

**RWE Renewables UK Dogger Bank
South (West) Limited**

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South (East) Limited**

Dogger Bank South Offshore Wind Farms

**Outline Scour Protection Plan (Revision 3) (Tracked)
Volume 8**

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Rev No.	Date	Status/Reason for Issue	Author	Checked by	Approved by
01	June 2024	Final for DCO Application	RWE	RWE	RWE
02	November 2024	Update November 2024	RWE	RWE	RWE
03	February 2025	Submission for Deadline 2	RWE	RWE	RWE

Revision Change Log			
Rev No.	Page	Section	Description
01	N/A	N/A	Submitted for DCO Application
02	8	1.1	Updates have been made because of Marine Management Organisation (MMO) Relevant Representation RR-030: 4.6.
02	14	1.3	Updates have been made because of Natural England Relevant Representation RR-039: C58.
03	6	Glossary	Removal of references to the Electrical Switching Platform and Collector Platforms for Change Request 1.
03	8	Acronyms	Removal of references to the Electrical Switching Platform, Collector Platforms, and Gravity Base Structures for Change Request 1.
03	9	Introduction	Clarification added on entry of cables to foundations). Deletion of reference to cable protection plan in line with MMO Written Representation REP1-075:2.9.3. Text describing the Deemed Marine Licence conditions requiring the update of this plan has been added in line with MMO Written Representation REP1-075:2.9.5.
03	10	1.1.1	Update of the maximum proposed number of platforms for Change Request 1. Text added to refer to Figure 1-1 in response to MMO Written Representation REP1-075:2.9.6.
03	10	1.2	Text added relating to the use of frond lines and mats and any associated plastic degradation in response to MMO Written Representation REP1-075:2.9.2.
03	11	Figure 1-1	Addition of a figure showing the Offshore Development Area Text added to refer to Figure 1-1 in response to MMO Written Representation REP1-075:2.9.6.
03	13	1.2.2	Removal of references to platforms on the Export Cable Corridor for Change Request 1.

Revision Change Log

03	14-15	Table 1-2	Edit of foundation numbers and related scour protection figures to match the Worst Case Scenario and removal of the reference to Gravity Based Structures for Change Request 1.
03	16	Table 1-3	Edit of foundation numbers and related scour protection figures to match the Worst Case Scenario for Change Request 1.
03	17	Table 1-4	A table has been added noting in line with MMO Written Representation REP1-075:2.9.4

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Glossary

Term	Definition
Array Areas	The DBS East and DBS West offshore Array Areas, where the wind turbines, offshore platforms and array cables would be located. The Array Areas do not include the Offshore Export Cable Corridor or the Inter-Platform Cable Corridor within which no wind turbines are proposed. Each area is referred to separately as an Array Area.
Collector Platforms (CPs)	Receive the AC power generated by the wind turbines through the array cables, collect it and transform the voltage for onward transmission to the Offshore Converter Platforms (OCPs).
Dogger Bank South (DBS) Offshore Wind Farms	The collective name for the two Projects, DBS East and DBS West.
Electrical Switching Platform (ESP)	The Electrical Switching Platform (ESP), if required would be located either within one of the Array Areas (alongside an Offshore Converter Platform (OCP)) or the Export Cable Platform Search Area.
Environmental Statement (ES)	A document reporting the findings of the EIA and produced in accordance with the EIA Directive as transposed into UK law by the EIA Regulations.
Offshore Development Area	The Offshore Development Area for ES encompasses both the DBS East and West Array Areas, the Inter-Platform Cable Corridor, the Offshore Export Cable Corridor, plus the associated Construction Buffer Zones.
Onshore Converter Stations	A compound containing electrical equipment required to transform HVDC and stabilise electricity generated by the Projects so that it can be connected to the electricity transmission network as HVAC. There will be one Onshore Converter Station for each Project.

Term	Definition
<u>Project Change Request 1</u>	<u>The changes to the DCO application for the Projects set out in Project Change Request 1 – Offshore & Intertidal Works [AS-141] which was accepted into Examination on 21st January 2025.</u>
Scour protection	Protective materials to avoid sediment erosion from the base of the wind turbine foundations and offshore substation platform foundations due to water flow.
The Projects	DBS East and DBS West (collectively referred to as the Dogger Bank South Offshore Wind Farms).
Wind turbine	Power generating device that is driven by the kinetic energy of the wind.

Acronyms

Term	Definition
CP	Collector Platform
DBS	Dogger Bank South
ESP	Electrical Switching Platform
FEED	Front-End Engineering Design
GBS	Gravity Based Structure
MMO	Marine Management Organisation
OCP	Offshore Converter Platform
(OFTO)	Offshore Transmission Owner

1 Introduction

1.1 Purpose of This Document

1. This Outline Scour Protection ~~and Cable Protection~~ Plan lays out the key principles of how the Dogger Bank South (DBS) Offshore Wind Farms intend to manage the protection of foundations and cables at the entry to foundations from the effects of scour and hazards (e.g. snagging anchors in the case of cables), both immediately post-construction and throughout the operational life of the Projects. This statement also provides a summary of the effects of scour protection as presented in the Environmental Statement.
2. Deemed Marine Licences 1-4 presented in Schedules 10-13 of the **Draft DCO** (Revision 5) [REP1-004](**application ref: 3.1**) include conditions requiring the approval prior to the commencement of construction of:
A scour protection plan (in accordance with the outline scour protection plan) including details of scour protection and cable protection including details of the need, type, sources, quantity and installation methods for scour protection and cable protection, with details updated and resubmitted for approval if changes to it are proposed following cable laying operations;
- ~~2.3.~~ The final Scour Protection Plan will be finalised and form part of the Construction Method statements and layout plans post-consent and prior to the commencement of construction, in line with the conditions of **Volume 3, Draft DCO (application ref: 3.1)**. The **Draft DCO (application ref: 3.1)** will be updated to make it clear that the final Scour Protection Plan (as part of the construction method statement(s)) will be subject to approval by the Marine Management Organisation (MMO) following consultation with relevant stakeholders. The final Scour Protection Plan will be reviewed and updated where necessary during the lifetime of the Projects, in line with project milestones. Relevant updates to the final Scour Protection Plan may be incorporated during review cycles, as considered necessary to reflect any material changes. At the time of Offshore Transmission Owner (OFTO) Transaction, post construction, The Applicants will make the latest finalised Scour Protection Plan available to the OFTO for their awareness.

1.1.1 Background

3.4. RWE Renewables UK Dogger Bank South (West) Limited and RWE Renewables UK Dogger Bank South (East) Limited has submitted an application to the Planning Inspectorate on behalf of the Secretary of State, for a Development Consent Order for the Dogger Bank South Offshore Wind Farms (hereafter referred to as The Projects). The Projects comprise two separate sites, DBS West and DBS East situated at a minimum of 100km and 122km from the north-east coast of England, respectively. When operational, DBS West and DBS East combined would have the potential to generate renewable power for up to 3 million UK homes.

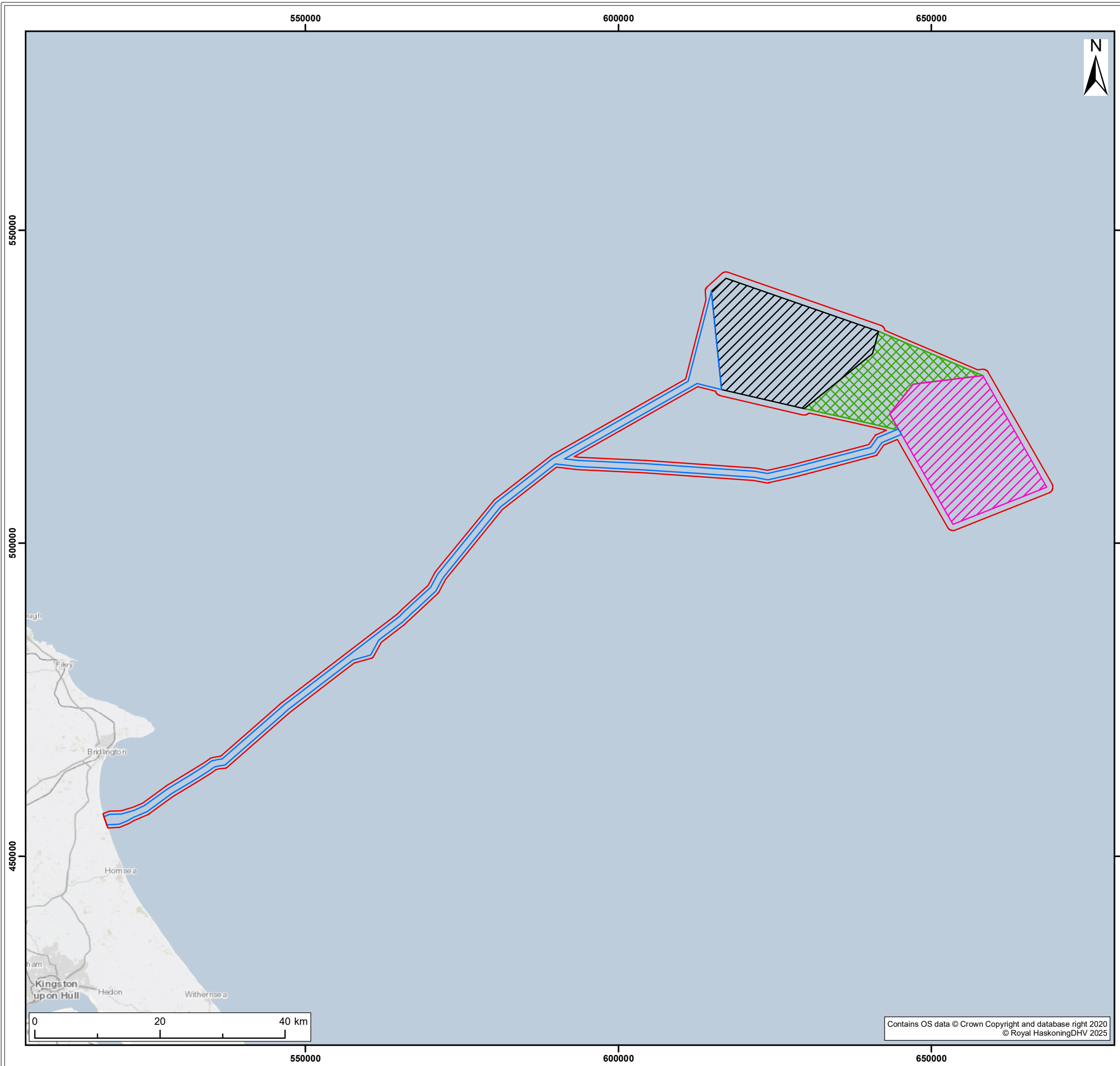
4.5. The Projects include provision for the construction, operation, maintenance and decommissioning of the Dogger Bank South Offshore Wind Farms with up to 200 wind turbine generators and 38 offshore platforms. The DBS Offshore Development Area is shown in Figure 1-1.

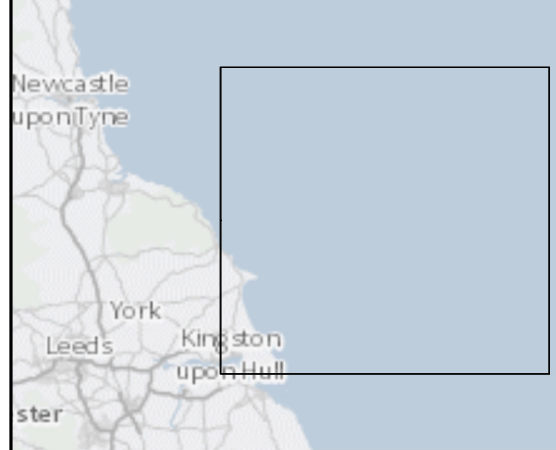
1.2 Scour Protection

5.6. Scour protection material may be required around the base of some or all foundations to provide protection from currents and wave action, thus ensuring structural integrity is not compromised. Structural health monitoring systems may be used to monitor the extent of scouring around each foundation. The findings of this monitoring, together with bathymetry survey results, will help determine the criticality of any scouring and will inform whether remedial action is required.

6.7. The maximum design scenario for scour protection has been estimated to inform the Environmental Impact Assessment. This information is presented in **Table 1-1** to **Table 1-3** which present the maximum scour protection parameters for turbines (**Table 1-1**) and platforms (**Table 1-2**). Maximum scour parameters for the project as a whole are presented in **Table 1-3**.


8. The scour protection types to be employed may include, but are not limited to, rock filter layers (typically laid before foundation installation) with a rock armour layer consisting of rock / stone filled geotextile bags and/or anti scour mattress solutions (typically laid after foundation installation). Should plastics materials such as frond lines or mats be considered for use, the risks of placing plastic infrastructure into the marine environment, including those risks associated with degradation, will be considered in the final Scour Protection Plan.





Legend:

- Offshore Development Area
- Offshore Export Cable Corridor
- DBS East Array Area
- DBS West Array Area
- Inter-Platform Cable Corridor

S2	P01	11/02/2025	Suitable for Information	SM	CC	RF
SUI	REV	DATE	DESCRIPTION	DRW	CHK	APR
Title: Offshore Development Area						
Figure: 1-1		Drawing No: PC2340-RHD-OF-ZZ-DR-Z-1014				
Co-ordinate system: WGS 1984 UTM Zone 31N			Page Size: A3		Scale: 1:600,000	
Project: Dogger Bank South Offshore Wind Farms			Report: Outline Scour Protection Plan			
						

~~7.9.~~ The first principle of the Projects' adoption of scour protection during construction and operation is that scour protection will be minimised to the greatest practicable extent.

~~8.10.~~ Developing scour protection designs for the Projects will involve the following steps:

- Pre-construction surveys to inform concept design;
- Front-End Engineering Design (FEED) design studies; and
- Detailed design of scour protection.

1.2.1 Turbine Foundations

~~9.11.~~ The foundation types that may be used for the turbines are monopiles and pin pile jackets. Scour protection may be required around the base of the foundations to protect against localised erosion of the seabed. **Table 1-1** shows worst case turbine foundation scour protection parameters for the Projects.

Table 1-~~11-1~~ Maximum Turbine Foundation Scour Protection Parameters.

	Small Turbines	Large Turbines
Monopile		
Maximum number of turbines	200	113
Indicative pile diameter (m)	11	15
Maximum footprint on the seabed per foundation (excl. scour protection) (m ²)	95	177
Maximum outer scour protection diameter at seabed (incl. foundation structure) (m)	63	83
Maximum area of scour protection per foundation (incl. structure footprint area) (m ²)	3,117	5,411
Maximum scour protection volume per foundation (m ³) (rock)	5,278	9,450
Maximum scour protection total footprint area (incl. structure footprint area) (m ²)	623,400	611,443

	Small Turbines	Large Turbines
Maximum scour protection total volume (m ³)	1,055,600	1,067,850
Pin Pile Jacket		
Maximum number of turbines	200	113
Maximum. number of legs per foundation	4	4
Number of legs across wind farm	800	452
Indicative separation of adjacent legs at seabed level (m)	20	34
Maximum pin pile diameter (m)	3	4
Maximum outer scour protection diameter at seabed per leg (including foundation structure) (m)	23	28
Maximum scour protection area per foundation (incl. structure footprint area per pile) (m ²)	1,662	2,463
Maximum scour protection volume per foundation (m ³) (rock)	2,229	3,542
Maximum scour protection total footprint area (incl. structure footprint area) (m ²)	332,400	278,319
Maximum scour protection total volume (m ³)	445,800	400,246

1.2.2 Platform Foundations

~~10.12.~~ The foundation types that may be used for the platforms within the Array Areas are monopiles and pin pile jackets. ~~For the potential Electrical Switching Platform (ESP) within the Offshore Export Cable Corridor, monopiles, pin pile jackets or gravity based foundations may be used.~~ Scour protection may be required around the base of the foundations to protect against localised erosion of the seabed. **Table 1-2** illustrates worst case platform foundation scour protection parameters for the Projects.

Table 1-21-2 Worst Case Platform Foundation Scour Protection Parameters

Parameters	Value
Monopile	
Maximum number	38 (Six CPs / 2 OCPs + Two Other Platforms 1 Accommodation Platform)
Maximum pile diameter (m)	15
Maximum outer scour protection diameter at seabed (including foundation structure) (m)	83
Maximum footprint on the seabed per foundation (excl. scour protection) (m ²)	177
Maximum scour protection area per offshore platform foundation (including structure footprint area monopile) (m ²)	5,411
Maximum scour protection volume per offshore platform monopile foundation (m ³) (rock)	9,450
Maximum total offshore platform foundation scour protection area (including structure footprint area monopile) (m ²)	43,285 16,233
Maximum offshore platform foundation scour protection volume for project (rock) (m ³)	75,600 28,350
Pin pile jacket	
Maximum number	3 (2 OCPs + 1 Accommodation Platform) 8 (Six CPs / OCPs + Two Other Platforms)
Number of legs per platform	8
Pin pile diameter (m)	3.8

Parameters	Value
Maximum outer scour protection diameter at seabed (including foundation structure) (m)	27
Maximum scour protection area per offshore platform foundation (including structure footprint area pin pile) (m ²)	4,580
Maximum scour protection volume per foundation leg (m ³) (rock)	808
Maximum scour protection area for all foundations (including structure footprint area pin pile) (m ²)	36,644 13,740
Maximum scour protection volume for project (rock) (m ³)	51,712 19,392
Gravity-based structure	
Maximum number	1 ESP
Maximum base diameter (OD) (m)	65
Indicative seabed preparation diameter (m)	70
Indicative scour protection width (m)	260
Maximum gravity based height above seabed (m)	10
Maximum outer scour protection diameter at seabed (including foundation structure) (m)	268
Maximum scour protection area per offshore platform foundation (including structure footprint area) (m ²)	56,410
Maximum scour protection volume per offshore platform foundation (m ³) (rock)	102,842

Table 1-31-3 Maximum Lifetime Footprints (Wind Turbines and Offshore Platforms). All figures presented include structure footprints.

Infrastructure	Worst case scenario description	Footprint - DBS East	Footprint - DBS West	Footprint - (combined)
Maximum wind turbine scour protection footprint (m²)	200 turbines x 3,117m² total scour protection per turbine	311,725	311,725	623,449
Maximum offshore platform scour protection footprint (m²)	Offshore platforms with scour protection (assumes three monopile foundations)	16,233 10,822	16,233 10,822	16,233 48,699
Total worst case scour protection for ESP (m²)	One ESP with a Gravity Based Structure (GBS) foundation	56,410	56,410	56,410
Combined Infrastructure footprints (m²)	200 turbines, 38 offshore platforms.	384,368 322,547	322,547 384,368	768,736 639,682

1.2.3 Impacts of Scour Protection

13. The likely significant effects of the placement of scour protection on different aspects of the marine environment are discussed in different chapters and sections of the DBS Environmental Statement. **Table 1-4** presents an overview of the sections of each chapter within which these likely significant effects are discussed. Any updates to the assessments of relevant likely significant effects are presented in the Environmental Statement resulting from Change Request 1 are detailed in the relevant sections of **Project Change Request 1 - Offshore and Intertidal Works (Revision 1)** [AS-141].

Table 1-4 An overview of the chapters and sections of the DBS Environmental Statement within which the likely significant effects of the placement of scour protection on the marine environment are discussed.

ES Chapter	Section Number and Impacts Considered
Chapter 8 – Marine Physical Environment	8.7.4.8 Loss of Seabed Area Due to the Footprint of Foundations
Chapter 9 – Benthic and Intertidal Ecology	9.6.3.3 Impact 5 - Permanent Habitat Loss 9.8.3.3 Impact 5 – Permanent Habitat Loss (Cumulative)
Chapter 10 – Fish and Shellfish Ecology	10.6.1.1 Impact 1: Temporary Habitat Disturbance to Fish and Shellfish Species and Spawning and / or Nursery Grounds 10.6.2.6 Impact 6: Permanent Loss of Habitat and / or Change in Habitat Type as a Result of Changes in Substrate Composition
Chapter 13 – Commercial Fisheries	13.6.2.1 Impact 1: Loss or Restricted Access to Fishing Grounds 13.6.1.6 Impact 6: Potential Consequential Impacts on commercial fisheries from Impacts on Commercially Important Fish and Shellfish Resources
Chapter 17 – Offshore Archaeology and Cultural Heritage	17.6.1.1 Impact 1 Direct (Physical) Impact to Known Heritage Assets (Construction) 17.6.2.1 Impact 1 Direct (Physical) Impact to Known Heritage Assets (Operation) 17.6.1.2 Impact 2 Direct Impact to Potential Heritage Assets (Construction) 17.6.2.2 Impact 2 Direct (Physical) Impact to Potential Heritage Assets (Operation) 17.6.3.1 Impact 1 Direct (Physical) Impact to Known Heritage Assets (Decommissioning) 17.6.3.2 Impact 2 Direct (Physical) Impact to Potential Heritage Assets (Decommissioning) 17.8.3.1 Impact 2 Direct impact to potential heritage assets (Cumulatively)

1.3 Secondary Scour Protection

~~11.14.~~ It is likely that any secondary scour effects associated with scour protection would be confined to within a few metres of the direct footprint of that scour protection material. The Applicants propose monitoring of scour protection measures and subsequent secondary scour. The quantity of turbines subject to monitoring would be confirmed following the completion of detailed design studies and in consultation with the MMO. This would also include consideration of secondary scour i.e. scour around the perimeter of installed scour protection. Geophysical surveys would be carried out both before and after construction both for engineering / asset integrity purposes and to feed into the requirements for other environmental topics such as benthic ecology and archaeology.

1.4 Conclusions

~~12.15.~~ Scouring of seabed around structures causes a serious risk to compromising foundation stability and cables integrity. Scour protection is essential in reducing risk. The Projects will undertake extensive site investigation in order to minimise the use of scour protection through design decisions. Though the maximum worst case scenario total scour protection footprint is 768,736m², it's unlikely the Projects will reach that limit.

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