Scottish and Southern Energy Power Distribution	CAITHNESS – MORAY TRANSMISSION REINFORCEMENT
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CAITHNESS – MORAY HVDC REINFORCEMENT

OFFSHORE INSTALLATION CUMULATIVE IMPACT REVIEW

Revision	Date	Prepared by	Reviewed by	Approved By
01	30.03.16	[redacted]	[redacted]	[redacted]
02	05.07.16			

Contents

Revision note:

1. New Section 6 added for Cumulative Impact During Installation.
2. Consideration given in Section 6 to simultaneous installation activities by BOWL and SHE T.
3. Reference to cumulative impact during installation removed from Section 5.
4. Appendix B (SHE T, BOWL and MORL installation programmes) added.

1 INTRODUCTION

The purpose of this document is to summarise the cumulative impact of the Beatrice Offshore Windfarm Limited (BOWL) and Moray Offshore Renewables Limited (MORL) windfarm developments and Scottish Hydro Electric Transmission plc's (SHE T) Caithness - Moray High Voltage Direct Current (CMHVDC) cable development on commercial fishing in the Moray Firth.

This document forms an addendum to SHE T's Fisheries Liaison Mitigation and Action Plan (FLMAP), SHE T's Socio-economic Assessment, BOWL's Environmental Statement (ES) and MORL's ES. It should be read in conjunction with these documents.

It should be noted that this review does not repeat the work already done by others but instead draws on their findings.

SHE T's CMHVDC cable is critical national infrastructure and, as such, SHE T has determined that the cable requires to be protected along its entire length.

2 REVIEW OF NOSS TO HUB ES CUMULATIVE IMPACT CONCLUSIONS

SHE T commissioned Aquatera in 2011 to produce an Environmental Statement (ES) in support of the application for a marine licence for the "Hub to Noss" section of the Caithness – Moray HVDC cable across the Moray Firth. This licence has been granted.

Chapter 11 of the ES (Cumulative and In-combination Issues) sets out possible synergies and antagonisms from the CMHVDC cable, other projects and plans. Table 11.1 below highlights the interactions between commercial fishing and cable infrastructure and notes that the interaction between the Noss to Hub Section of the C-M cable and commercial fisheries as being "possible". This is a lesser level of interaction than that noted between commercial fishing and offshore wind farms such as BOWL and MORL.

Key	×	?	+?✓	+✓✓	+✓✓✓
	×	?	?✓	✓✓	✓✓✓
	No interaction	Uncertain	Possible interaction	Likely interaction	Certain interaction

Issue/mechanism	Cable infrastructure	Offshore wind farms	PFOW tidal projects	PFOW wave projects	Oil and gas exploration	Conservation	Coastal development
Seabed character changes	✓✓	✓✓	✓✓	✓✓	✓✓	×	×
Water quality changes due to re-suspended sediments	?✓	?✓	×	×	?✓	×	?✓
Seascape changes	×	✓✓✓	✓✓	✓✓	✓✓	×	✓✓
Direct seabed disturbance	✓✓	✓✓	✓✓	✓✓	✓✓	×	?✓
Effects on migrating salmon	×	?	?	?	×	×	×
Disturbance to seabirds offshore	?✓	✓✓	?✓	?✓	?✓	×	?✓
Disturbance to marine mammals from noise	×	✓✓	×	×	✓✓✓	×	?✓
Ecological impacts from spillages of oil and chemicals	×	×	×	×	?✓	×	?✓
Disturbance to commercial fishing	?✓	✓✓	×	✓✓	✓✓	?✓	×
Obstacle to navigation from offshore structures	✓✓	✓✓✓	✓✓	✓✓✓	✓✓	×	×
Obstacle to oil & gas activities	✓✓✓	✓✓✓	×	×	✓✓	✓✓	×
Benefits to the wider renewables sector	+✓✓✓	+✓✓✓	+✓✓✓	+✓✓✓	×	?✓	+?✓
Benefits to the local economy	+?✓	+✓✓	+?✓	+?✓	+?✓	×	+✓✓

Table 11.1 Possible synergies and antagonisms within the current project and with other future projects and plans.

However, this assessment was only carried out in relation to the Noss to Hub section and is therefore not representative of the entire CMHVDC cable route although, it does include the impact from the now discontinued Moray Firth Offshore Hub and the associated 33kV power

supply cable. Thus, the assessment of the impacts on commercial fishing detailed in this document is conservative when compared to the scope of works actually being planned by SHE T.

However, this low level of interaction is consistent with the findings subsequently set out in 2016 in SHE T's Socio-Economic Assessment (for the whole CMHVDC route), which concluded that although there was interaction with fisheries, the likely socio-economic consequences of this was likely to be small.

3 REVIEW OF SHETLAND TO MORAY EA CUMULATIVE IMPACT CONCLUSIONS

SHE T commissioned Entec in 2008 to produce an Environmental Appraisal (EA) in support of their application for a marine licence for the “Shetland HVDC Link”. This licence was granted.

At that time, other developments of significance were considered to be at an early stage in their lifecycle with no formal consenting process having commenced and it was deemed unlikely that any such development would coincide with SHE T’s subsea HVDC cable installation. Hence, cumulative effects were not considered likely.

However, SHE T recognises that this snapshot is no longer representative of the developments that are now planned for the Moray Firth. Therefore, the content of this EA is not considered further in this review.

4 REVIEW OF BOWL AND MORL ES CUMULATIVE IMPACTS ASSESSMENTS

BOWL and MORL jointly commissioned ERM in 2011 to produce a Cumulative Assessment Discussion Document (MORL ES Technical Appendix 1.3D) which set out the methodologies that these developments would use to assess and quantify their cumulative impacts.

BOWL's ES assessed the cumulative impacts of developments in the Moray Firth (including SHE T's C-M cable). Section 16.7 details the developments that were considered in the cumulative impact assessment. The output from this assessment is set out within Section 16 of BOWL's ES and broadly states that the impact on commercial fishing in the Moray Firth is expected to be minor to negligible, though it is considered that these impacts are probable. Table 16.8 from BOWL's ES (set out below) illustrates these findings for selected commercial species.

Table 16.8 Summary of Assessment on Haddock, Scallops and Squid (Operational Phase)

Effect	Receptor	Predicted Significance	Mitigation Proposed	Residual Effect Significance	Probability
Loss of habitat	All	Negligible	None Proposed	Negligible	Probable
Introduction of new habitat	All	Negative minor	None Proposed	Minor	Probable
Electromagnetic Fields	All	Negligible	None proposed	Negligible	Probable
Operational Noise	All	Negative Minor	None Proposed	Minor	Probable

MORL's ES assessed the cumulative impacts of developments in the Moray Firth (including SHE T's C-M cable). Table 15.1-1 discusses the impacts of individual developments against a variety of receptors. In summary, this notes that there will be moderate displacement of scallop, squid and nephrops fisheries within the wind farm areas and minor displacement of whitefish in the same area. It also notes that the impact will be similarly split for complete loss or restricted access to traditional fishing grounds.

Furthermore, there is no expected cumulative effect on crab and lobster fisheries. Full detail is set out in Section 15.1 of MORL's ES.

5. CAITHNESS – MORAY HVDC CABLE CONTRIBUTION TO THE OVERALL CUMULATIVE IMPACT

The assessments carried out by BOWL and MORL, as summarised above, indicate that the cumulative impact of all of the planned developments in the Moray Firth is generally considered to be moderate. However, there are some elements that are considered to be minor or negligible.

SHE T's Socio-economic Assessment describes and quantifies the impacts of the C-M cable on commercial fisheries. These are generally considered to be minor or negligible as set out in Section 3.3.

The table below sets out the impacted areas from each of the projects:

Project	Impacted area, i.e. excluded from mobile gear fishing
BOWL	285,348 m^2 (86 No. foundations x 3,318m^2 - assumed)
MORL (Round 3 Zone worst case)	1,393,689 m^2 (420 No. foundations x 3,318m^2)
SHE T C-M cable	262m^2 (over the Noss Head MPA)

This indicates that the contribution from the C-M cable to the overall impacted area in the Moray Firth is less than 0.1% of the area impacted by the combination of the BOWL and MORL turbine foundations (excluding inter-array or export cables, the inclusion of which would increase the impacted area). This is based upon mobile gear fishing not being prevented over the C-M cable however, some vessels may choose not to fish over the cable route.

The above is notwithstanding any legislation or conventions in place (detailed in ***Appendix A***) that protect subsea telecommunications or high voltage electricity cables from injury, nor does it preclude the vessel master's responsibility to protect the safety and welfare of his vessel and crew.

SHE T would seek to recover the costs of any losses incurred as a result of the injury to the C-M cable from the party responsible for the injury.

6. CUMULATIVE IMPACT DURING INSTALLATION

There is a potential for simultaneous activities being carried out by various organisations and these are considered below:

- SHE T and BOWL:

  The subsea portions of the SHE T CMHVDC cables and the BOWL AC export cables are relatively close to each other within the first 7.5km off the Moray coastline. At the coastline, the cables are approximately 800m apart and at kp 7.5, the cables are approximately 100m apart. Beyond this, the cables diverge.

  Both installation programmes are available and indicate the following:

  - SHE T landfall horizontal directional drilling takes place between August 2016 and February 2017. BOWL landfall direct pipe drilling takes place between March and April 2017. There are therefore no expected simultaneous activities relating to the landfall duct installation operations. SHE T will carry out their offshore trenching work in the area off the Moray coastline in April 2017 but this operation is physically displaced from the landfall duct installation operations.

  - BOWL will carry out some nearshore backhoe trenching work at the Moray coastline between late June and early July 2017. Immediately prior to this, SHE T will have pulled in their cables through their landfall ducts and, by the date when BOWL commence their backhoe trenching work, will already be approximately 25km away from the Moray coastline. There are therefore no expected simultaneous activities relating to BOWL's nearshore backhoe trenching operations.

  - BOWL will carry out a pre-lay grapnel run in July 2017. SHE T will have no operations in the area near the Moray coastline ongoing at that time.

  - BOWL will install their first cable circuit in September 2017. SHE T will have no operations in the area near the Moray coastline ongoing at that time.

  - BOWL will carry out their cable protection work (post-lay burial) between September and October 2017. SHE T will be carrying out rock protection works where necessary during this time but will be carrying this out at the Caithness end of the Caithness – Moray cable route. There are therefore no expected simultaneous activities relating to BOWL's cable protection operations.

- SHE T and MORL:

  The subsea portions of the SHE T HVDC cables and the MORL AC export cables cross each other approximately 40km off the Moray coastline. Furthermore, the SHE T HVDC cables are within 100m of the eastern periphery of the MORL wind farm zone.

  Both installation programmes are available and indicate the following:

- MORL's export cable installation activities take place in 2020 i.e. in excess of 2 years after SHE T's cable is put into permanent service. There are therefore no expected simultaneous activities relating to MORL's export cable installation.
- MORL's wind turbine installation activities take place between 2019 and 2021 i.e. in excess of at least 1 year after SHE T's cable is put into permanent service. There are therefore no expected simultaneous activities relating to MORL's wind turbine installation.

- Ardesier redevelopment:
  - This project is on hold pending re-sale. Therefore, potential construction programme overlap is unlikely.
- Nigg Harbour piling:
  - This work was completed in 2015. Therefore, there is no installation programme overlap.

7. SHE T MITIGATION MEASURES

SHE T's mitigation measures include:

- routing the cable to optimise burial in sediments;
- establishing a target trench depth at 1.8m;
- determining a minimum depth of cover being 1.0m;
- allowing for up to 0.65m of trench backfill between trenching and cable laying (noting that the cable diameter is 0.15m);
- issuing Notices to Mariners through agreed channels;
- provision of guard vessels during the installation phase;
- surveying of the trench profile, cable placement and mechanical backfill;
- placing rock where surveys indicate that minimum depth of cover has not been achieved;
- final surveying of completed installation; and
- ongoing monitoring of the installation during its operational lifespan.

Scotland's National Marine Plan states the following:

> *New cables should implement methods to minimise impacts on the environment, seabed and other users, where operationally possible and in accordance with relevant industry practice.*
>
> *Cables should be buried to maximise protection where there are safety or seabed stability risks and to reduce conflict with other marine users and to protect the assets and infrastructure.*
>
> *Where burial is demonstrated not to be feasible, cables may be suitably protected through recognised and approved measures (such as rock or mattress placement or cable armouring) where practicable and cost-effective and as risk assessments direct.*

It is therefore evident that the mitigation measures detailed above discharge SHE T's obligations in this respect.

8. CONCLUSION

The following conclusions can be drawn from the above:

- SHE T acknowledges that the cumulative impact of all planned developments in the Moray Firth will have a moderate impact on mobile gear commercial fishing;
- it is not certain that all planned developments included in the cumulative impact assessment will proceed;
- the timeframes for the delivery of the planned developments other than SHE T's C-M cable are not defined;
- it is not possible to consider cumulative impacts during installation as the programmes for other projects are not available to SHE T, or are not firm;
- the area impacted by SHE T's C-M cable is negligible as a proportion of the total area impacted by BOWL and MORL;
- the mitigation measures that will be implemented by SHE T on the C-M cable are in accordance with the requirements set out in Scotland's National Marine Plan; and
- the mitigation measures that will be implemented by SHE T on the C-M cable are proportionate to its contribution to the cumulative impact of developments in the Moray Firth.

APPENDIX A

The International Convention for the Protection of Submarine Cables, 1884, as extended by the Convention on the High Seas, 1958 stipulates:

> *vessels shall not remain or close within 1 mile of vessels engaged in laying or repairing submarine cables or pipelines, and vessels engaged in such work shall show the signals laid down in the International Regulations for Preventions of Collisions at Sea 1972. Fishing gear and nets shall also be removed to, or kept at, a distance of 1 mile from vessels showing those signals, but fishing vessels shall be allowed 24 hours after the signal is first shown for them to get clear.*

The International Regulations for Preventions of Collisions at Sea 1972 rule 18/c states:

> *a vessel engaged in fishing when underway shall, so far as possible, keep out of the way of:*
>
> *(i) A vessel not under command*
>
> *(ii) A vessel restricted in her ability to manoeuvre.*

United Nations Convention on the Law of the Sea Article 113 states:

> *Breaking or injury of a submarine cable or pipeline*
>
> *Every State shall adopt the laws and regulations necessary to provide that the breaking or injury by a ship flying its flag or by a person subject to its jurisdiction of a submarine cable beneath the high seas done wilfully or through culpable negligence, in such a manner as to be liable to interrupt or obstruct telegraphic or telephonic communications, and similarly the breaking or injury of a submarine pipeline or high-voltage power cable, shall be a punishable offence. This provision shall apply also to conduct calculated or likely to result in such breaking or injury. However, it shall not apply to any break or injury caused by persons who acted merely with the legitimate object of saving their lives or their ships, after having taken all necessary precautions to avoid such break or injury.*

APPENDIX B

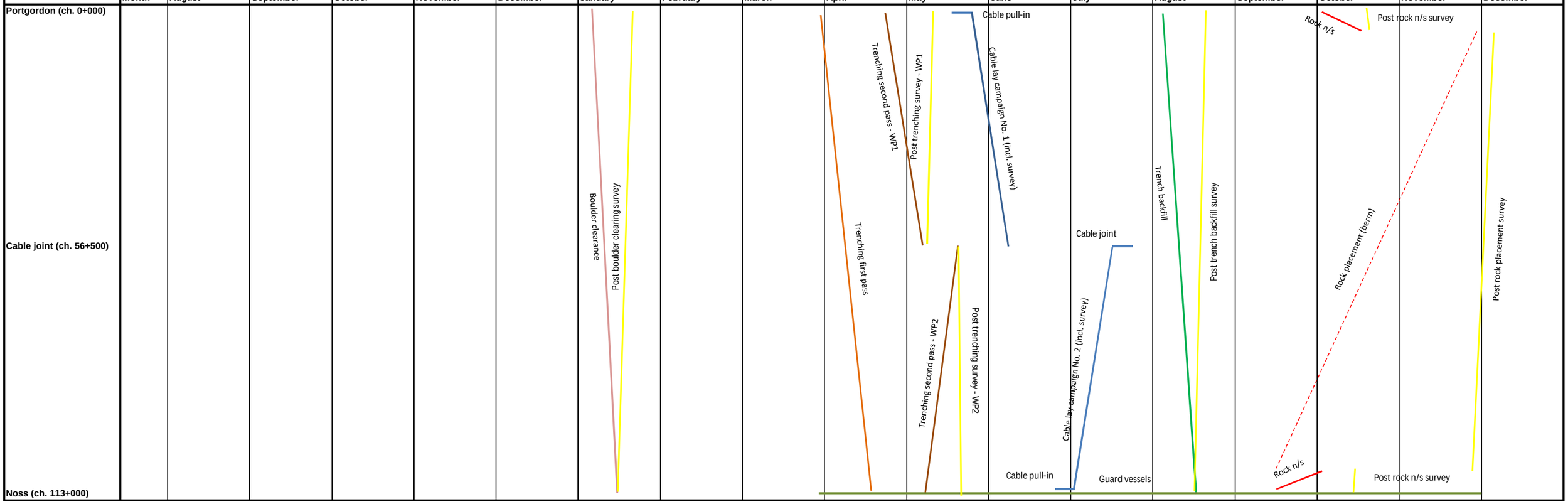
SHE T, BOWL and MORL Installation programmes

Scottish and Southern Energy

LT21 Caithness HVDC Reinforcement

Marine Operations: current programme

Schedule of activities **Date:** 18.05.16 **Doc No.:** LT000021-PRG-003 **Revision:** 6.0 **Revision note:** Update to reflect Contractor's Revision 24 installation programme



Programme dates

Activity	Start date	Finish date	Duration (days)
Boulder clearance	11/01/2017	21/01/2017	10
Post boulder clearance survey	21/01/2017	26/01/2017	5
Trenching first pass	31/03/2017	19/04/2017	19
Trenching second pass WP1	23/04/2017	06/05/2017	13
Post trenching survey WP 1	06/05/2017	08/05/2017	2
Trenching second pass WP2	09/05/2017	22/05/2017	13
Post trenching survey WP 2	22/05/2017	24/05/2017	2
Cable pull-in (Portgordon)	19/05/2017	24/05/2017	5
Cable lay - campaign 1 (incl. survey)	24/05/2017	08/06/2017	15
Cable pull-in (Noss)	26/06/2017	01/07/2017	5
Cable lay - campaign 2 (incl. survey)	01/07/2017	16/07/2017	15
Cable joint	16/07/2017	23/07/2017	7
Trench backfill	03/08/2017	17/08/2017	14
Post trench backfill survey	17/08/2017	22/08/2017	5
Rock placement (berm)	16/09/2017	25/11/2017	70
Post rock placement survey	25/11/2017	06/12/2017	11
Rock n/s (Noss)	16/09/2017	02/10/2017	16
Rock n/s (Portgordon)	02/10/2017	18/10/2017	16
Post rock n/s survey (Noss)	18/10/2017	19/10/2017	1
Post rock n/s survey (Portgordon)	19/10/2017	21/10/2017	2
Guard vessels (varying quantity)	31/03/2017	30/11/2017	244

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Beatrice Offshore Windfarm Project
Consortium Baseline Programme

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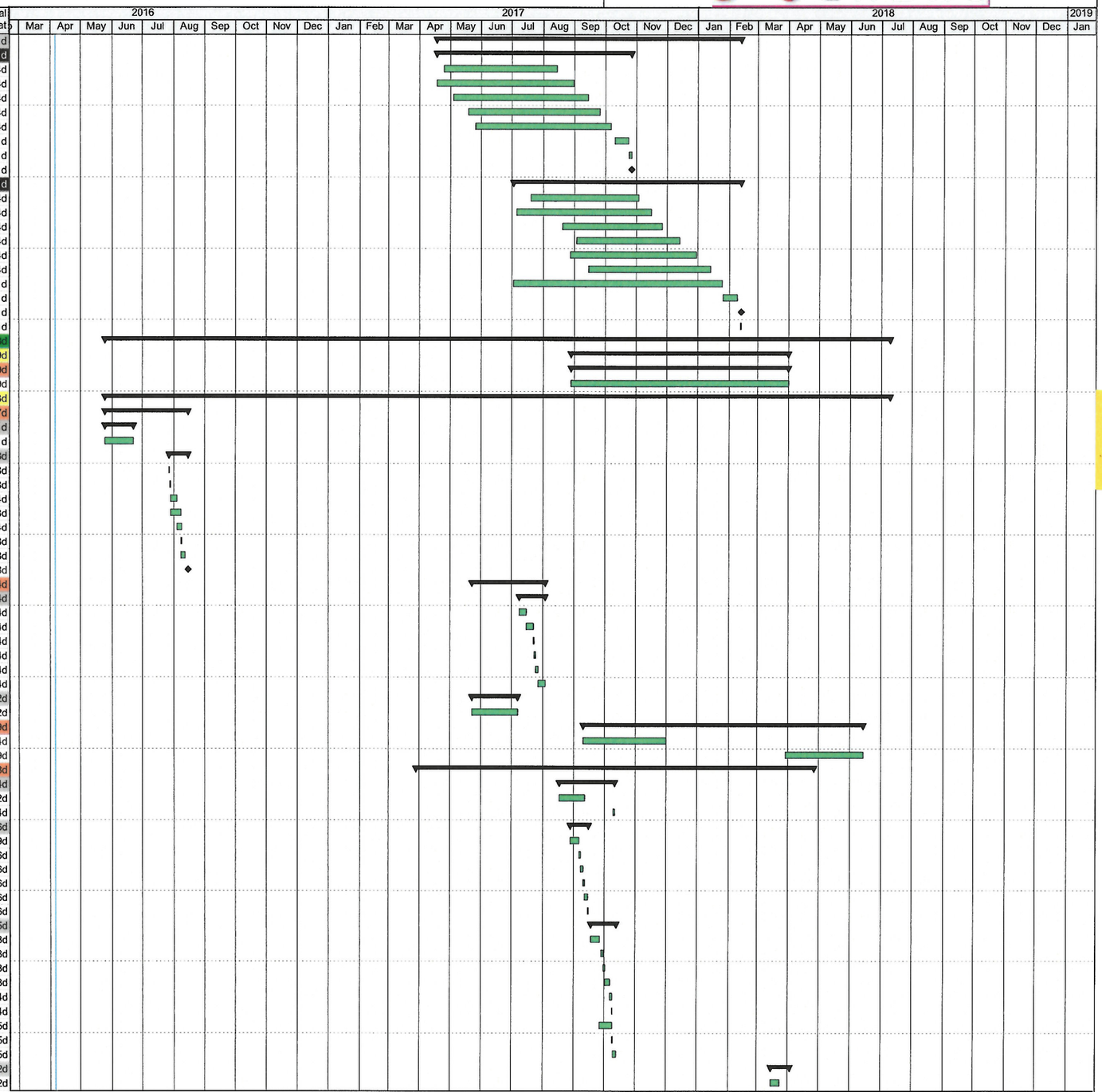
Activity ID	Activity Name	Duration	Start	Finish	Total Float
Offshore Cable EC2 + Spare (220kV)		301d	18-Apr-17	13-Feb-18	51d
Offshore Cable (220kV) EC2.2		192d	18-Apr-17	27-Oct-17	141d
Nex.1860	MAN Batch 13 (Al)	112d	25-Apr-17	15-Aug-17	64d
Nex.10040	MAN Batch 12 (Al)	135d	18-Apr-17	31-Aug-17	64d
Nex.1870	MAN Batch 15 (Al)	133d	04-May-17	14-Sep-17	64d
Nex.1880	MAN Batch 14 (Al)	130d	19-May-17	26-Sep-17	64d
Nex.1890	MAN Batch 16 (Al)	134d	26-May-17	07-Oct-17	64d
Nex.1920	MAN Armouring, EC2.2	13d	11-Oct-17	24-Oct-17	141d
Nex.1930	MAN FAT, EC2.2	2d	25-Oct-17	27-Oct-17	141d
Nex.1940	MAN Ready for Load out, EC2.2	0d		27-Oct-17	141d
Offshore Cable (220kV) EC2.1 + Spare		225d	03-Jul-17	13-Feb-18	51d
Nex.1960	MAN Batch 18 (Al)	106d	20-Jul-17	03-Nov-17	64d
Nex.10050	MAN Batch 17 (Al)	133d	06-Jul-17	16-Nov-17	64d
Nex.1965	MAN Batch 23 (Al)	99d	20-Aug-17	27-Nov-17	64d
Nex.1980	MAN Batch 20 (Al)	102d	03-Sep-17	14-Dec-17	64d
Nex.1970	MAN Batch 19 (Al)	124d	28-Aug-17	30-Dec-17	64d
Nex.1990	MAN Batch 21 (Al)	120d	15-Sep-17	13-Jan-18	64d
Nex.2005	MAN Batch 22 (Cu)	206d	03-Jul-17	25-Jan-18	51d
Nex.2030	MAN Armouring, EC2.1+spare	14d	26-Jan-18	09-Feb-18	51d
Nex.2040	MAN Ready for Load out, EC2.1+spare	0d		13-Feb-18	51d
Nex.2035	MAN FAT, EC2.1+spare	1d	12-Feb-18	13-Feb-18	51d
Transport & Installation - Offshore Cable		776d	25-May-16	10-Jul-18	83d
Transport		215d	29-Aug-17	01-Apr-18	59d
Transport Accessories		215d	29-Aug-17	01-Apr-18	59d
Nex.10060	TRP Transport of accessories to site, Scotland	215d	29-Aug-17	01-Apr-18	59d
Installation		776d	25-May-16	10-Jul-18	83d
Route Survey		82d	25-May-16	15-Aug-16	247d
GI Below SSSI Area		28d	25-May-16	22-Jun-16	301d
Nex.14440	INST Marine refraction work (incl. mobilisation)	28d	25-May-16*	22-Jun-16	301d
Route Survey (UXO) Done by Clinton		19d	27-Jul-16	15-Aug-16	78d
Nex.10070	INST Kick-off and Mobilisation Automated Underwater Vehicle (AUV) + Northern Win	0d	27-Jul-16	27-Jul-16	78d
Nex.20130	INST ATR AUV/Northern Wind at Port Gordon	1d	28-Jul-16	29-Jul-16	78d
Nex.20140	INST AUV UXO Survey 0 meter - 10 meter (Nearshore Operation)	6d	29-Jul-16	04-Aug-16	84d
Nex.20160	INST NW UXO Survey 10 - Offshore	10d	29-Jul-16	08-Aug-16	78d
Nex.20150	INST AUV UXO Weather Stand-by (Nearshore Operation)	5d	04-Aug-16	09-Aug-16	84d
Nex.20170	INST NW Tentative UXO Re-routing Survey	1d	08-Aug-16	09-Aug-16	78d
Nex.20180	INST NW UXO Weather Stand-by	4d	08-Aug-16	12-Aug-16	78d
Nex.20190	INST ROV Inspection and Demobilisation completed	0d		15-Aug-16	78d
Route Clearance		73d	23-May-17	04-Aug-17	84d
Pre-Lay Grapnel Run		26d	09-Jul-17	04-Aug-17	84d
Nex.10090	INST Preparations and mob. to site	7d	09-Jul-17*	16-Jul-17	84d
Nex.1190	INST PLG, 2x70 km ,140 line km	7d	16-Jul-17	23-Jul-17	84d
Nex.1200	INST Retrieval of debris (if found) (Estimate)	1d	23-Jul-17	24-Jul-17	84d
Nex.1210	INST Disposal of scrap/debis to port (Estimate)	1d	24-Jul-17	25-Jul-17	84d
Nex.1220	INST Demobilisation	3d	25-Jul-17	28-Jul-17	84d
Nex.1230	INST Reporting	7d	28-Jul-17	04-Aug-17	84d
Pre-Trench Backhoe		45d	23-May-17	07-Jul-17	112d
Nex.10080	INST Pre-trench backhoe, KP 0,5 - 4,5	45d	23-May-17*	07-Jul-17	112d
Guard Vessels		277d	10-Sep-17	14-Jun-18	109d
Nex.10100	INST Guard Vessels, Circuit 1	82d	10-Sep-17	01-Dec-17	304d
Nex.10110	INST Guard Vessels, Circuit 2	77d	29-Mar-18	14-Jun-18	109d
Marine Installation		394d	28-Mar-17	26-Apr-18	158d
Winch Installation		55d	17-Aug-17	11-Oct-17	354d
Nex.10130	INST Winch installation OTM1 and OTM2	25d	17-Aug-17	11-Sep-17	112d
Nex.10137	INST Winch de-mobilisation OTM1 and OTM2	2d	09-Oct-17	11-Oct-17	354d
2017 Installation Campaign 1 EC1.1 33KM		18d	29-Aug-17	16-Sep-17	86d
Nex.10140	INST Loading and transport, site checks	8d	29-Aug-17*	06-Sep-17	59d
Nex.1090	INST Pre-lay check	2d	06-Sep-17	08-Sep-17	86d
Nex.1100	INST Shore pull and laying, Pull-in pipe end	2d	08-Sep-17	10-Sep-17	86d
Nex.1110	INST EC1.1 Lay	2d	10-Sep-17	12-Sep-17	86d
Nex.1120	INST Return to factory	3d	12-Sep-17	15-Sep-17	86d
Nex.1130	INST Part demob	1d	15-Sep-17	16-Sep-17	86d
2017 Installation Campaign 2 EC1.2+EC3 37KM + 1,5KM		25d	18-Sep-17	13-Oct-17	155d
Nex.10150	INST Loading and transport, site checks	8d	18-Sep-17	26-Sep-17	83d
Nex.1250	INST OTM1 pull-in	2d	28-Sep-17	30-Sep-17	83d
Nex.1260	INST Cable lay EC1.2	2d	30-Sep-17	02-Oct-17	83d
Nex.1270	INST Offshore jointing	5d	02-Oct-17	06-Oct-17	83d
Nex.1280	INST OTM1 pull-in first end, EC3 (Interlink)	2d	06-Oct-17	08-Oct-17	104d
Nex.1290	INST Cable lay EC3 (Interlink)	1d	08-Oct-17	09-Oct-17	104d
Nex.1305	INST Crew Transfer Vessel	13d	26-Sep-17	09-Oct-17	155d
Nex.1300	INST OTM2 Pull in second end, EC3 (Interlink)	1d	09-Oct-17	09-Oct-17	155d
Nex.1310	INST Return to factory	4d	09-Oct-17	13-Oct-17	155d
2018 Installation Campaign 3 EC2.2 37KM		19d	15-Mar-18	03-Apr-18	2d
Nex.10160	INST Loading and transport, site checks	8d	15-Mar-18*	23-Mar-18	2d



Remaining Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

Consortium Baseline Programme

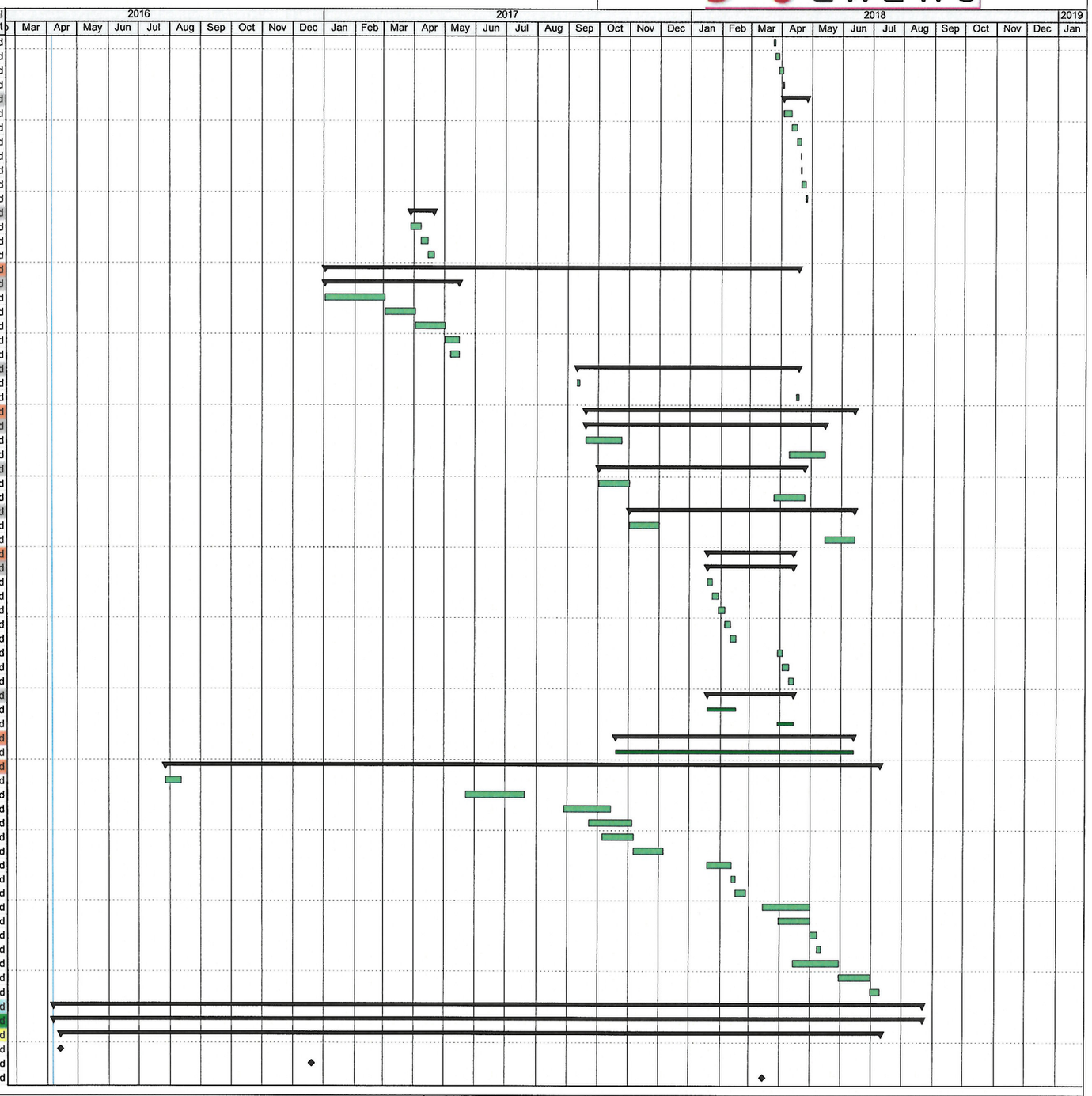
Date	Revision	Checked	Approved
29-Jun-16	Works Programme - Draft	[redacted]	[redacted]
	Revision 01		

SIEMENS

Beatrice Offshore Windfarm Project
Consortium Baseline Programme

Nexans

Activity ID	Activity Name	Duration	Start	Finish	Total Float
Nex.1400	INST Pre-lay check	2d	23-Mar-18	25-Mar-18	2d
Nex.1410	INST Pull-in OTM2 first end+ Lay EC2.2	4d	25-Mar-18	29-Mar-18	2d
Nex.1420	INST Return to factory	4d	29-Mar-18	02-Apr-18	2d
Nex.1430	INST Part-Demobilisation	1d	02-Apr-18	03-Apr-18	2d
2018 Installation Campaign 4 EC2.1 + Spare 33KM + 4KM		23d	03-Apr-18	26-Apr-18	50d
Nex.10170	INST Loading and transport, site checks	8d	03-Apr-18	11-Apr-18	2d
Nex.1450	INST Shore pull and laying EC2.1, Pull-in pipe end	5d	11-Apr-18	16-Apr-18	2d
Nex.1460	INST Offshore Joint	4d	16-Apr-18	20-Apr-18	38d
Nex.1470	INST Transit to spare cable off-load harbour	1d	20-Apr-18	20-Apr-18	38d
Nex.1480	INST Offload spare cable	1d	20-Apr-18	21-Apr-18	38d
Nex.1490	INST Return to factory	4d	21-Apr-18	25-Apr-18	50d
Nex.1500	INST Demobilisation	1d	25-Apr-18	26-Apr-18	50d
DTS System Installation		24d	28-Mar-17	21-Apr-17	404d
Nex.10120	INST Transport to Site	10d	28-Mar-17	07-Apr-17	404d
Nex.9040	INST DTS System Installation 1 (Offshore)	7d	07-Apr-17	14-Apr-17	404d
Nex.9050	INST DTS System Installation 2 (inside Onshore substation)	7d	14-Apr-17	21-Apr-17	404d
Land Installation		472d	02-Jan-17	19-Apr-18	29d
Direct Pipe Drilling (2x 500M)		134d	02-Jan-17	16-May-17	201d
Nex.10180	INST Mobilisation + Set-up Site	60d	02-Jan-17*	03-Mar-17	201d
Nex.20880	INST Pull-in pipe Construction (Pipe 1)	30d	03-Mar-17	02-Apr-17	201d
Nex.20890	INST Pull-in pipe Construction (Pipe 2)	30d	02-Apr-17	02-May-17	201d
Nex.20900	INST Demobilisation	14d	02-May-17	16-May-17	201d
Nex.20910	INST Reinstatement (Direct Pipe)	9d	07-May-17	16-May-17	201d
Transition Joints Submarine Cables (EC1.1 EC2.1) To Onshore Cables		221d	10-Sep-17	19-Apr-18	29d
Nex.10190	INST Preparation for Jointing works, EC1.1 to 3 single core underground cables - 201	3d	10-Sep-17	13-Sep-17	135d
Nex.10200	INST Preparation for Jointing works, EC2.1 to 3 single core underground cables - 201	3d	16-Apr-18	19-Apr-18	29d
Protection (method to be confirmed after FEED)		269d	18-Sep-17	14-Jun-18	2d
Nearshore Protection & Diving Services		239d	18-Sep-17	15-May-18	2d
Nex.10250	INST Nearshore Protection + diving services, Capjet50, Circuit 1	36d	18-Sep-17	24-Oct-17	91d
Nex.10260	INST Nearshore Protection + diving services, Capjet50, Circuit 2	36d	09-Apr-18	15-May-18	2d
Protection By Water Jetting		204d	02-Oct-17	24-Apr-18	22d
Nex.10210	INST Protection by Water Jetting, Capjet 1 MW, Circuit 1	30d	02-Oct-17	01-Nov-17	83d
Nex.10220	INST Protection by Water Jetting, Capjet 1 MW, Circuit 2	30d	25-Mar-18	24-Apr-18	22d
Protection by Rock Installation		225d	01-Nov-17	14-Jun-18	2d
Nex.10230	INST Protection by Rock Installation, Circuit 1	30d	01-Nov-17	01-Dec-17	83d
Nex.10240	INST Protection by Rock Installation, Circuit 2	30d	15-May-18	14-Jun-18	2d
Topside Installation		85d	18-Jan-18	14-Apr-18	58d
Topside Cable Termination Work		85d	18-Jan-18	14-Apr-18	58d
Nex.10410	INST Mobilisation Topside Termination	5d	18-Jan-18	23-Jan-18	3d
Nex.10420	INST EC1.2 on OTM1 - 3 off GIS	6d	23-Jan-18	29-Jan-18	3d
Nex.10425	INST EC3 on OTM1 - 3 off GIS	6d	29-Jan-18	04-Feb-18	3d
Nex.10430	INST EC3 on OTM2 - 3 off GIS	6d	04-Feb-18	10-Feb-18	3d
Nex.10434	INST De-mobilisation Topside Termination	5d	10-Feb-18	15-Feb-18	3d
Nex.10436	INST Mobilisation Topside Termination	5d	29-Mar-18	03-Apr-18	58d
Nex.10440	INST EC2.2 on OTM2 - 3 off GIS	6d	03-Apr-18	09-Apr-18	58d
Nex.10660	INST De-mobilisation Topside Termination	5d	09-Apr-18	14-Apr-18	58d
Crew Transfer Vessel for Topside Termination Work		85d	18-Jan-18	14-Apr-18	58d
Nex.10450	INST Crew Transfer Vessel (provided by BOWL) - EC1.2 + EC3	28d	18-Jan-18	15-Feb-18	3d
Nex.23190	INST Crew Transfer Vessel (provided by BOWL) - EC2.2	16d	29-Mar-18	14-Apr-18	58d
Testing & Commissioning		170d	19-Oct-17	13-Jun-18	2d
Nex.10665	INST Testing and Commissioning (for cost allocation purposes only)	170d	19-Oct-17	13-Jun-18	2d
Weather Option - P50		713d	27-Jul-16	10-Jul-18	83d
Nex.9555	INST P50 UXO Survey	16d	27-Jul-16	12-Aug-16	780d
Nex.9556	INST P50 Backhoe Dredger	59d	23-May-17	21-Jul-17	390d
Nex.9560	INST P50 Cable Laying and Pull-in EC1+EC3	47d	29-Aug-17*	15-Oct-17	351d
Nex.9580	INST P50 Nearshore Protection + diving services, Capjet50, Circuit 1	43d	22-Sep-17	04-Nov-17	290d
Nex.9585	INST P50 Protection by Water Jetting, Capjet 1 MW, Circuit 1	31d	06-Oct-17	06-Nov-17	289d
Nex.9600	INST P50 Protection by Rock Dumping, Circuit 1	30d	06-Nov-17	06-Dec-17	289d
Nex.9605	INST P50 Topside Termination Circuit 1	24d	19-Jan-18*	12-Feb-18	217d
Nex.9608	INST P50 Sheath test, LV test Circuit 1	4d	12-Feb-18	16-Feb-18	217d
Nex.9609	INST P50 Soak test Circuit 1 (Offshore + Onshore)	10d	16-Feb-18	26-Feb-18	217d
Nex.9620	INST P50 Cable Laying and Pull-in EC2	47d	15-Mar-18*	01-May-18	132d
Nex.9635	INST P50 Protection by Water Jetting, Capjet 1 MW, Circuit 2	32d	30-Mar-18	01-May-18	111d
Nex.9680	INST P50 Topside Termination Circuit 2	7d	01-May-18*	08-May-18	132d
Nex.9685	INST P50 Sheath test, LV test Circuit 2	4d	08-May-18	12-May-18	132d
Nex.9630	INST P50 Nearshore Protection + diving services, Capjet50, Circuit 2	46d	14-Apr-18	30-May-18	83d
Nex.9640	INST P50 Protection by Rock Dumping, Circuit 2	31d	30-May-18	30-Jun-18	83d
Nex.9700	INST P50 Soak test Circuit 2 (Offshore + Onshore)	10d	30-Jun-18	10-Jul-18	83d
SCADA: STDL		597d	06-Apr-16	21-Aug-18	28d
Design / Engineering		597d	06-Apr-16	21-Aug-18	28d
Process Milestones		562d	13-Apr-16	11-Jul-18	27d
A1210960	M1 - Project Clarification	0d		13-Apr-16	589d
A1210970	M2 - Base line Control Design	0d		19-Dec-16	414d
A1235750	M3 - Offshore - Release SCADA Config / Test Docs to Site	0d		15-Mar-18	108d



Remaining Level of Effort ◆ Milestone
Actual Work Summary
Remaining Work
Critical Remaining Work

Beatrice WBS BL Layout

Consortium Baseline Programme			
Date	Revision	Checked	Approved
29-Jun-16	Works Programme - Draft	[redacted]	
	Revision 01		

High Level Programme