Construction Method Statement

KINCARDINE OFFSHORE WINDFARM PROJECT

Prepared	Checked	Reviewed	Approved
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Date	Rev. Status	Purpose of Issue*	Remarks	Initials
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Detailed Change Log

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Abbreivations

Abbreviation	Meaning
AHT	Anchor Handling Vessel
CD	Chart Datum
CMS	Construction Method Statement
CWIL	Cobra Wind International Ltd
FPSO	Floating production, storage and offload.
HDD	Horizontal direction drilling
KOWL	Kincardine Offshore Wind Ltd
MHWS	Mean high water spring
NtoM	Notice to Mariners
ROV	Remotely operated vehicle
SFF	Scottish Fishing Federation
WROV	Work ROV
WTG	Wind turbine generator

1. Introduction

1.1. Purpose of the Document

This document has been authored to satisfy condition 10 of the Section 36 Consent Licence issued to Kincardine Offshore Windfarm Ltd (KOWL) for the Kincardine Offshore Windfarm (Project). This document provides the current (at the time of writing) Construction Method Statement (CMS) proposed for the Project, (see Section 1.5 for the wording of the Condition), which requires the submission of a Construction Method Statement no later than six months prior to the commencement of the Development.

1.2. Scope of the Document

This document confirms the construction methods for Tranche 1 (see Section 2.1 for details) of the Project. This document will be updated prior to the commencement of further Tranches as necessary. The CMS includes details of both on-shore and offshore works to provide full details of the Project,

however, it should be noted that the requirements of the Section 36 Consents are pertinent to the offshore works only.

1.3. Project Overview

The Project is considered a commercial demonstrator site, which will utilise floating foundation technology. It has been included within the Survey, Deploy and Monitoring scheme for offshore renewable systems (similar to wave and tidal devices).

The Project is located south-east of Aberdeen approximately 8nm (15km) from the Scottish coastline and where suitable water depth for a floating offshore wind demonstrator development (approximately 60-80m CD) (Figure 1-1).

The project is split into the following areas:

- The Development Area – the wind farm area including the Wind Turbine Generators (WTG) and inter-array cables.
- The Offshore Export Cable Corridor – the area within which the proposed export cables will be laid, from the perimeter of the Development Area to the onshore area at Mean High Water Spring (MHWS).
- The Onshore Area – the onshore area above MHWS including the underground cables connecting to the onshore substation at Redmoss.

This CMS encompasses offshore areas only.

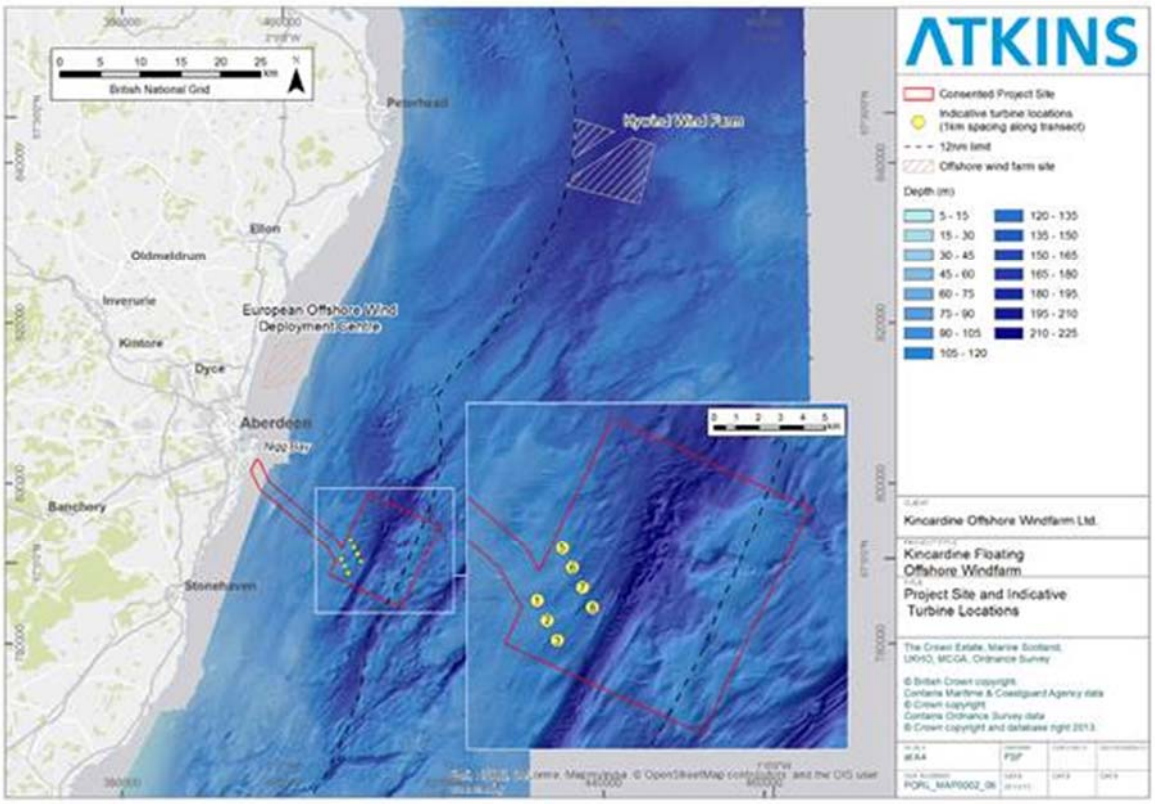


Figure 1-1 Project site and indicative turbine locations.

In April 2016 KOWL submitted applications for consent to construct and operate the Project, which included the Original ES. In September 2016 an addendum (referred to as the ES Addendum), of additional environmental information to the Original ES, was also submitted. In March 2017 consent under Section 36 and Section 36A of the Electricity Act 1989 was granted.

Since consent was granted, there have been some changes to the Project. Therefore, an application for a variation of the Section 36 consent granted by the Scottish Ministers under S36C of the Electricity Act 1989 was applied for in November 2017 (the 'Variation Application'), see Table 1.1 below.

The table 1.1 below outlines the application dates, relevant ES Documents and the components of the Project as were included in the Original Application and the Variation Application.

Table 1-1 Summary of document timelines

Original Documents	Addendums	Variation
Original Application	Original Application	S36C Variation Application
Date Submitted: April 2016	**Date Submitted: September 2016**	**Date Submitted: November 2017**
Kincardine Offshore Windfarm ES (Original ES)	ES Additional Information Addendum (ES Addendum)	Section 36C Variation ES (Variation ES)
Maximum generation capacity: 50MW	Maximum generation capacity: 50MW	Maximum generation capacity: 50MW
WTGs: 8 x 6MW	WTGs: 8 x 6MW	WTGs: 1 x 2MW and 6 x 8.4MW
Substructures: semi-submersible	Substructures: semi-spar	Substructures: combination of semi-submersible and semi-spar
Cables: 33kv inter-array and export cables	Cables: 33kv inter-array and export cables	Cables: 33kv inter-array and export cables

Project Components

As noted in table 1-1 above, the maximum generation capacity of the windfarm is capped at 50MW, the main difference between the various stages of the applications have been the number and size of the turbines, and the substructure type.

As applied for in the Section 36 Variation, the Project will now consist of the following offshore components:

- WTGs: 1 x 2MW and 6 x 8.4MW.
- Substructures: combination of semi-submersible and semi-spar (number of each still to be decided).
- 33kV inter-array and two export cables.

2. Project Timelines for Construction

2.1. Construction Programme Overview

The construction of the Project is anticipated to occur in 'Tranches' in-line with the indicative Programme outlined below. A final Construction Programme for each tranche will be provided to Scottish Ministers prior to commencement of the construction as a requirement of the consent conditions and will be included in the Construction Programme document.

Table 1-2 Indicative construction programme

Tranche	Activities	Indicative Start Dates
Tranche 1	Onshore works and HDD drilling	March 2018
	Mooring installation Turbine Location 1	May 2018
	Export Cable 1 installation	May 2018
	Installation of 2MW turbine to Location 1	June 2018
Tranche 2	Export Cable 2 installation	April 2019
	Mooring installation Turbine Locations 5-7	April 2019
	Installation of inter-array cables Locations 5-7	Aug 2019
	Installation of turbines to Locations 5-7	Aug 2019
Tranche 3	Mooring installation Turbine Locations 1-3	March 2020
	Installation of inter-array cables Locations 1-3 and 8	June 2020
	Move 2MW to Location 8 (dependent on recertification and consultation as noted above)	June 2020
	Installation of turbines to Locations 1-3	June 2020

Please note, Export cable 2 may be installed as part of Tranche 1; however, at the time of writing this CMS the date was still to be decided. This will be confirmed in due course, and this document will be updated if required as part of the Construction Programme amendments.

2.2. Seasonal Avoidance

The current construction programme will avoid the noted key sensitive bird species as noted in Section 36 condition 10.

3. Installation Methodologies for the Export Cables

3.1. Pre-Lay Grapnel Run (Optional)

As part of the pre-lay operation an optional grapnel run (depending on review of site data) will be undertaken along the export cable route to confirm the complete clearance of any abandoned fishing equipment (fishing nets and pots). This will be undertaken using normal operational approaches (such as an SFF vessel mobilised to undertake such activities), with the figure below showing a typical grapnel chain assembly that could be used for such operations.

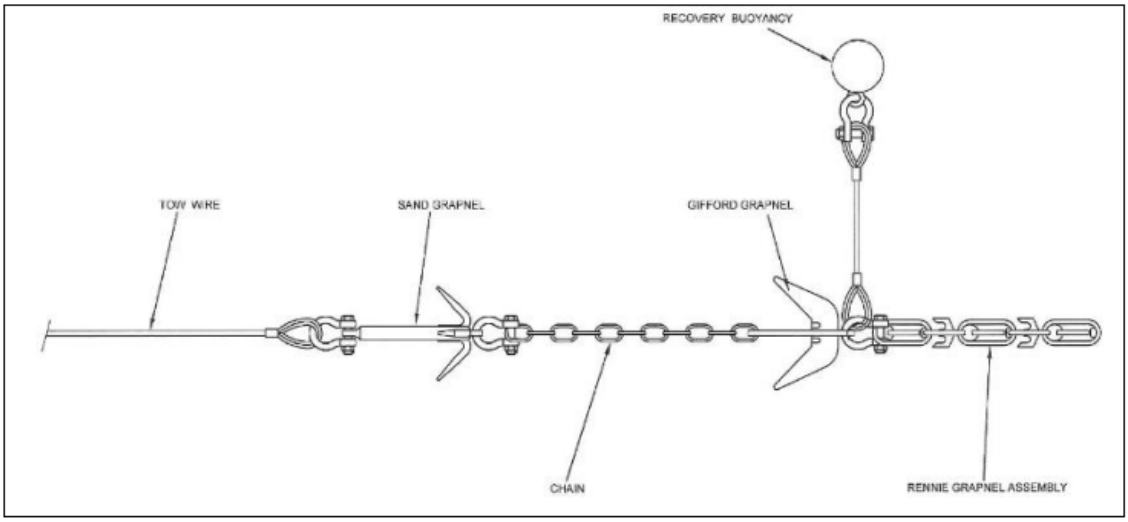


Figure 2-1 Typical grapnel chain assembly.

3.2. Boulder Clearance

Where boulders are present within the cable route (large number noted during cable route survey), a boulder clearance campaign will be undertaken utilising a dedicated boulder grab to pick up larger boulders (>30cm) and shifting them approximately 15m perpendicular to the cable route. No boulders will be removed from site during this operation.

3.3. Cable Laying

The cable lay shall be installed from the HDD drill out location to the Development Area in one continuous operation using a dedicated cable lay vessel to undertake the operation.

The cable will be installed by utilising a cable trenching tool (either mechanical cutting or jetting depending on the sea bed material encountered). The cable will be laid within the trench and then buried to the required depth. Post cable lay surveys will be undertaken to ensure that no berm formation has occurred due to the potential buildup of seabed material caused by the trenching and cable lay operations. Should any berm be identified it will be removed using standard marine operations.

Where burial depth is not achieved suitable protective material (such as rock dump) will be used to ensure coverage).

3.4. Post-Lay Survey

As part of the post lay work, a survey will be undertaken to ascertain the burial location, the depth of burial and any areas where the cable is still exposed. Should any areas be identified where post-lay protection is still required to ensure complete burial, additional measures will be brought into play to bury and exposed sections of the cable. This report will be submitted to MS LOT as part consent discharge process.

4. Installation Methodologies for the Mooring Systems

4.1. Pre-Lay survey

A pre-lay survey shall be performed in order to identify and remove any debris which is along the route of the mooring lines.

4.2. Mooring Line Deployment

The mooring lines will be deployed by connecting the chain to the anchor on the back deck of an Anchor Handling Vessel (AHV). The anchor will be lowered using the mooring chain to the seabed into a pre-determined target box and orientated to face the WTG location. The location of the anchor on the seabed will be recorded for comparison with the post embedment location.

The chain will then be deployed using well established and recognised practises in the offshore industry. Upon completion of the laying operation the chain end will be transferred onto the main winch wire.

4.3. Anchor Embedment and Laydown

The embedment of the anchor involves the Anchor Handling Vessel applying a large horizontal thrust to the mooring line which will act to pull the anchor down into the seabed.

The load applied is usually up to the maximum design tension with the WTG connected, in order than further movement of the anchor is prevented.

The load will be applied by the vessel and the tension monitored using the load cell on the main winch. The load will be applied gradually up to a target tension and held for a period of time to ensure the anchor has reached its final location.

The anchor will usually embed to a depth well below the seabed level and thus the monitoring of its' final position can be determine accurately by measuring the movement of a pre-defined point on the mooring line (for example a shackle connection). The length of the chain can then be adjusted to compensate for the drag distance of the anchor.

5. Hook-up Methodologies for the Floating Systems

The hook-up of the WTG will follow similar principals for any floating structure such as floating production, storage and offloading vessels (FPSO's), Dry-Tow, Drilling rigs plus draw on the experience of the vessels and crews experience involved in a range of similar activities.

5.1. Preparation and Tow

Prior to the tow of the WTG and its substructure, certificate of worthiness for sailing will be required from a Marine Warranty Surveyor, which will typically include but not be limited to the following checks:

- Towing calculations.
- Specification of towing equipment.
- Towing vessel audits and assessment of suitability.
- Towage route and safe havens / sheltered locations.
- Necessary permits and notifications for the towing operations.
- Contingency and emergency procedures.

- Checks of all vital hook-up equipment (i.e. winches).
- Confirmation a suitable weather window.

The tow will generally consist of at least two vessels to conduct the open ocean tow plus smaller supporting tugs for the sensitive operation of leaving a port area.

The towing operation will be performed at a safe speed for the WTG sub-structure and if there are any delays or issues in-field a designated sheltered location or safe haven will be identified.

5.2. Hook-up Infield

Prior to the towing vessels and WTG arriving there will be a survey and preparation of the mooring system and cable, as required, to ensure that no damage has occurred prior to hook-up. This will normally be performed by a supporting AHT vessel complete with an WROV equipped.

The operation to perform the hook-up will generally following on immediately after the towing operation, effectively as part of the same operation. The towing vessels will have to setup on location in a pre-defined heading and position to keep the WTG above the target location.

A supporting AHT or crew transfer vessel will transfer hook-up personnel on-board ready for the hook-up operation. The operation will typically involve the transfer of the winch wire across to the support AHT. This wire will be connected to the end of the mooring line and a cross-haul operation conducted to pull-in the chain to the securing arrangement.

This operation will be performed for each mooring line in turn, after which once securely moored the towing vessels will be disconnected, but remain on standby until mooring is complete.

The last operation will be the final tensioning of the mooring lines to achieve the required pre-tension and ensure it is on-location as close as possible to the design position. For a three leg system this often will involve the adjustment of the last mooring line only; however some small adjustment may be required on the other mooring lines.

Once confirmed as securely moored, a signed off by the Designers Representative and Marine Warranty Surveyor will be undertaken prior to the towing vessels being demobilised.

5.3. As-built Survey

The final operation for the support vessel is a full ROV survey of the mooring system to identify and record the status to be compared against future surveys. The hull of the WTG will also be survey to confirm there is no damage during the transit and hook up operation.

6. Installation Methodology for the Interarray Cables

6.1. Vessel Specification

The interarray cables will be installed from a suitable vessel with suitable storage for the cables and handling of the various ancillary items on the cable, such as buoyancy and bend stiffeners.

6.2. Pre-Lay Survey

Prior to the laying the route will be surveyed to identify and as required remove any items along the route.

6.3. Installation Operation.

Subject to the schedule there are two installation methodologies.

If the WTG is on location the cable can be initiated directly into the J-tube of the WTG and pulled up to deck level then permanently secured. The cable will then be laid away using attached buoyancy modules in the required locations on the cable. The lay will continue along the designated route; however, the action depends upon whether the WTG is in place or not.

If the WTG is present and a cross-haul operation is required, this will be conducted using buoyancy modules attached and laid continued until the end of the cable (bend stiffener) is on deck. A pulling winch wire will be accepted from the WTG and connected to the end of the cable to allow cross-haul operation to be performed, pulling in the cable to its final location.

6.4. As-Built Survey

The final operation of the cable installation will be an as-built survey of the cable to confirm it has been laid to the correct depth and manner. This will provide the confirmation and validation of the cable lay operation has been undertaken as per the licence requirements and also provide the baseline for the future long-term assessment of the cable burial which will be undertaken as part of the O&M process.

7. Waste Management

The requirement to set out the environmental management framework for the management of waste generated by the construction and operation of the Project arises from specific requirements in the Consent. Which was granted by the Scottish Ministers under Section 36 of the Electricity Act 1989 for the construction and operation of an offshore generating station, the Kincardine Floating Offshore Windfarm, approximately 15 km South East of Aberdeen (7th March 2017):

Section 10:

The Construction Method Statement (CMS) must include, but not be limited to:

d) a waste management plan for the construction phase of the Development;

Section 13:

d) a site waste management plan (dealing with all aspects of waste produced during the construction period), including details of contingency planning in the event of accidental release of materials which could cause harm to the environment. Wherever possible the waste hierarchy of reduce, re-use and recycle should be encouraged;

The waste management framework for KOWL is set out in the Site Waste Management Plan, which sets out the following, with respect waste management from marine operations:

- regulatory framework relating to waste management.
- roles and responsibilities in relation to the management of waste.
- waste types that may be generated, including special waste; and
- the waste hierarchy (options to recycle, re-use and dispose) as well as the storage and segregation of waste offshore for subsequent onshore disposal.

KOWL will require that all contractors and sub-contractors for the construction and operation of the Project to:

- demonstrate waste management procedures for their activities providing details of expected waste streams and proposed procedures for waste management;
- meet the pertinent legislative requirements and obtain, where necessary, any licences in relation to waste management;
- ensure that all waste is placed in appropriately labelled containers;
- ensure that all waste is disposed of in accordance with the waste management framework; and
- ensure that the disposal of waste or refuse is transported by a suitably licensed waste carrier to a licensed waste facility.

8. Roles and Responsibilities.

The KOWL Project team are responsible for the management of the project through the construction period and then the operational and maintenance for the life of the project. The KOWL team consist of the following roles and key contact names (Figure 8.1) and the Cobra Wind International Ltd (CWIL) project construction team consists of the following roles ad key contact names (Figure 8.2):

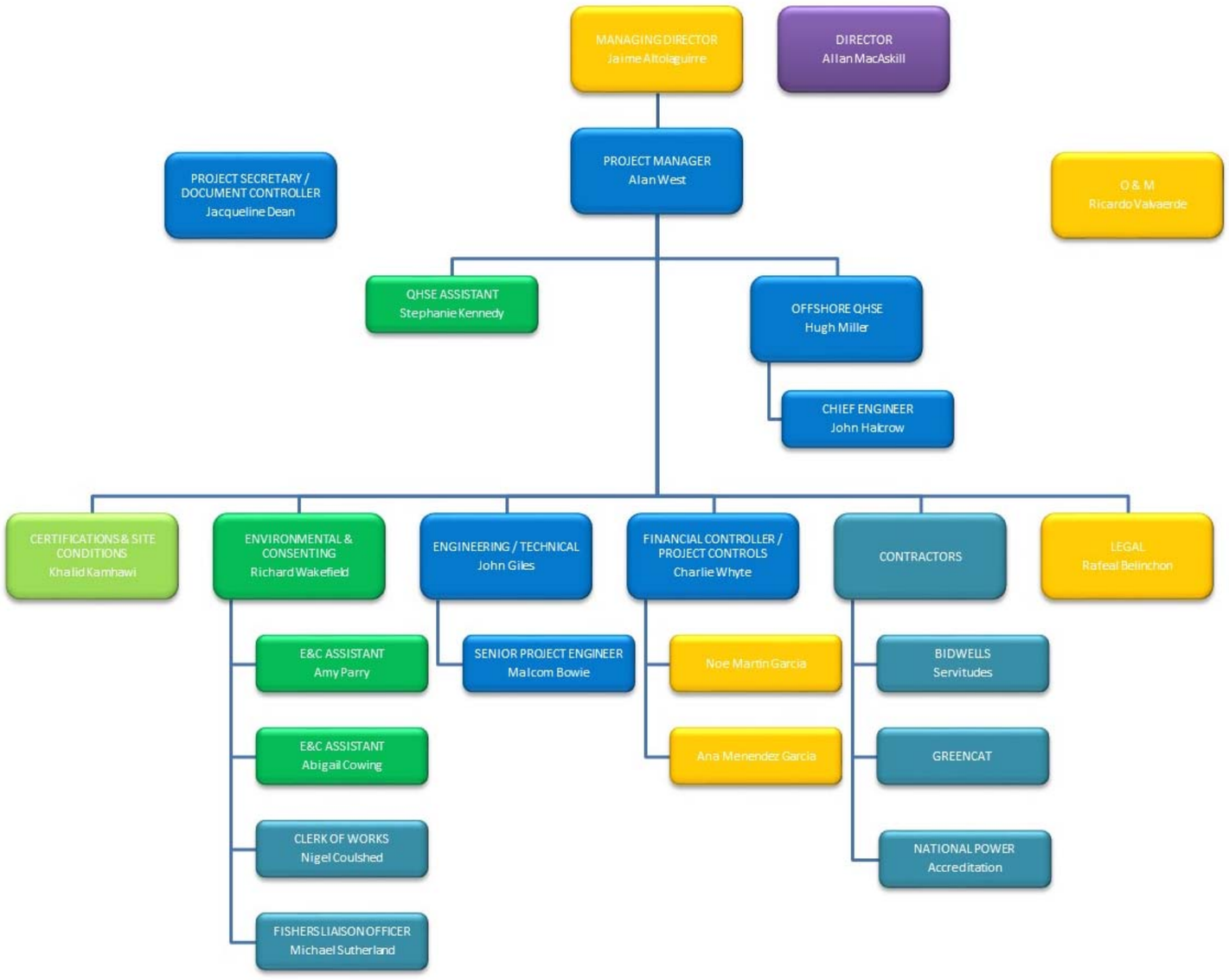


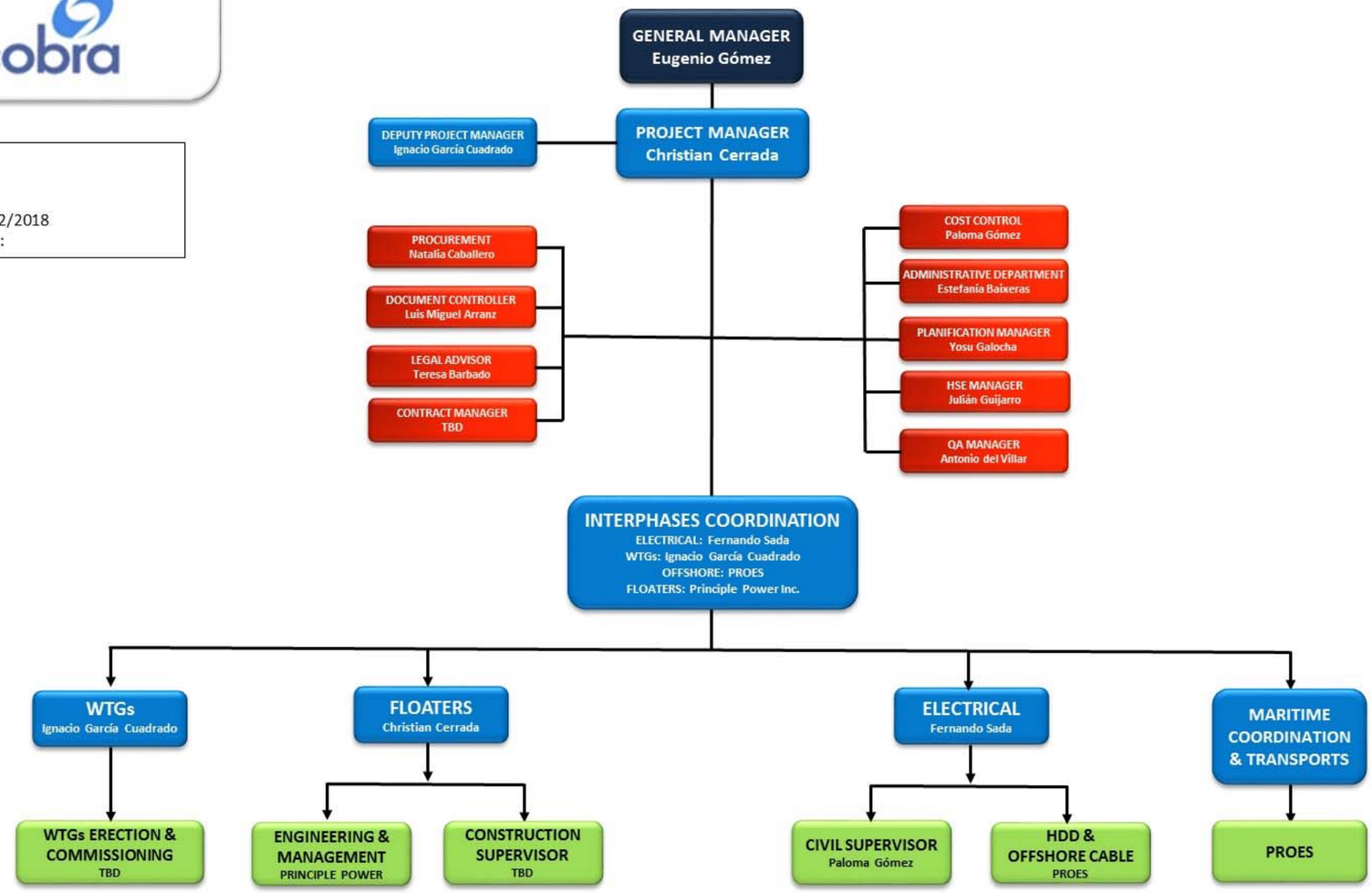
Figure 8-1 KOWL Project team and key contacts.

ORGANIZATIONAL CHART
COBRA WIND INTERNATIONAL LTD.

cobra

REV: 3

DATE: 18/02/2018
SIGNATURE:



FEBRUARY 2018

Figure 8-2 CWIL Project team and key contacts.

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9. Compliance with Project Mitigation

The following project mitigation elements (Table 9-1) have been included within the construction programme as noted within project ES and Variation. Due to the limited amount of time that the construction activities are active on site and the installation processes associated with the use of semi-sub floating offshore structures there are a limited number of identified environmental mitigation commitments noted in the table below.

Table 9-1 – Compliance with identified mitigation embedded in ES and ES Variation.

Identified Issue	Mitigation noted within ES	Actioned in Construction process
Cable burial and protection of Cables	Export cables would be protected appropriately taking into account fishing and anchoring practices and an appropriate burial protection index study. Positions of cables would be promulgated and charted by appropriate means. As per the requirements of MGN 371 any cable protection used will be risk assessed to ensure it does not present an under-keel clearance risk to vessels transiting over the top. This in particular is required in shallow waters areas where deep keeled recreational craft may transit.	KOWL will aim to bury the cable to the required burial depth of 1.5m. This will be confirmed by a post-lay survey to identify cable burial and where required cable protection will be installed. This will also confirm the underwater clearance is not impact by the cable installation.
Fisheries Liaison Officer (FLO)	The FLOWW (Fishing Liaison with Offshore Wind and Wet Renewables Group) best practice guidance for fisheries liaison will be followed, including the establishment of a fishing liaison plan. An FLO has been appointed for the Project and will continue in this role during construction.	FLO appointed to mitigate risk with fishing industry during construction. Fishing engagement plan completed following consultation with SFF.
Fisheries Management and Mitigation Strategy	In order to inform the production of the FMMS, the Company must monitor or collect data as relevant and agreed with Scottish Ministers in terms of the ES and ES Addendum and any subsequent monitoring or data collection for: i) the impacts on the adjacent coastline; ii) the effects on local fishermen; and iii) the effects on other users of the sea. As part of any finalised FMMS, the Company must produce and implement a mitigation strategy for	Fisheries Management and Mitigation Strategy for project submitted for consultation to ensure appropriate interactions with fishing community.

	each commercial fishery that can prove to the Scottish Ministers that they would be adversely affected by the Development. The Company must implement all mitigation measures committed to be carried out by the Company within the FMMS. Any contractors, or sub-contractors working for the Company, must co-operate with the fishing industry to ensure the effective implementation of the FMMS.	
Guard vessels during construction	Guard vessels would be used during construction, and significant maintenance to both protect the installations and workers on the wind turbines, particularly in areas in proximity to main traffic routes. Their role would be to both alert vessels to the development activity and provide support in the event of an emergency situation. A guard vessel will be present for the period when the export cables, inter array cables and mooring structures will be in situ.	KOWL to appoint SFF guard vessels for construction work.
Promulgation of information	Appropriate liaison and dissemination of information and warnings through Notices to Mariners and other appropriate media, (e.g. Admiralty Charts, fishermen's awareness charts and Pilot Books) would enable vessels too effectively and safely passage plan around the Project (including inter-array cables) and the offshore cable corridor. It is noted that this will include international promulgation of information.	Information on construction programme to be send via Notice to Mariners (NtoM) and other appropriate notices.
Towing risk management plan	A management plan for the towing operation will be developed by the towage company; this will follow standard and international marine procedures.	KOWL has appointed a Master Mariner to review this tow and will report all information pertinent to NtoM.