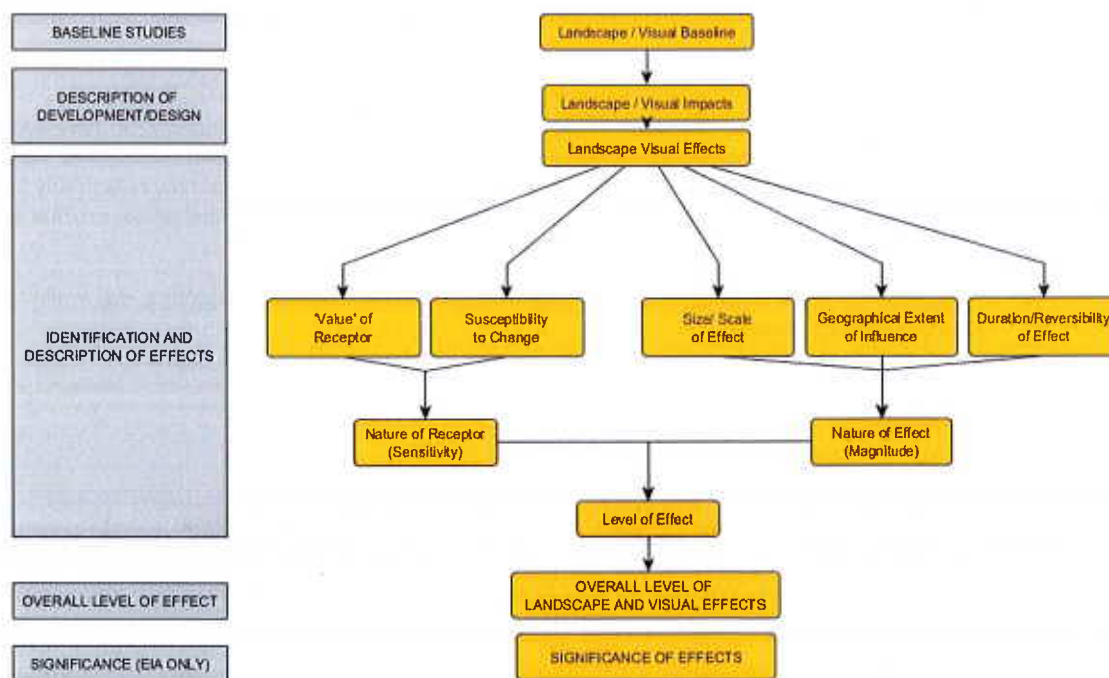
D.6 Identification of Visual Receptors and Selection of Representative and Specific Viewpoints

The ZTV will be appraised through desk study and field survey, and different receptor groups identified. A proportionate number of viewpoints will be selected from within the ZTV, and verified during site visits, to illustrate the range of views afforded towards the site. Viewpoints will be selected wherever possible to be representative of different visual receptor groups. It is acknowledged however that visual receptor groups are likely to experience a varying degree of exposure to views (duration and extent) and that a view from one location may be very different from another in close proximity. Such viewpoints, where selected, are intended to provide an illustration of a typical view. By contrast, specific viewpoints, such as panoramic vantage points or vistas of recognised value may be selected where relevant and assessed as a specific visual receptor.

D.7 Assessment of Potential Effects on Receptors

For each of the landscape/seascape and visual receptors identified in the baseline studies, an assessment is made on the **level of effect** arising from the proposed development. For an LSVIA as part of an EIA process it is customary to also determine whether overall the effects are significant, so that potential impacts on the landscape/seascape can be considered alongside other environmental impacts in a standardised manner. The process for assessing potential effects is set out within Figure D1.1, adapted by NPA from Figure 3.5 of GLVIA⁶ (LI and IEMA 2013: 39).

Figure D1.1: Assessment of the Level of Effect on Receptors



The level of effect is determined through an understanding of both the nature of the receptor, **Sensitivity**; and the nature of the effect, **Magnitude**.

Sensitivity is determined by consideration of both the **susceptibility** to change and the **value** placed on the resource.

⁶ Landscape Institute and Institute of Environmental Management & Assessment (2013) *Guidelines for Landscape and Visual Impact Assessment*. 3rd ed. Abingdon: Routledge

The LSVIA will present a reasoned summary of the overall effects on the landscape/seascape character and visual receptors from the specific development proposals.

D.7.1 Criteria for Assessing Potential Effects

Landscape/Seascape Sensitivity

Landscape/seascape sensitivity is determined by consideration of both the **susceptibility** to change and the **value** placed on the landscape resource, as follows.

Value of a landscape/seascape receptor depends on a variety of considerations including international, national or local designations, its contribution to a community or its cultural significance, e.g. landscapes/seascapes reflected through literature, poetry, art etc.

Susceptibility of landscape/seascape receptors is defined as “the ability of the landscape receptor... to accommodate the proposed development without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies or strategies”⁷ (LI and IEMA 2013: p88-9).

The level of **sensitivity** of the landscape/seascape receptor is determined through professional judgement in balancing together the value described and the susceptibility to change. Sensitivity is recorded on a verbal scale of High, Medium and Low. Where intermediate ratings are given, e.g. “Medium-Low”, this indicates a sensitivity that is both less than Medium and more than Low.

Set criteria are not necessarily provided for the determination of overall levels of sensitivity since GLVIA3 (para 5.46, p90) recognises that:

“there can be complex relationships between the value attached to landscape receptors and their susceptibility to change which are especially important when considering change within or close to designated landscapes. For example:

- *An internationally nationally or locally valued landscape does not automatically, or by definition, have high susceptibility to all types of change.*
- *It is possible for internationally, nationally or locally important landscape to have relatively low susceptibility to change resulting from a particular type of development in question, by virtue of both the characteristics of the landscape and the nature of the proposal.*
- *The particular type of change or development proposed may not compromise the specific basis for the value attached to the landscape.*

Visual Sensitivity

As with landscape/seascape sensitivity, visual sensitivity is determined by consideration of both the **susceptibility** to change and the **value** placed on the view or visual resource.

The **Value** of a view experienced by a receptor group, or its visual amenity depends on a variety of considerations including international, national or local designation/recognition, its contribution to the visual amenity of a community or its cultural significance e.g. views recognised through the arts etc.

The **Susceptibility** of visual receptors is considered to be a “*function of the occupation or activity of people experiencing the view at particular locations; and the extent to which their attention or interest may therefore be focused on the views and the visual amenity they experience at particular locations*”⁸ (LI and IEMA 2013: p113).

Value and Susceptibility are considered together to provide a reasoned judgement on the overall level of **sensitivity** of the visual context and views from the visual receptor group. This is set out on a verbal scale of High, Medium, Low and Negligible. Higher sensitivity is more likely to occur with increasing

⁷ Landscape Institute and Institute of Environmental Management & Assessment (2013) *Guidelines for Landscape and Visual Impact Assessment*. 3rd ed. Abingdon: Routledge

⁸ Landscape Institute and Institute of Environmental Management & Assessment (2013) *Guidelines for Landscape and Visual Impact Assessment*. 3rd ed. Abingdon: Routledge

value and/or susceptibility to change. Lower sensitivity is more likely to occur with reduced value and/or susceptibility to change.

Where intermediate ratings are given, e.g. "Medium-Low", this indicates a sensitivity that is both less than Medium and more than Low.

Magnitude of Change

The nature of the change, **magnitude**, on each receptor is assessed through an understanding of the changes to the landscape/seascape character and visual context, resulting from the proposals. The magnitude of effect may be considered to be either beneficial or adverse. These are described for each receptor.

Consideration is given to the size or scale of change arising from the development (either directly to the landscape/seascape receptor or to views and the general visual setting for visual receptors), the geographical extent over which the change is experienced as well as the duration, for example temporary or permanent, and reversibility of effects. If appropriate, and in keeping with the attributes of sensitivity (susceptibility/value) verbal scales may be used as follows:

Size/Scale of change considers the elements of the landscape/seascape receptor or views that may be affected by the changes brought about by the development proposal.

Geographical Extent of Influence considers the proportion of the landscape/seascape/visual receptor that may be affected by the changes brought about by the development proposal. The geographical extent of influence could range from the Receptor level (where the effects of the change are experienced throughout the receptor group), Local level (where only portions of the receptor would experience the changes) or Site level (where only very localised impacts would be experienced).

Duration of Effect/Reversibility considers the timescales of the impacts of the development on the landscape/seascape character and views/visual amenity of receptors.

The size/scale, geographical extent of influence and the duration/reversibility of effects on receptors are taken together to form a reasoned assessment of the magnitude of impact/effect on a scale of High, Medium, Low and Negligible. Higher magnitude is more likely to occur with increasing scale and duration. Lower magnitude is more likely to occur with reduced scale and/or duration. Where intermediate ratings are given, e.g. "Medium-Low", this indicates a magnitude of change that is both less than Medium and more than Low.

The magnitude of impact on each receptor is assessed.

Level of Effect

Following the assessment of the sensitivity of each receptor and the magnitude of change, it is possible through professional judgement to determine the potential **level of effect** of the development. Due to the level of judgement required in determining the level of an effect, it is important to recognise that defined terms are not absolute and that any scale of levels is a continuum. The levels of effect are judged as Substantial, Moderate, Slight and Negligible as set out in Tables D1.1 and D1.2. Where intermediate ratings are given, e.g. "Moderate (adverse) to Slight (adverse)", this indicates a level of effect that is both less than Moderate and more than Slight.

For each level of effect on a receptor those effects are defined using professional judgement as being either **Beneficial** or **Adverse**. Where elements of the change are considered to be both beneficial and adverse, these may be considered as having a **Neutral** overall effect. In such circumstances this balance is described.

Colter (98/11-E) Exploration Well: EIA Scoping Report

Table D1.1: Descriptors for Levels of Effect on the Landscape/Seascape Receptors

Level of Effect	Example Definition
Substantial (Adverse)	<p>The development would:</p> <ul style="list-style-type: none"> • Be at considerable variance with the character of the landscape/seascape; • Degrade or lose the integrity of characteristic features or elements; • Damage or lose the sense of place or local distinctiveness of the area; • In terms of magnitude, would likely relate to all or very large parts/ areas or extent of the receptor; • In terms of sensitivity, would likely to affect receptors deemed to be of higher value or very susceptible to this form of development; • Effects are likely to be long term and may be permanent.
Moderate (Adverse)	<p>The development would:</p> <ul style="list-style-type: none"> • Conflict with the character of the landscape/seascape; • Have a negative impact on some characteristic features or elements; • Diminish the sense of place or local distinctiveness of the area; • In terms of magnitude, would likely relate to some parts/ areas or extent of the receptor; • In terms of sensitivity, would likely to affect receptors deemed to be of moderate value or moderately susceptible to this form of development; • Effects are likely to be long term but moderated by smaller scales of change or may be short term but with larger scales of change.
Slight (Adverse)	<p>The development would:</p> <ul style="list-style-type: none"> • Not wholly fit with the character of the landscape/seascape; • Be at variance with the existing characteristic features or elements; • Detract from the sense of place or local distinctiveness of the area; • In terms of magnitude, would likely relate to small parts/areas or extent of the receptor – ‘small scale’; • In terms of sensitivity, would likely to affect receptors deemed to be of lower value or low susceptible to this form of development; • Effects may be long term but of negligible size/ scale or short term and of a larger scale of change.
Negligible	<p>The development would:</p> <ul style="list-style-type: none"> • Maintain the character of the landscape/seascape; • Complement/ blend in with the existing characteristic features or elements; • Enable the sense of place or local distinctiveness of the area to be retained.
Slight (Beneficial)	<p>The development would:</p> <ul style="list-style-type: none"> • Complement the character of the landscape/seascape; • Maintain or enhance the existing characteristic features or elements; • Enable some of the sense of place or local distinctiveness of the area to be restored; • In terms of magnitude, would likely relate to small parts/areas or extent of the receptor – ‘small scale’;

Colter (98/11-E) Exploration Well: EIA Scoping Report

Level of Effect	Example Definition
	<ul style="list-style-type: none"> In terms of sensitivity, would likely to affect receptors deemed to be of lower value or low susceptible to this form of development; Effects may be long term but of negligible size/scale or short term and of a larger scale of change.
Moderate (Beneficial)	<p>The development would:</p> <ul style="list-style-type: none"> Improve the character of the landscape/seascape; Enable the creation, repair, conservation or restoration of characteristic features or elements partially lost or diminished as a result of inappropriate management or prior development; Enable the sense of place or local distinctiveness of the area to be restored; In terms of magnitude, would likely relate to some parts/areas or extent of the receptor – ‘medium scale’; In terms of sensitivity, would likely to affect receptors deemed to be of moderate value or moderately susceptible to this form of development; Effects are likely to be long term but moderated by smaller scales of change or may be short term but with larger scales of change.
Substantial (Beneficial)	<p>The development would:</p> <ul style="list-style-type: none"> Greatly enhance the character of the landscape/seascape; Enable the creation, repair, conservation or restoration of characteristic features or elements lost or harmed as a result of inappropriate management or prior development; Greatly enhance the sense of place or local distinctiveness of the area; In terms of magnitude, would likely relate to all or very large parts/ areas or extent of the receptor – ‘large scale’; In terms of sensitivity, would likely to affect receptors deemed to be of higher value or very susceptible to this form of development; Effects are likely to be long term and may be permanent.

Table D1.2: Descriptors for Levels of Effect on the Visual Receptors

Level of Effect	Example Definition
Substantial (Adverse)	<p>The development would:</p> <ul style="list-style-type: none"> Cause a large deterioration in the existing views; In terms of magnitude, would likely relate to the majority of views afforded by the receptor group and/ or to all or very large extents of each of those views; In terms of sensitivity, would likely to affect views afforded by receptors which are deemed to be of higher value or to receptors and their views considered to be very susceptible to this form of development; Effects are likely to be long term and may be permanent.
Moderate (Adverse)	<p>The development would:</p> <ul style="list-style-type: none"> Cause a noticeable deterioration in the existing views; In terms of magnitude, would likely relate to a moderate proportion of range of views afforded by the receptor group and/or to a large proportion of each of those views – ‘medium scale’;

Colter (98/11-E) Exploration Well: EIA Scoping Report

Level of Effect	Example Definition
	<ul style="list-style-type: none"> In terms of sensitivity, would likely to affect views afforded by receptors which are deemed to be of more moderate value or to receptors and their views considered to be have a medium level of susceptible to this form of development; Effects are likely to be long term but moderated by smaller scales of change or may be short term but with larger scales of change.
Slight (Adverse)	<p>The development would:</p> <ul style="list-style-type: none"> Cause a barely perceptible deterioration in the existing views; In terms of magnitude, would likely relate to a small proportion of range of views afforded by the receptor group and/or to a small proportion of each of those views – ‘small scale’; In terms of sensitivity, would likely to affect views afforded by receptors which are deemed to be of more lower value or to receptors and their views considered to be have a low level of susceptible to this form of development; Effects are likely to be long term but moderated by smaller scales of change or may be short term but with larger scales of change. Effects may be long term but of negligible size/scale or short term and of a larger scale of change.
Negligible	<p>The development would:</p> <ul style="list-style-type: none"> Cause no discernible deterioration or improvement to the existing view being experienced.
Slight (Beneficial)	<p>The development would:</p> <ul style="list-style-type: none"> Cause a barely perceptible improvement in the existing views; In terms of magnitude, would likely relate to a small proportion of range of views afforded by the receptor group and/or to a small proportion of each of those views – ‘small scale’; In terms of sensitivity, would likely to affect views afforded by receptors which are deemed to be of more lower value or to receptors and their views considered to be have a low level of susceptible to this form of development; Effects are likely to be long term but moderated by smaller scales of change or may be short term but with larger scales of change. Effects may be long term but of negligible size/scale or short term and of a larger scale of change.
Moderate (Beneficial)	<p>The development would:</p> <ul style="list-style-type: none"> Cause a noticeable improvement in the existing views; In terms of magnitude, would likely relate to a moderate proportion of range of views afforded by the receptor group and/or to a large proportion of each of those views – ‘medium scale’; In terms of sensitivity, would likely to affect views afforded by receptors which are deemed to be of more moderate value or to receptors and their views considered to be have a medium level of susceptible to this form of development; Effects are likely to be long term but moderated by smaller scales of change or may be short term but with larger scales of change.

Level of Effect	Example Definition
Substantial (Beneficial)	<p>The development would:</p> <ul style="list-style-type: none"> • Cause a large improvement in the existing views; • In terms of magnitude, would likely relate to the majority of views afforded by the receptor group and/or to all or very large extents of each of those views; • In terms of sensitivity, would likely to affect views afforded by receptors which are deemed to be of higher value or to receptors and their views considered to be very susceptible to this form of development; • Effects are likely to be long term and may be permanent.

D.8 Overall Significance of Residual Effects

A final judgement is made about whether or not the overall landscape/seascape and visual residual effects of the development are likely to be significant. The level of effect at which an impact is considered to be significant is to be determined on a case-by-case basis. Significant effects, in general, would be where there is a major change or irreversible effect, over an extensive area/proportion of views, on elements and/ or aesthetic and perceptual aspects that are key to the character/visual amenity of nationally valued landscapes/views. Less significant effects, in general, would be reversible effects of short duration, over a restricted area/proportion of views, on elements and/or aesthetic and perceptual aspects that contribute to but are not key characteristics of the landscape/views of community value. Effects may be either adverse or beneficial.

D.9 Cumulative Effects on Landscape Character and Visual Context

Cumulative effects are taken in general terms to be *“impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions, together with the project”* (Hyder, 1997, quoted in GLVIA3, p120, 7.1). Cumulative effects are defined here as the landscape/seascape and visual effects of the scheme in combination with other proposed developments in the area. The scope of potential additional developments will be agreed with the relevant stakeholders but is intended to be limited to developments which have an existing planning approval or which are due for determination at the time of writing.

The study area for assessment of cumulative impacts geographic extent will be limited to the following criteria:

- **Seascape Character** – Limited to additional developments within the same locally defined Seascape Character Area.
- **Visual Context** – Limited to additional developments seen from within the ZTV of the main development.

Landscape/seascape and visual effects will be identified where the combined impact from the additional developments with the main development are considered to be different to the effects of the main development alone. In the case of visual effects, the nature of effect will also be described either as:

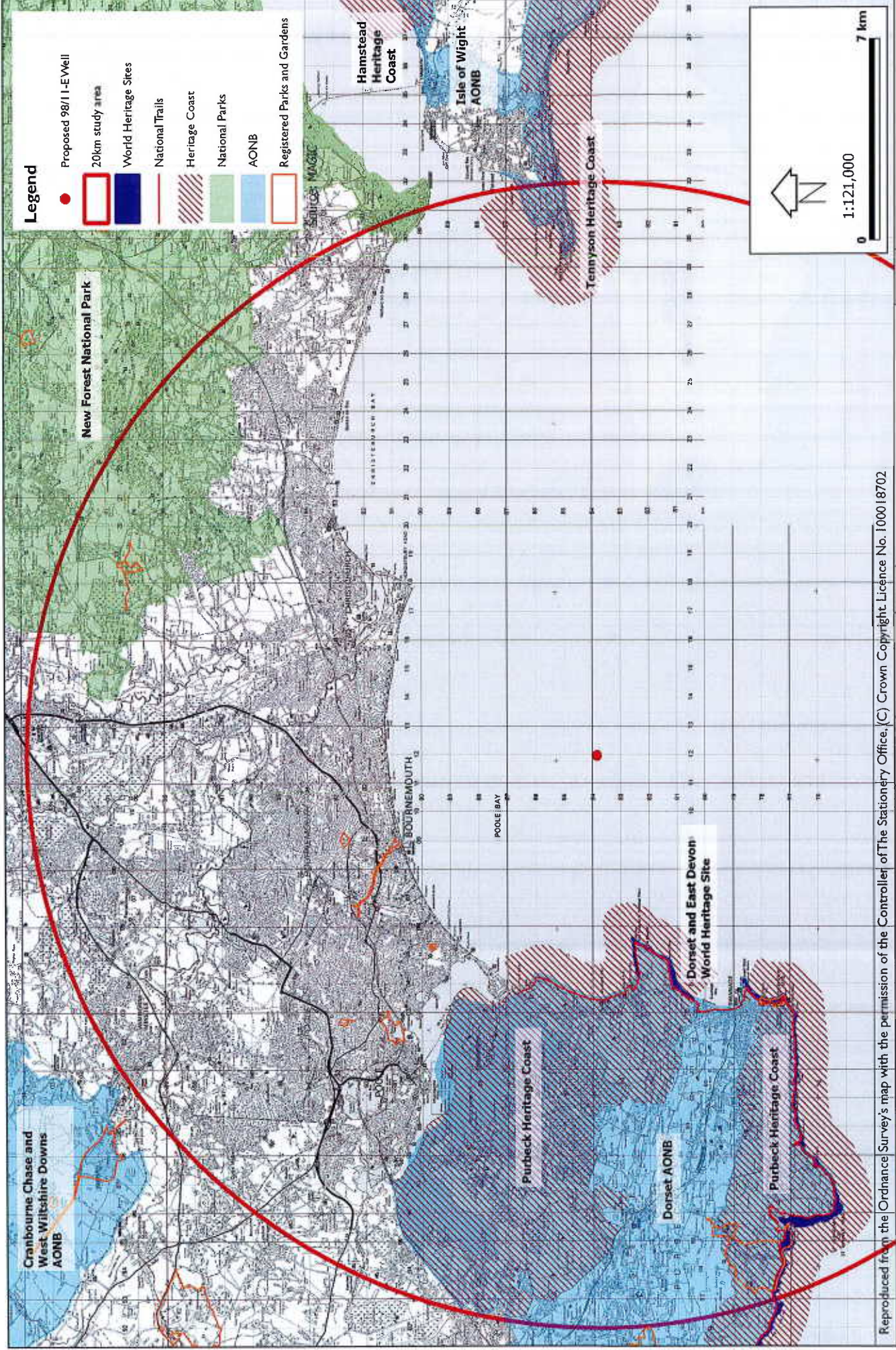
- In **combination**, where more than one development is seen at one time within a single view;
- In **succession**, where more than one development is seen at one time from the same viewpoint but at different orientations;
- In **sequence**, where multiple developments can be seen along a route.

A summary of the cumulative level of effects on landscape/seascape and visual receptors will be provided based on the criteria, previously defined. Any opportunities for mitigation of cumulative impacts, such as community compensation schemes or inter-developer partnerships will be identified and reviewed as part of the iterative design process.

D.10 Glossary

Refer GLVIA 3 for a glossary of terms.

Appendix E: LSVIA Figures

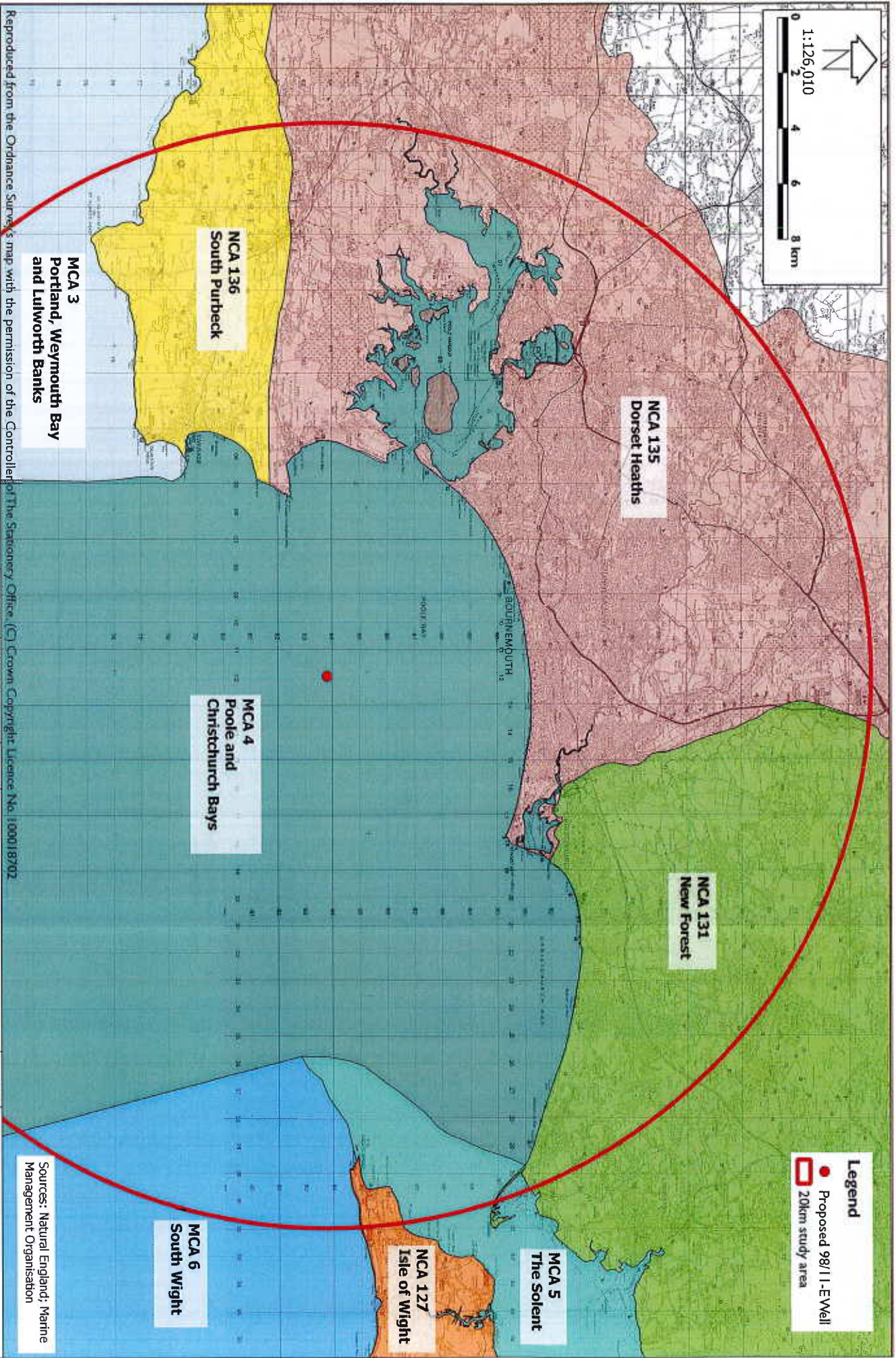
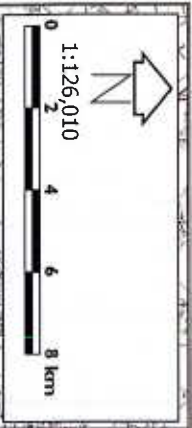


- Legend**
- Proposed 98/1 I-E Well
 - 20km study area
 - World Heritage Sites
 - National Trails
 - ▨ Heritage Coast
 - National Parks
 - AONB
 - Registered Parks and Gardens

Reproduced from the Ordnance Survey's map with the permission of the Controller of The Stationary Office, (C) Crown Copyright Licence No. 100018702.

PROJECT NO: 10964 CAR		CLIENT: CORALLIAN ENERGY LTD	FIGURE NO: 6.1
DATE: September 2017	PROJECT: COLTER (98/1 I-E) EXPLORATION WELL	TITLE: Landscape Designations	
ISSUE STATUS: PRELIMINARY			





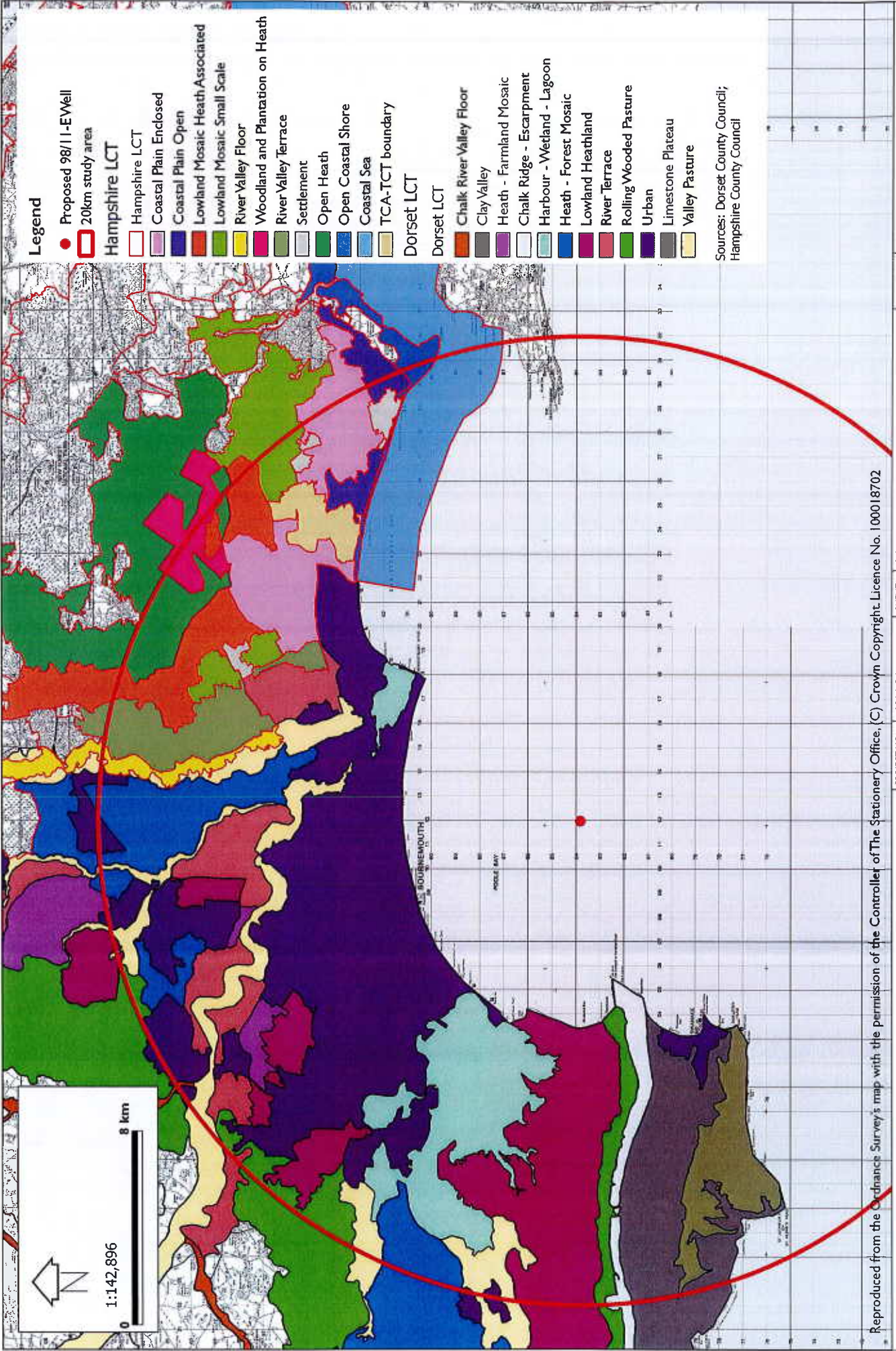
Legend

- Proposed 98/11-EWell
- 20km study area

Sources: Natural England; Marine Management Organisation

Reproduced from the Ordnance Survey's map with the permission of the Controller of the Stationery Office. (C) Crown Copyright Licence No. 100018702

NICHOLAS PEARSON ASSOCIATES Geographical Services · Landscape Architecture · Ecological		CLIENT: CORALLIAN ENERGY LTD	FIGURE NO.: 6.2
PROJECT NO: 10964 CAR	DATE: September 2017	PROJECT: COLTER (98/11-E) EXPLORATION WELL	TITLE: National Character Areas and Marine Character Areas
ISSUE STATUS: PRELIMINARY			



Legend

- Proposed 98/11-EWell
- 20km study area

Hampshire LCT

- Hampshire LCT
- Coastal Plain Enclosed
- Coastal Plain Open
- Lowland Mosaic Heath Associated
- Lowland Mosaic Small Scale
- River Valley Floor
- Woodland and Plantation on Heath
- River Valley Terrace
- Settlement
- Open Heath
- Open Coastal Shore
- Coastal Sea
- TCA-TCT boundary

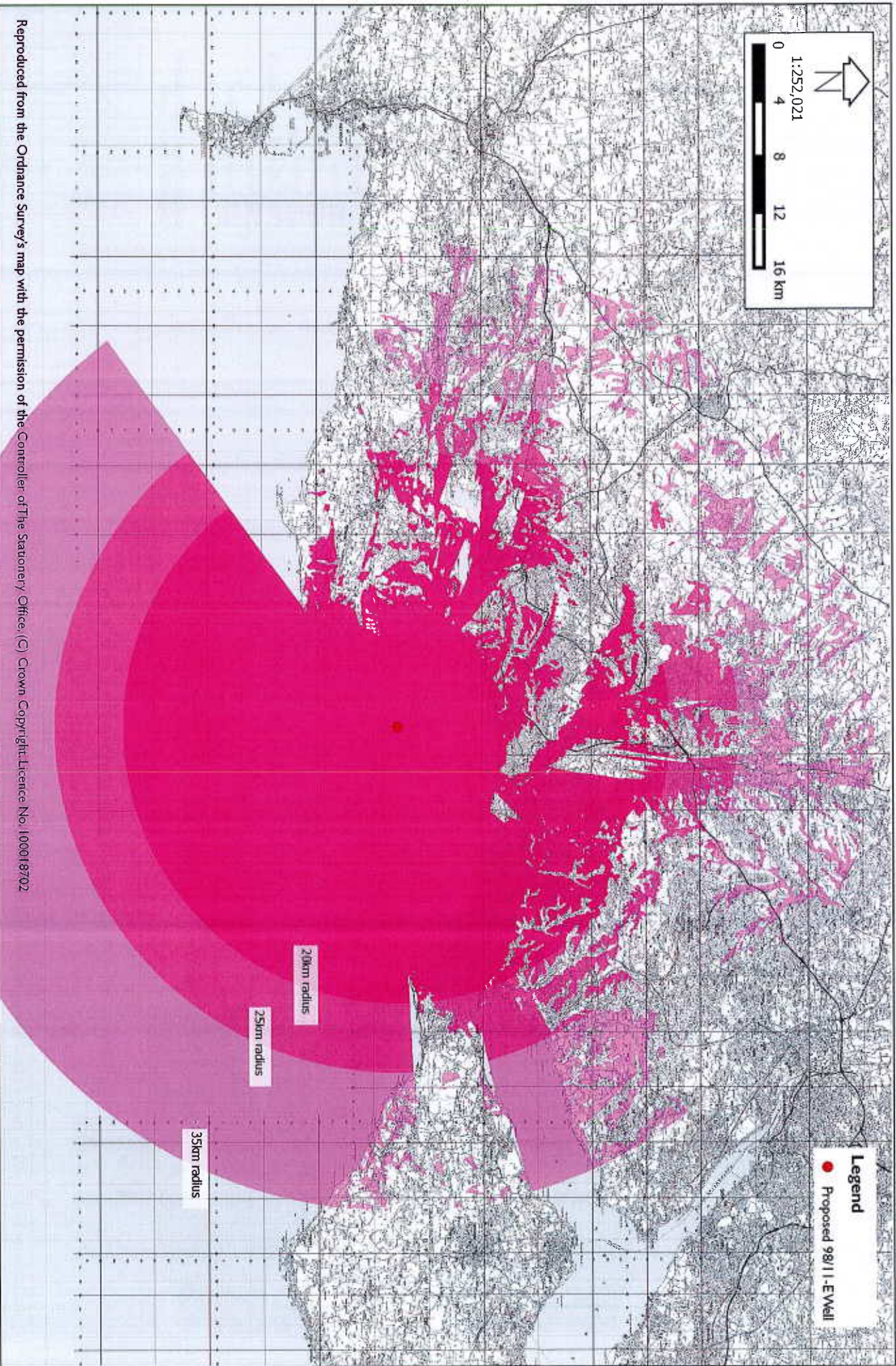
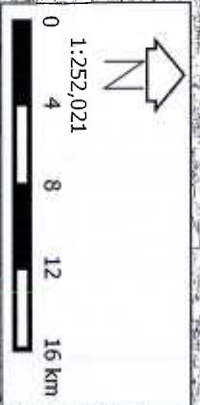
Dorset LCT

- Dorset LCT
- Chalk River Valley Floor
- Clay Valley
- Heath - Farmland Mosaic
- Chalk Ridge - Escarpment
- Harbour - Wetland - Lagoon
- Heath - Forest Mosaic
- Lowland Heathland
- River Terrace
- Rolling Wooded Pasture
- Urban
- Limestone Plateau
- Valley Pasture

Sources: Dorset County Council;
Hampshire County Council

Reproduced from the Ordnance Survey's map with the permission of the Controller of The Stationery Office, (C) Crown Copyright Licence No. 100018702

PROJECT NO: 10964 CAR		CLIENT: CORALLIAN ENERGY LTD	FIGURE NO: 6.3
DATE: September 2017	PROJECT: COLTER (98/11-E) EXPLORATIONWELL	TITLE: Landscape Character Types	
ISSUE STATUS: PRELIMINARY			



Legend
 ● Proposed 98/11-E Well

Reproduced from the Ordnance Survey's map with the permission of the Controller of The Stationery Office. (C) Crown Copyright Licence No. 100018702

NICHOLAS PEARSON ASSOCIATES
 Environmental Planning Technical Services Division

PROJECT NO:	10964 CAR	CLIENT:	CORALLIAN ENERGY LTD	FIGURE NO.:	6.4
DATE:	September 2017	PROJECT:	COLTER (98/11-E) EXPLORATION WELL	TITLE:	Zone of Theoretical Visibility
ISSUE STATUS:	PRELIMINARY				