

Project Title/ Location	MeyGen Tidal Energy Project, Phase 1a. Inner Sound.
Date:	06/08/2015

MeyGen Tidal Energy Project Phase 1

Construction Method Statement:

Construction Works



James Fisher and Sons plc
Marine Services Worldwide



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EXECUTIVE SUMMARY

This Construction Method Statement (CMS) has been prepared by MeyGen Ltd. to set out the proposed method for discharging the Condition 9 of the Section 36 Consent for the Development.

The document details the construction methods proposed for the Development, how construction related mitigation detailed in the Environmental Management Plan is to be delivered, the construction procedures and good working practices for installing the Development, how this document integrates with the wider environmental management of the Development, and how communication will be maintained between the Principal Contractor and MeyGen Ltd. on this Development.

The CMS presented within this document is to satisfy Condition 9 and enable construction of the Development to progress, subject to the CMS being implemented.

The CMS will be submitted to the licensing authority and consulted on by SNH, SEPA, MCA, the Planning Authority, NLB, and any such other advisors as may be required at the discretion of the Scottish Ministers, and will be used, where appropriate, to inform the discharge of other Conditions within the Section 36 Consent which refer to it.

A CMS for HDD Marine Works (MEY-1A-40-HSE-001-F-ConstructionMethodStatementHDD) has already been consulted on and approved by Scottish Ministers. This CMS is for the remaining Construction Works for Phase 1a; this includes the installation of:

- 4 x Turbine Subsea Cable (TSC);
- 4 x Turbine Support Structure (TSS); and
- 4 x Tidal Turbine Generator (TTG).

1 INTRODUCTION

The MeyGen Tidal Energy Project Phase 1 (“the Development”) received consent under Section 36 of the Electricity Act 1989 from the Scottish Ministers on 9th October 2013 (“the S.36 Consent”). This Construction Method Statement (CMS) is prepared to enable Condition 9 of the S.36 Consent (“the Condition”) to be discharged. Condition 9 states:

The Company must, prior to the Commencement of the Development, submit to the Scottish Ministers a Construction Method Statement (“CMS”), in writing, endorsed by the Ecological Clerk of Works, as referred to in Condition 10 of this consent, to the Scottish Ministers for their approval, following consultation with SNH, the Scottish Environment Protection Agency, the Maritime and Coastguard Agency, the Planning Authority, Northern Lighthouse Board, and any such other advisors as may be required at the discretion of the Scottish Ministers. Unless otherwise agreed in writing by the Scottish Ministers, construction of the Development must proceed in accordance with the approved CMS. The CMS must include, but is not limited to, the following information:

- a) Commencement dates;*
- b) Working methods including the scope, frequency and hours of operations;*
- c) Duration and Phasing Information of key elements of construction, for example– turbine structures, foundations, turbine locations, inter-array cabling and land fall cabling;*
- d) Details of the location of the turbines, grid export cable(s), method of installation (including techniques and equipment) and depth of cable laying and cable landing sites;*
- e) Details of mitigation measures to prevent adverse impacts to species and habitats during construction;*
- f) Details of how all contractors and sub-contractors will be made aware of environmental sensitivities, what requirements they are expected to adhere to and how chains of command will work;*
- g) Confirmation of reporting mechanisms used to provide Scottish Ministers and relevant consultees with regular updates on construction activity, including any environmental issues encountered and how these have been addressed;*
- h) Vessel specification, routing, including location of vessel ports; and*
- i) Pollution prevention measures including contingency plans.*

The CMS must, so far as is reasonably practicable, be consistent with the Environmental Management Plan, the Project Environmental Monitoring Programme, the Vessel Management Plan and the Navigational Safety Plan.

Reason: *To ensure the appropriate construction management of the Development, taking into account mitigation measures to protect the environment and other users of the marine area.*

The CMS also includes the Cable Installation Plan (Marine Licence Condition 3.2.1.8) and Cable Protection Plan (Marine Licence Condition 3.2.1.9). This document sets out the proposed CMS that MeyGen Ltd, intends to undertake, to allow these Conditions to be discharged.

2 SCOPE OF CONSTRUCTION METHOD STATEMENT

Phase 1a of the Development is a 6MW, 4 tidal turbines initial phase to be installed and operatives under the restriction placed on the Development by Condition 2 of the S.36 Consent.

This document, as agreed with the licensing authority, covers the installation of the Phase 1a infrastructure (4 x Tidal Turbine Generators (TTG), 4 x Gravity-base Turbine Support Structures (TSS) and Turbine Subsea Cables (TSC), collectively described as “**the Construction Works**”.

MeyGen has produced a CMS for the HDD Marine Works (MEY-1A-40-HSE-001-F-ConstructionMethodStatementHDDWorks), which was consulted on and approved by Scottish Ministers.

The CMS forms part of a suite of documents related to the consent conditions that MeyGen Ltd. seek to discharge:

- Environmental Management Plan (EMP) (S.36 Consent, Condition 11) including Marine Pollution Contingency Plan (Marine Licence, Condition 3.2.13), Reporting Protocol for the Discovery of Marine Archaeology (S.36 Consent, Condition 16);
- Vessel Management Plan (VMP) (S.36 Consent, Condition 14);
- Navigation Safety Plan (NSP) (S.36 Consent, Condition 17); and
- Electromagnetic Fields Best Practice Report (Marine Licence, Condition 3.2.1.1).

The CMS is in accordance with the construction methods assessed in the Environmental Statement (ES) and Supplementary Environmental Information Statement (SEIS) and includes details of how the construction related mitigation steps documented in the EMP are to be delivered. The EMP commits MeyGen Ltd. to safeguarding the environment through the identification, avoidance and mitigation of the potential negative environmental impacts associated with the development, construction and operation of the tidal array. The CMP will be an integral element of the EMP.

The CMS contains the following sections:

- Roles and Responsibilities;
- Programme;
- Construction Methods and Procedures (including mitigation);
- Emergency Preparedness and Response;
- Licences and Legal Requirements;
- Linkages with Other Conditions;
- Linkages with Other Strategies and SHE Management Systems;
- CMS Review and Consultation; and

- Technical Appendices Containing Detailed Construction Methodologies.

3 COMMUNICATION, ROLES AND RESPONSIBILITIES

This section details the project team roles, responsibilities and lines of communication during the construction and operation of the Development.

3.1 Responsibilities and Ownership

The Principal Contractor (PC) will have the ultimate responsibility for ensuring the implementation of the CMS.

The Ecological Clerk of Works (ECoW) will provide quality assurance and approval of any version of the CMS.

Any updates to the CMS by the PC will require the ECoW to check compliance with current legislation, consent conditions and related documents. Updated CMS will then be submitted to Scottish Ministers for approval.

3.2 Organisation Chart and Reporting

The organisational chart for the Construction Works is below in . This includes how communication as part of the CMS will be conducted in normal working procedures and in the case of emergencies.

The organisation chart presents the key interfaces, lines of communication and responsibilities with regards to the flow of requirements and provision of mitigating actions across the Construction Works.

Details are provided in the Table 1 below for contacts relevant to the delivery of this plan. These details may change and the CMS will be updated when necessary.

Name	Role	Organisation	Telephone	Mobile
Ian Sargent	Project Manager	James Fisher Marine Services	+441565 658812	[Redacted]
Stan Groundwater	Marine Coordinator	James Fisher Marine Services	+441565 658824	[Redacted]
Tony Blackshaw	HSE Advisor	James Fisher Marine Services	+441565 658817	[Redacted]
Ed Rollings	ECoW	MeyGen Ltd	+44131 659 9662	[Redacted]
Fraser Johnson	Marine Package Manager	MeyGen Ltd	+44131 659 9672	[Redacted]

Table 1 Contact Details

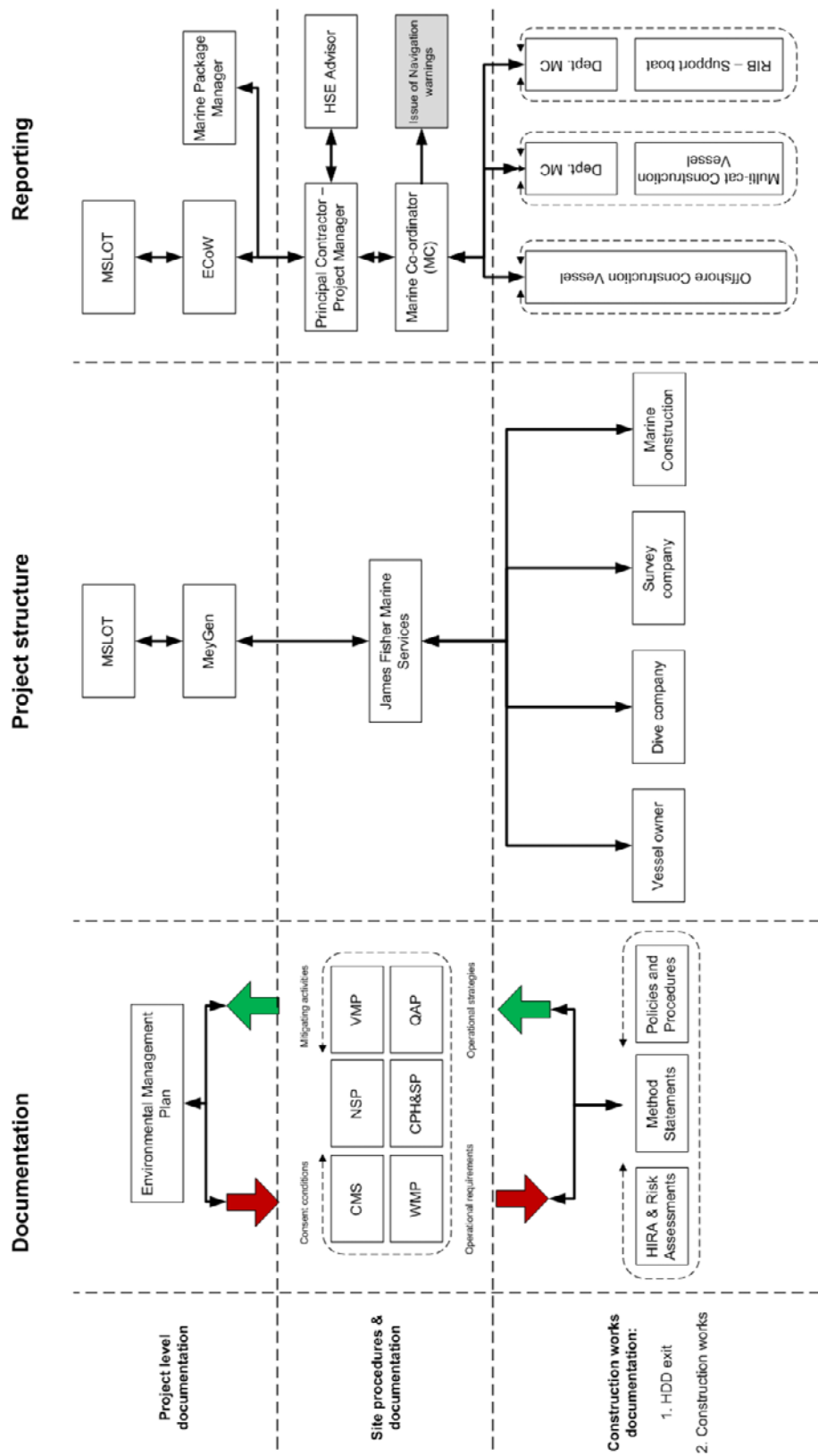


Figure 1 Project Organogram

3.3 MeyGen - Ecological Clerk of Works

- Review and approve all consent related documents (S36 Condition 10).
- Review / comment on content of Site Inductions and Toolbox Talks.
- Review / comment on Risk Assessments and Method Statements (RAMS) as and where necessary with respect to environmental impacts and controls.
- Inspect the site / vessel on a regular basis to ensure effective implementation/operation of all environmental mitigation measures.
- Audit PC procedures, inspections, investigation and reporting.
- Ensure compliance with approve consent related documents, environmental legislation and requirements and address any shortfalls with the PC (S36 Condition 10).
- Review environmental incidents / near misses and PC investigations
- Report compliance and incidents to the licensing authority and other necessary regulatory authorities.
- Notify the licensing authority of vessel details (ML Condition 3.1.3)
- Notify the licensing authority of the commencement date (ML Condition 3.2.1.4)
- Provide Transport Audit Sheets for works to the licensing authority (ML Condition 3.2.2.1)
- Notify the licensing authority of deposits by MHWS (ML Condition 3.2.2.2)
- Ensuring any protected species licenses are in place for the Development (S36 Condition 10)

3.4 Principal Contractor – James Fisher Marine Services (JFMS)

3.4.1 Project Manager

- Facilitate dissemination of specific environmental requirements to the project team.
- Oversee the implementation and review of environmental procedures throughout the project.
- Review and approve all consent related documents, including, but exhaustive, CMS, VMP and NSP.
- Monitor the environmental performance of the project through maintaining an overview of incidents, inspections and audits.
- Ensure that environmental considerations form an integral part of Design and Implementation of the Works and to include environmental reviews as part of regular project meetings.
- Review and approve Risk Assessments and Method Statements (RAMS) as and where necessary with respect to environmental impacts and mitigation.
- Ensure that all environmental incidents are reported to the ECoW and MeyGen in accordance detailed reporting requirements and the respective regulatory bodies

(where required) as soon as possible.

- Review environmental matters with the ECoW and MeyGen and respective regulatory bodies on a regular basis and as per project requirements.
- Ensure that arrangements for liaison with Project respective regulatory bodies on all environmental issues is appropriate and maintained.
- Implement and maintain a project communications strategy to manage project public relations and complaints.
- Produce weekly and monthly reports and submit to MeyGen Package Manager and ECoW.
- Ensure contractors are approved, operates a Safety Management System, confirm that they are suitably qualified in their line of work and have undertaken suitable environmental training to cover tasks to be undertaken.

3.4.2 HSE Advisor

Key roles and responsibilities of the HSE Advisor include, but are not limited to the following:

- Verify compliance with relevant legislation.
- Prepare, implement, review and update consent related documents (in conjunction with the Project Management Team) in accordance with consent condition, James Fisher Marine Services procedures and current legislation.
- Advise the project team on environmental related decision making
- Review Risk Assessments and Method Statements (RAMS) as and where necessary with respect to environmental impacts and mitigation.
- Approve Toolbox Talks and Site / Vessel Inductions and ensure content promotes effective environmental management, specific works and Site / Vessel sensitivities and communicate associated lessons learnt.
- Provide support to the Marine Coordinator and workforce on any environmental matters that may arise.
- Audit contractors to confirm that they are suitably qualified in their line of work and have undertaken suitable environmental training to cover tasks to be undertaken.
- Ensure suitable consideration is given to the period and frequency of environmental monitoring (particularly with respect to higher risk areas).
- Inspect and audit the site / vessels on a regular basis to ensure effective implementation / operation of any environmental mitigation measures.
- Ensure compliance with environmental requirements and address any shortfalls.
- Provide inspection reports to the project management detailing any issues that must be addressed
- Undertake investigations into environmental incidents or near misses to determine the root/direct cause and present the findings, recommendations and lessons learnt.

- Monitor hazardous observations and incidents trends in relation to environmental aspects and impacts and initiate actions as required to minimise the potential environmental impacts and reduce risk in a timely and effective manner.

3.4.3 Marine Coordinator

- Responsible for all construction operations Marine Coordination including vessel / site HSE during construction operations.
- Ensure that all contractors have received and understood the Site / Vessel induction.
- Undertake Toolbox Talks to promote effective environmental management and communicate associated lessons learnt.
- Monitor and disseminate weather information and forecasts
- Production of marine safety alerts including issuing Notice to Mariners to agreed stakeholder list.
- Responsible for collating, communicating and responding to statutory navigation notices.
- Liaise with port authorities.
- Implement / operate environmental mitigation measures as approved in the consent related documents at the site / vessel.
- Coordinating, ensuring compliance for and recording all vessel movements and personnel movements offshore.
- Emergency response coordination.
- Produce daily reports and submit to the PC Project Manager, MeyGen Package Manager and ECoW.
- Keep Transport Audit Sheets for all materials listed in the licence to be deposited as part of the works
- Keep audit reports stating the nature and quantity of all substances and objects deposited below MHWS under the authority of the licence.

3.5 Contractors

3.5.1 Vessel Master

- Overriding authority and responsibility to make decisions with respect to safe navigation of the vessel and matters related to HSE.
- Dedicated watch-keeper on board the vessel, or nominate suitable qualified deputy.
- The persons present on board must adhere to the Vessel Master's instructions.
- Adhere to IMO International Regulations for the Prevention of Collisions at Sea.
- Ensure that all contractors have received and understood the vessel induction.

3.5.2 All Other Staff

- To understand and implement procedures relevant to their role as laid out.
- To conduct their work with a view to eliminating/reducing the environmental impact of the Project and to raise any environmental concerns with Marine Coordinator or Project Manager.
- To report all environmental incidents to the Marine Coordinator and Vessel Master as soon as possible.

3.6 Communication

Environmental issues will be formally communicated through the arrangements on Site / Vessel in Table 2.

Meeting/briefing	Frequency	Attendees
Safety, Health, Environment, Security and Quality (SHESQ) and Progress Meeting	Weekly	See paragraph below
Daily site team briefs	Daily	All work parties
Risk Assessment/Method Statement briefings	Each job task	All members of the working party
Toolbox Talks including environmental practices and mitigation measures	Before mobilisation, or a minimum of one per week	All Site / Vessel personnel
Site / Vessel Induction	On first attendance at site / vessel <u>BEFORE</u> any work is undertaken	All persons attending Site / Vessel

Table 2 Communication and Meetings

3.6.1 SHESQ and Progress Meeting

The PC shall convene weekly Site / Vessel meetings with all contractors on Site / Vessel to communicate, discuss and consult any change in conditions, working practices and environmental arrangements, procedures and overall environmental performance.

The ECoW and representatives from MeyGen and other interested Third Parties shall have an open invitation to attend these weekly Site / Vessel meetings. Each contractor on Site / Vessel shall nominate a person to attend these meetings with the appropriate authority to act on those contractors behalf. SHESQ and Progress Meetings shall be augmented by additional meetings at intervals dictated by the requirements of the contract or at key stages of the works.

Minutes of all such meetings shall be produced and held on file for record purposes, with copies supplied to each contractor on Site / Vessel, the CDM Co-ordinator and ECoW.

3.6.2 Extraordinary meetings

Extraordinary meetings would be held in order to deal with special environmental issues that may arise during the project such as environmental incidents. These meetings shall be organised by the HSE Advisor with the aim of ensuring a timely response and resolution to any identified issues.

3.6.3 Daily site team meetings

Daily site team meetings will take place at the Onshore / Offshore site between the PC and contractors. Any environmental concern shall be addressed at this meeting.

3.6.4 Risk Assessment / Method Statement briefings

These briefings will take place before each construction task and attended by all directly involved in the task. Environmental requirements and mitigation measures will be instructed and reviewed.

3.6.5 Site / Vessel inductions

Inductions, conducted before anyone commences work on the project are utilised to raise awareness for personnel regarding Site / Vessel rules, emergency response procedures and environmental protection arrangements. The inductions include a test to confirm understanding.

3.6.6 Site / Vessel notice boards

Site / Vessel notice boards will contain relevant Site / Vessel information relating to Health, Safety and Environmental issues. The Site / Vessel will also have appropriate signage in place to highlight awareness of environmental hazards. Other communications media, such as newsletters and posters will also be posted on notice boards to communicate awareness of environmental matters.

3.7 Reporting

The PC will communicate the following to the ECoW and contractors on Site / Vessel:

- Details of audits and inspections;
- Details and statistics for environmental incidents and near misses;
- Details of any pending and actual enforcement action in respect of any environmental incidents;
- Any other pertinent environmental issues identified;
- Transport Audit Sheets (MEY-1A-40-HSE-004-D-TransportAuditSheet) (beginning of each month); and
- Audit reports for the nature and quantity of all substances and objects deposited below MHWS (MEY-1A-70-HSE-005-D-DepositAuditSheet) (every 6 Months).
- Marine Mammal reports (MEY-1A-70-TEM_009-MarineMammalReport) (daily during marine operations)

The PC will provide these in:

- Daily logs and reports when construction activities are taking place on site / vessels;
- Weekly progress reports
- Monthly reports (additionally, confirming the status of the project, implementation of environmental commitments and mitigation measures, monthly and cumulative statistics, training delivered, environmental initiatives undertaken, amendments to the any of the consents related documents)

3.7.1 External Communication

The Marine Coordinator is responsible for:

- Documenting, issuing, communicating and responding to statutory navigation notices for the Development; and
- Emergency Response and Co-operation Procedures are in place for such events. The communication and reporting protocols for such an event can be found in the Emergency Response and Co-operation Plan (NSP).

The ECoW is responsible for:

- Notification to the licensing authority detailed in the consent condition;
- Reporting monthly to the licensing authority once works have commenced with:
 - Details of audits and inspections;
 - Details and statistics for environmental incidents and near misses;
 - Details of any pending and actual enforcement action in respect of any environmental incidents;
 - Any other pertinent environmental issues identified;
 - Transport Audit Sheets; and
 - Audit reports for the nature and quantity of all substances and objects deposited below MHWS.
- Meeting with the licensing authority and statutory agencies and the local community; and
- Receiving, documenting and responding to any environmental communication from third parties.

3.8 Training

The purpose of environmental training is to ensure that all site personnel have the knowledge to successfully implement the environmental requirements of the project.

In order to ensure that the environmental mitigation measures are implemented on site, the following environmental training

Training	Target Persons
Induction (which will include environmental aspects such as environmental sensitivities and controls, pollution prevention, waste management and emergency preparedness and response)	All persons attending Site / Vessel (Site / Vessel personnel, contractors on Site / Vessel, and visitors)
Environmental Toolbox Talks	Toolbox talks will be carried out at a minimum of one per week appropriate to the construction works being carried out on Site / Vessel at that time. All persons carrying out work on site (site personnel, contractors on site) shall attend.
Environmental Bulletins / Legislation Briefings / Best Practice Briefings	All persons carrying out work on Site / Vessel (Site / Vessel personnel, contractors on Site / Vessel) shall attend.
Job specific training e.g. <ul style="list-style-type: none"> • IOSH Working with Environmental Responsibilities / IOSH Managing Environmental Responsibilities. • Use of Pollution Prevention Equipment. • Site Waste Management. 	As identified for personnel with environmental responsibilities
Project specific information, including relevant elements of: <ul style="list-style-type: none"> • the EMP, CMS, NSP, VMP • Consent Conditions 	Briefed out and available for reference to all Site / Vessel staff.

Table 3 in will be required.

Any person working on the site/vessel will be competent and trained sufficiently to undertake their work in a safe and efficient manner. Each Contractor will ensure that their personnel maintain the necessary level of competence for their work & will maintain the training records on site & make them available for review and audit.

Training	Target Persons
Induction (which will include environmental aspects such as environmental sensitivities and controls, pollution prevention, waste management and emergency preparedness and response)	All persons attending Site / Vessel (Site / Vessel personnel, contractors on Site / Vessel, and visitors)
Environmental Toolbox Talks	Toolbox talks will be carried out at a minimum of one per week appropriate to the construction works being carried out on Site / Vessel at that time.

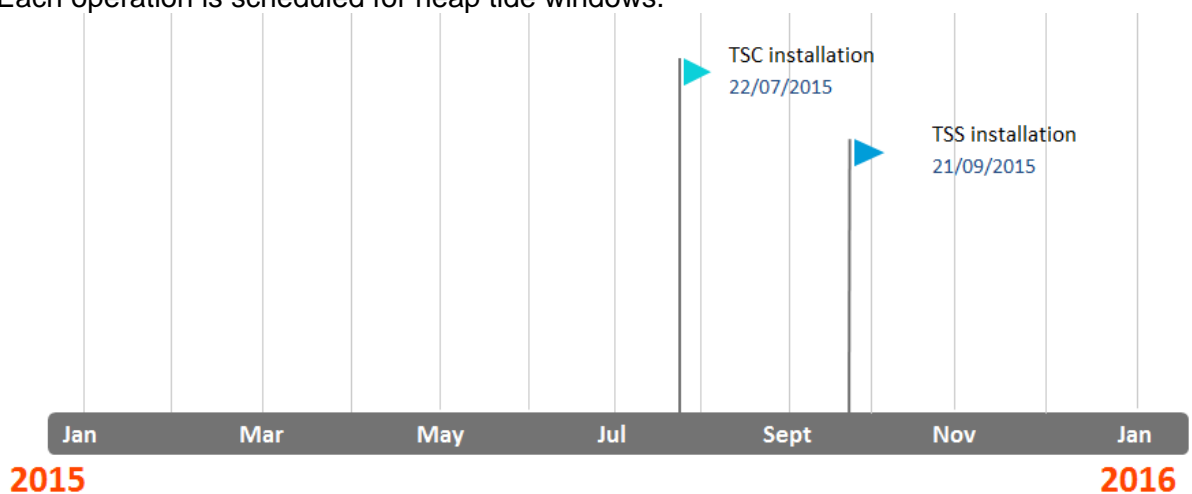
Training	Target Persons
	All persons carrying out work on site (site personnel, contractors on site) shall attend.
Environmental Bulletins / Legislation Briefings / Best Practice Briefings	All persons carrying out work on Site / Vessel (Site / Vessel personnel, contractors on Site / Vessel) shall attend.
Job specific training e.g. <ul style="list-style-type: none"> • IOSH Working with Environmental Responsibilities / IOSH Managing Environmental Responsibilities. • Use of Pollution Prevention Equipment. • Site Waste Management. 	As identified for personnel with environmental responsibilities
Project specific information, including relevant elements of: <ul style="list-style-type: none"> • the EMP, CMS, NSP, VMP • Consent Conditions 	Briefed out and available for reference to all Site / Vessel staff.

Table 3 Training

Any person working on the Site / Vessel will be competent and trained sufficiently to undertake their work in a safe and efficient manner. Each Contractor will ensure that their personnel maintain the necessary level of competence for their work & will maintain the training records on site & make them available for review and audit. Records of training will be maintained and made available for inspection.

4 PROGRAMME

The high level programme for the Construction Works is shown in Figure 2. The Programme is subject to change and will be regularly updated during the course of the Development. Each operation is scheduled for neap tide windows.



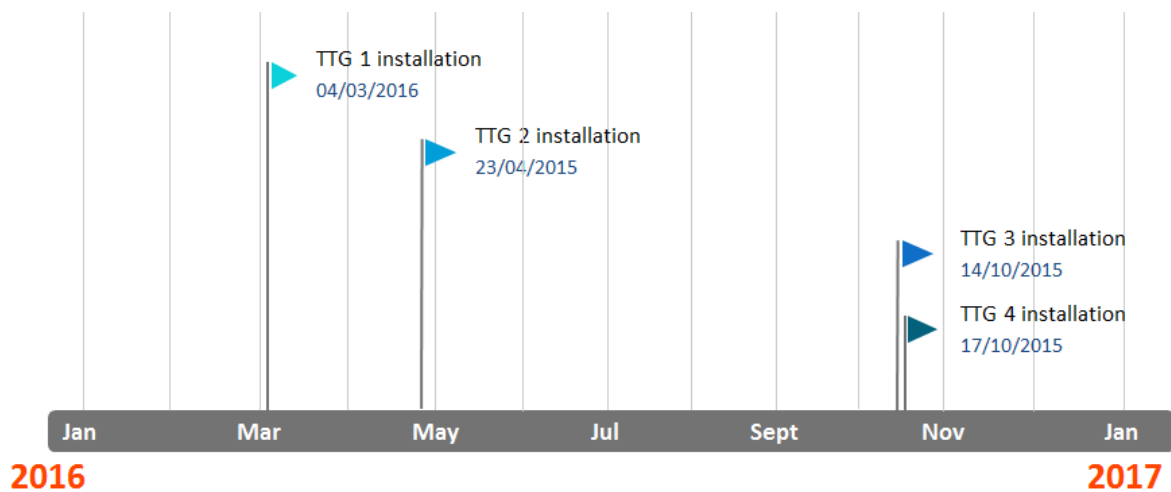


Figure 2 Construction Works Programme

4.1 TSC installation

Each TSC installation should take approximately 6 hours and matched to the tidal cycle. The operation will be designed to minimise the time spent in the high flow areas when on the flood or ebb tide. The TSC pull through the HDD duct will be undertaken 3 hours before low water and the vessel progressing through a number of locations getting progressively further offshore as the tidal current drops off towards low water when the TSC installation vessel would place the offshore end of the TSC onto the seafloor.

TSC protection will be laid to inhibit strumming. The TSC protection will be laid immediately after completion of the TSC installation works using the same vessel. Based upon previous experience, the operational duration for the installation of the TSC stability and protection measures would be similar in duration to those of the TSC installation activities.

4.2 TSS installation

Each TSS is made up of 7 components (1 tripod substructure and 6 ballast blocks). Each component will be installed in a slack tide window, with lift preparation operations taking place between each slack tide. Requiring 7 slack tide windows will mean the operation for 1 TSS will take 2 days in total.

4.3 TTG installation

The ARL TTG and cable management system will take 3 slack tide windows to deploy, estimated to take 1.5 days.

The AHH TTGs and TSC connection will take 2 days to complete.

5 CONSTRUCTION METHODS AND PROCEDURES

The following section describes the installation of 4 x Turbine Subsea Cables, 4 x Turbine Support Structures and 4 x tidal Turbine Generators. Figure 3 shows the general layout for the Construction Works.

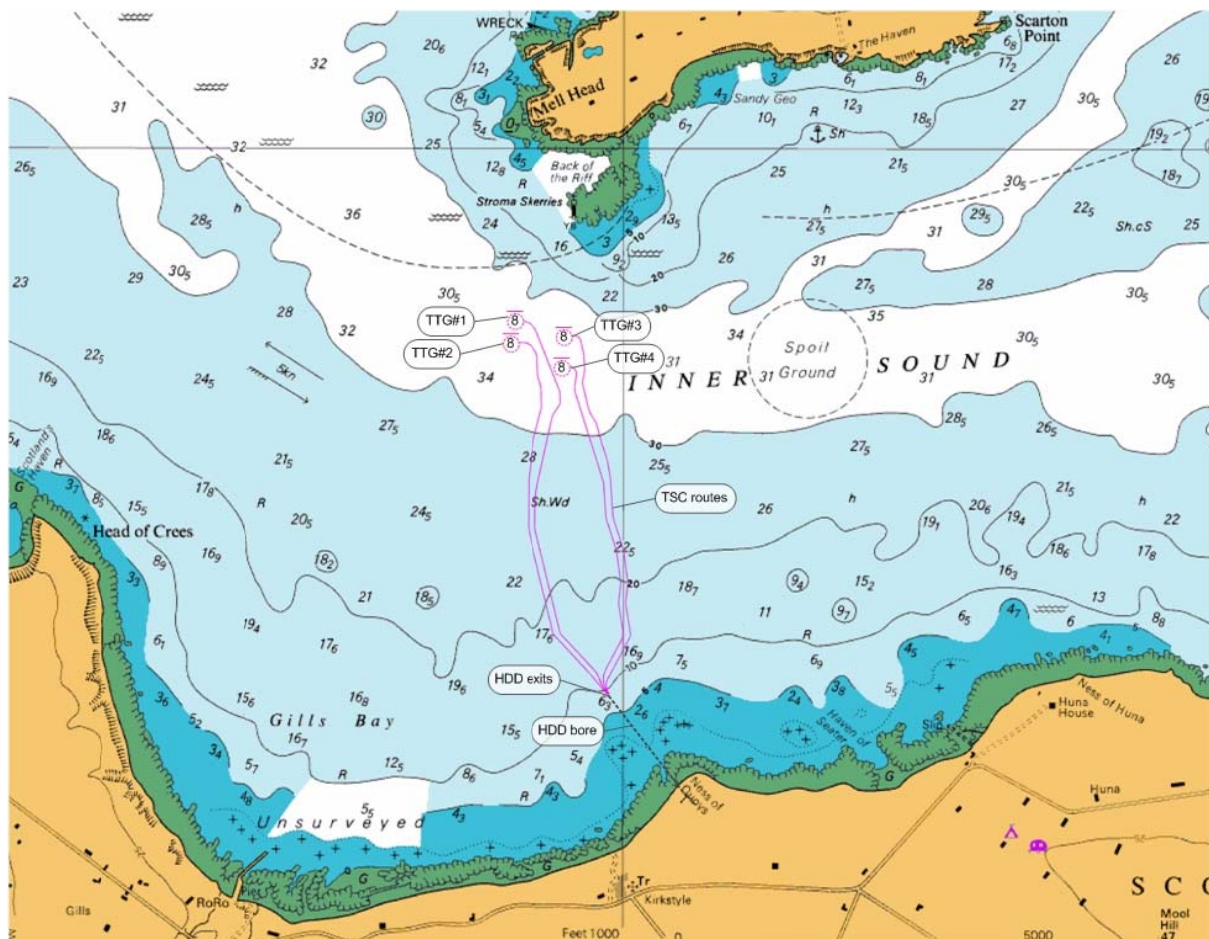


Figure 3 Construction Works Location

5.1 Pre-mobilisation and Mobilisation Procedures

The following sequence outlines the processes that take place before each operation takes place.

5.1.1 Pre-mobilisation

- No less than one month prior to commencement of works the ECoW will notify the licensing authority, in writing, the date of commencement and confirm this date no less than 24 hours before commencement (ML 3.2.1.4)
- The PC will confirm:
 1. the vessel,

2. vessel master,
3. vessel IMO number, and
4. vessel owner and operator

to be used on the works to the ECoW, so that the ECoW can notify the licensing authority, in writing, no less than 72 hours prior to commencement of the works (ML 3.1.3)

- Notice to Mariners will be issued a minimum of 2 weeks prior to commencement of the works, an example is provided in Appendix A of the NSP.
- Weather forecasts will be reviewed at regular intervals to ensure the appropriate site conditions.

5.1.2 Mobilisation

- All communications and meetings will be held as per Section 3.6.
- Inventories for all tools, materials and liquids will be completed before loading onto the vessel.
- Vessel environmental mitigation measures will be checked to ensure compliance with the EMP (RHK-1A-40-HSE-D-002-EMPConstructionWorks).
- Vessel will leave selected port and transit to site on the route described in the VMP (MEY-1A-40-HSE-006-D-VMPCConstructionWorks)
- Details of the navigation safety measure are contained in the NSP (MEY-1A-40-HSE-005-D-NSPCConstructionWorks).

5.2 Turbine Subsea Cable Works

This section meets the requirements of Marine Licence condition 3.2.1.8 (Cable Installation Plan) and 3.2.1.9 (Cable Protection Plan). The TSC installation works complies with the best practice to mitigate Electromagnetic Fields (EMF) described in MEY-1A-20-HSE-F-001-EMFBestPracticeReport.

The installation process will pull 4 x TSCs from offshore via the HDD ducts to onshore and then lay the TSC along to the seabed to the 4 x TSS locations. The landfall works, undertaken via 4 x HDD ducts has been described in MEY-1A-40-001-F-ConstructionMethodStatementHDD.

The seabed of the Inner Sound is scoured bedrock with no significant superficial sediments. From the HDD exit locations to the TTGs the TSCs will be laid on the seabed and will not be buried.

The installation will use:

- 1 Cable Laying Vessel (CLV); and
- 1 Multi-cat type vessel.

Vessel specifications can be found in MEY-1A-40-006-F-VMFConstructionWorks.

The key elements of the TCS installation are:

5.2.1 Route survey

3 weeks prior to TSC Works a pre-installation survey will be undertaken, to confirm the route for the cable in order to:

- Confirm bathymetry in detail from HDD exit to TTG location, to confirm and refine a route along natural fault lines and benefiting from shelter from tidal conditions provided by local topography;
- Identify and chart any debris and other features (e.g. archaeological features) along the TSC route and TTG location; and
- Determine a safe approach and holding position(s) for construction vessels during installation.
- Post survey, data can be used to identify benthic habitats and species on the TSC route.

The survey will be undertaken using a combination of ROV, dropdown cameras from a multi-cat vessel.

5.2.2 HDD bore preparation

- Prior to the CLV arriving on site, a multi-cat vessel will moor up to the temporary moorings (described in MEY-1A-40-001-F-ConstructionMethodStatementHDD). Divers from a multi-cat will remove the HDD exit cap, install a bellmouth (Figure 4) to the HDD liner and a pull the winch wire through the HDD liner.

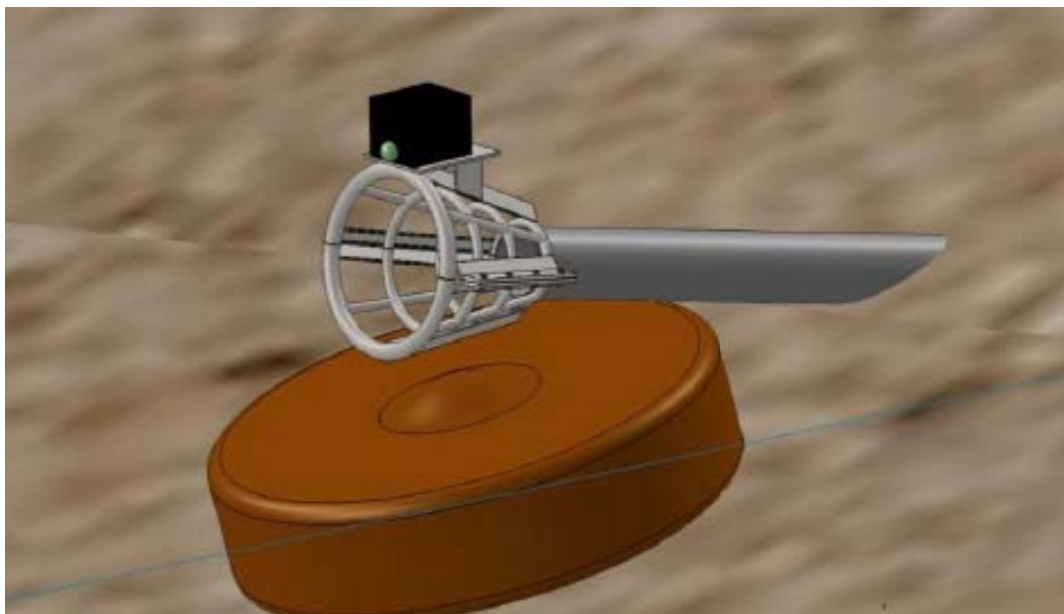


Figure 4 Bellmouth with integrated camera connected to HDD liner

5.2.3 TSC pull through

- Mobilise the CLV; the TSCs will be mobilised direct from the TSC manufacturer (Hartlepool), two TSC per 9m drum;
- The CLV will transit to site, position and hold station to the north of HDD exit points.
- The winch wire will be attached the TSC pulling head and then the TSC will be paid out from the CLV, floated towards the HDD exit point. The multi-cat vessel will monitor and assist the operation.
- An onshore winch will then begin to pull the TSC through the HDD bore as it is paid out from the CLV (Figure 5).
- The Multi-cat will monitor progress and release the floats attached to the TSC.
- When the TSC has reached the onshore site it will be temporarily secured.

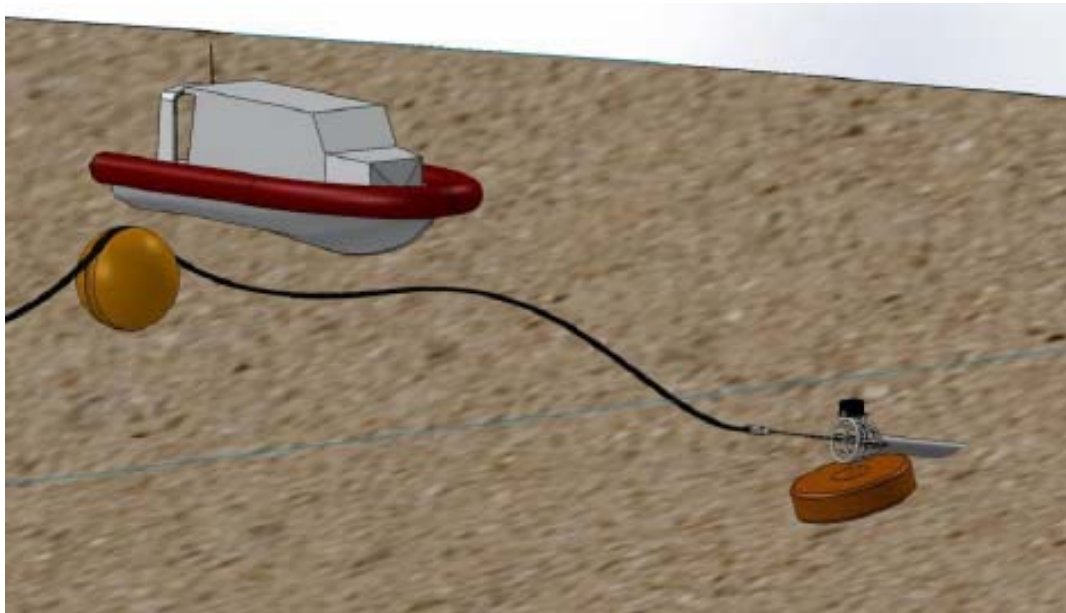


Figure 5 TSC floated towards HDD duct before being pulled through by winch wire

5.2.4 TSC seabed lay

- Once the TSC is confirmed to be secured at the onshore site, the CLV will then begin to lay the TSC (Figure 6) along the design route (Figure 7) towards the Turbine Support Structure (TSS) locations.
- TSC is set down near the TSS location and secured with a temporary dead man anchor.

5.2.5 TSC protection

MeyGen are considering two options for cable stability measures between the HDD exit and the TSS location; steel ingots that sit over the top of the TSC or rock bags.

Cable stability measures will be marshalled on a local quayside to wait load-out. In the case of the MeyGen site it is likely that we would use Scrabster. Depending upon the final individual size and number employed the cable stability measures are then loaded onto the back deck of a suitable DP vessel with a crane capacity in the order of 50T and a subsea reach of 40m.

The vessel would then transit to site and employing previous analysis identifying the intended positions, and on board positional and survey equipment. Cable stability measures will be overboarded from the DP vessel crane into position.

A post installation survey to confirm the location of the cable stability measures and final depth will be carried out. Overall height of the cable stability measures should not exceed 0.6m.

The process from 5.2.2 to 5.2.5 will be repeated for all 4 TSC then the CLV and Multi-cat will be demobilised.



The installation vessel (Olympic Zeus shown here), begins to lay the cable progressing along the pre-determined route, laying the cable over the beam so that the vessel can remain bow on to the tide and maintain adequate station keeping.



Figure 6 CLV paying out TSC and laying along design route to TTG location

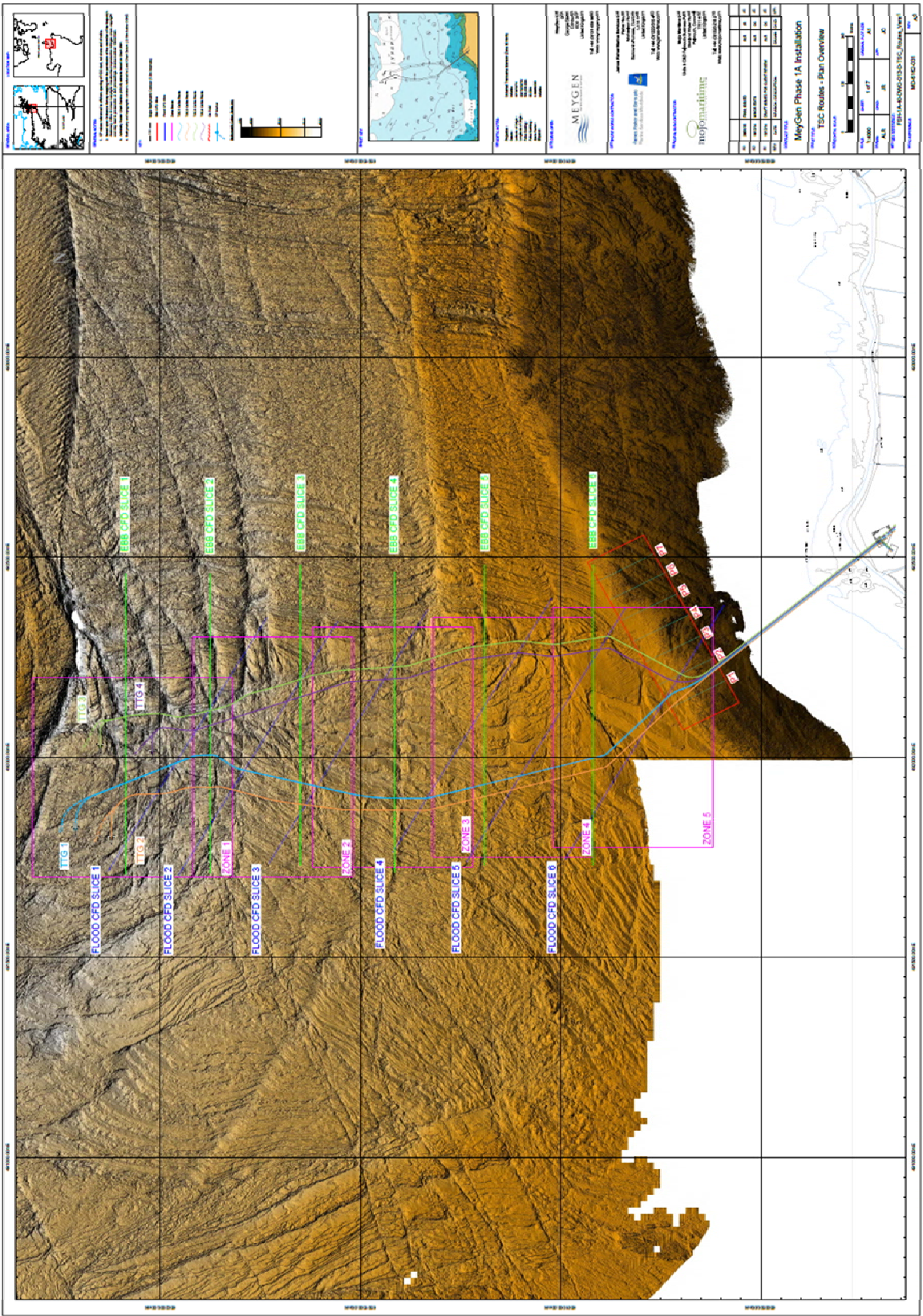


Figure 7 TSC Design Route

5.3 Turbine Support Structures Works

4 x TSS to be used in the deployment are tripod gravity bases which are to be positioned at locations detailed in Table 4 and Figure 8 within particular position, angles of declination and orientation to allow for proper functioning of the Tidal Turbine Generators (TTGs). The gravity base TSSs are made up of a tripod substructure and 6 ballast blocks (2 per tripod foot). The tripod will be fabricated at Nigg Energy Park and the ballast blocks at Thurso / Scrabster Harbour.

The installation will use:

- 1 Dynamic Positioning (DP) Construction Vessel

DP Vessel specification can be found in MEY-1A-40-006-F-VMFConstructionWorks.

The general concept for installation is:

5.3.1 Tripod installation

- Mobilisation of DP vessel prepared with the necessary grillages and sea fastenings to suit.
- 2 x tripods are loaded directly from Nigg Energy Park onto DP vessel and transit to site
- The DP vessel will prepare for the operation off site at a suitable holding location identified during the pre-installation survey.
- Upon arrival on site, the vessel would set up on DP over the TSS location;
- A lift frame incorporating sub-sea cameras, acoustic beacons, would be used along with traditional rigging. This would be attached to the TSS lifting points through the use of hydraulically actuated pins.
- The sea fastenings would be released, the TSS weight taken by the vessels crane and moved overboard to wait for acceptable tidal flow conditions. The tidal rate would be closely monitored using live current data from a deployed current monitoring buoy attached to the DP vessel. As soon as the reducing tidal flow has reached the acceptable agreed rate, the lift would be lowered towards the seabed (Figure 9);
- A Remotely-Operated Vehicle (ROV) will provide a live video feed of the installation of the TSS onto the seabed.
- The DP vessel will prepare the next tripod lift at a suitable holding location whilst waiting for the next slack tide.
- The DP vessel will complete the 2nd tripod lift using the same method

5.3.2 Ballast block installation

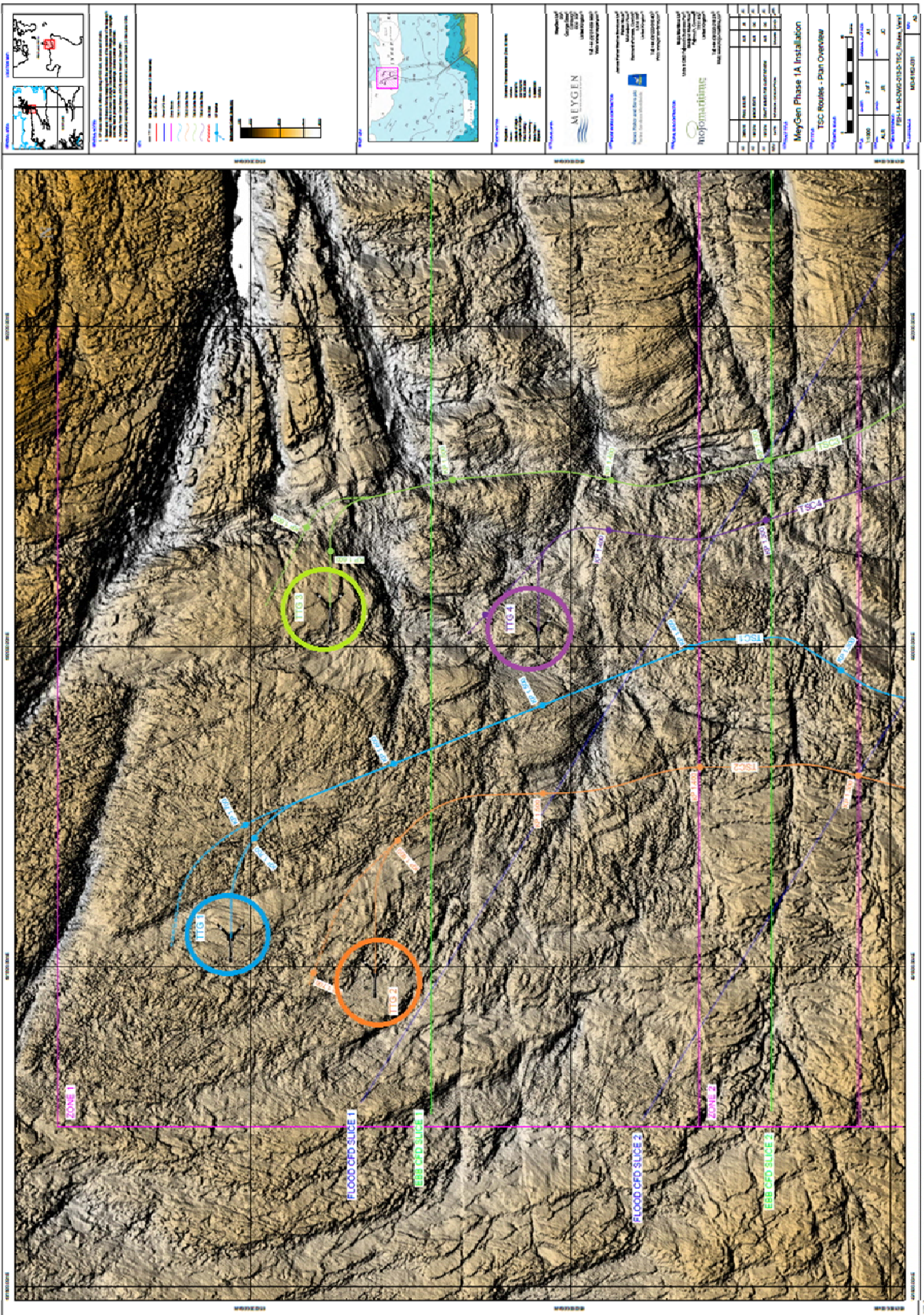
- Following the 2nd tripod installation the DP vessel will collect ballast blocks from Scrabster Harbour.
- The DP vessel will sequentially install ballast blocks to the tripod (Figure 10). One per slack tide window. The DP vessel will plan and prepare for the each subsequent lift in between slack tides.

- A Remotely-Operated Vehicle (ROV) will provide a live video feed of the installation of the ballast blocks on the tripod.

The DP vessel will collect the tripod 3 and 4 from Nigg Energy Park and follow the same sequence of installation. The remaining ballast blocks will be collected from Scrabster Harbour to complete the operation.

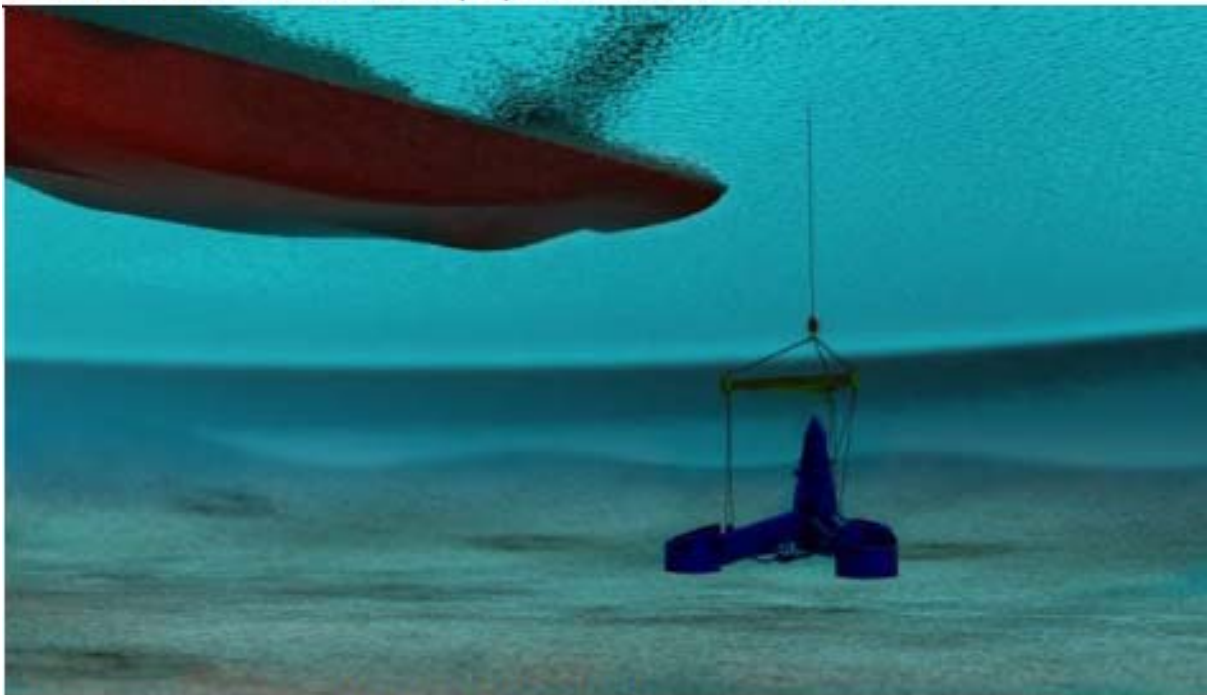
Turbine No.	Model	Eastings	Northings
1	AHH 1	491818 E	6502212 N
2	AHH 2	491796 E	6502122 N
3	AHH 3	492025 E	6502150 N
4	ARL 1	492010 E	6502020 N

Table 4 TTG locations





Vessel orientates with the tide and prepares to lower substructure



Substructure oriented and lowered to the seabed

Figure 9 TSS Tripod installation



Vessel transits to site and orientates in current ready for ballast deployment



Sequentially, ballast blocks are deployed to substructure buckets

Figure 10 TSS Ballast Block installation

5.4 Tidal Turbine Generators Works

4 x TTGs are to be installed on the TSS. The final assembly of these units will be at Nigg Energy Park (1 x ARL) & Scrabster Harbour (3 x AHH).

The installation will use:

- 1 x DP Construction Vessel

5.4.1 ARL TTG installation

The ARL installation consists of two operations; connecting the cable management system to the TSS and the installation of the TTG on the TSS. The general concept for installation is:

- TTG, cable management system back-pack and associated equipment are assembled at the port (Nigg Energy Park).
- A DP Vessel is prepared with the necessary grillages and sea-fastening.
- TTG and equipment is loaded onto the DP vessel.
- The DP vessel will transit to site.
- The DP vessel will prepare for the operation off site at a suitable holding location identified during the pre-installation survey.
- The DP vessel waits for slack tide before moving onto DP station at the TSS location.
- An ROV will be deployed to hook the vessel crane wire to the end of TSC.
- The TSC is retrieved to the DP vessel deck and the back-pack cable management system is connected to the TSC;
- The back-pack structure is installed onto the TSS, using an ROV to monitor the installation;
- An active lift frame incorporating sub-sea cameras, acoustic beacons, gyros and inclinometers will be used for the TTG. This would be attached to the TTG lifting points through the use of hydraulically actuated pins.
- When approaching the slack tide the DP vessel will move onto DP over the TSS location.
- The turbine seafastenings would be released, the turbine weight taken by the vessel crane and moved overboard to wait for acceptable tidal flow conditions. The tidal rate would be closely monitored using live current data from a deployed current monitoring buoy attached to the DP vessel. As soon as the reducing tidal flow has reached the acceptable agreed rate, the lift would be lowered towards the substructure (Figure 11).
- The TTG connection will be monitored using the active lift frame, with small positional corrections being made by crane driver, tugger winches or vessel DP.
- Once the TTG is positioned on the TSS, the lift frame would be remotely disengaged from the TTG lifting points and recovered to the surface.
- In installing the TTG on the TSS the electrical connection in the back-pack is made.
- DP Vessel is demobilised.

5.4.2 AHH TTG installation

The AHH installation consists of two operations; installing the TTG on the TSS and connecting the TSC to the TSC tail (already connected to the TTG). The general concept for installation is:

- TTG with TSC tail and connector and associated equipment are assembled at the port (Scrabster Harbour).
- A DP Vessel is prepared with the necessary grillages and sea-fastening.
- TTG and equipment is loaded onto the DP vessel.
- The DP vessel will transit to site.
- The DP vessel will prepare for the operation off site at a suitable holding location identified during the pre-installation survey.
- The DP vessel waits for slack tide before moving onto DP station at the TSS location.
- An active lift frame incorporating sub-sea cameras, acoustic beacons, gyros and inclinometers will be used for the TTG. This would be attached to the TTG lifting points through the use of hydraulically actuated pins.
- The turbine seafastenings would be released, the turbine weight taken by the vessel crane and moved overboard to wait for acceptable tidal flow conditions. The tidal rate would be closely monitored using live current data from a deployed current monitoring buoy attached to the DP vessel. As soon as the reducing tidal flow has reached the acceptable agreed rate, the lift would be lowered towards the substructure.
- The TTG connection will be monitored using the active lift frame, with small positional corrections being made by crane driver, tugger winches or vessel DP.
- As the TTG is lowered, the TSC tail, connected to the TTG, will be slowly paid out under control over an over-boarding chute using a linear cable engine.
- Once the TTG is positioned on the TSS, the lift frame would be remotely disengaged from the turbine lifting points and recovered to the surface.
- The DP vessel will move away from the TTG under DP, laying away the TSC tail into the foundation TSC guide and onwards towards the TSC on the seabed.
- An ROV would be deployed to hook the TSC onto the crane wire and will be lifted to the vessel deck.
- Cable clamps would be fitted to both TSC tail and TSC, and the jointing operation commenced. This will take between 2 to 4 hours. On the completion of jointing operations, the TSC will be laid away on the seabed.
- The DP vessel will then demobilise.
- This operation will be done for 3 x AHH TTG.

Following demobilisation off site for each operation, waste materials and liquids will be taken onshore and disposed of in accordance with the waste management plan. (James Fisher Marine Services Waste Management Plan included in the EMP).

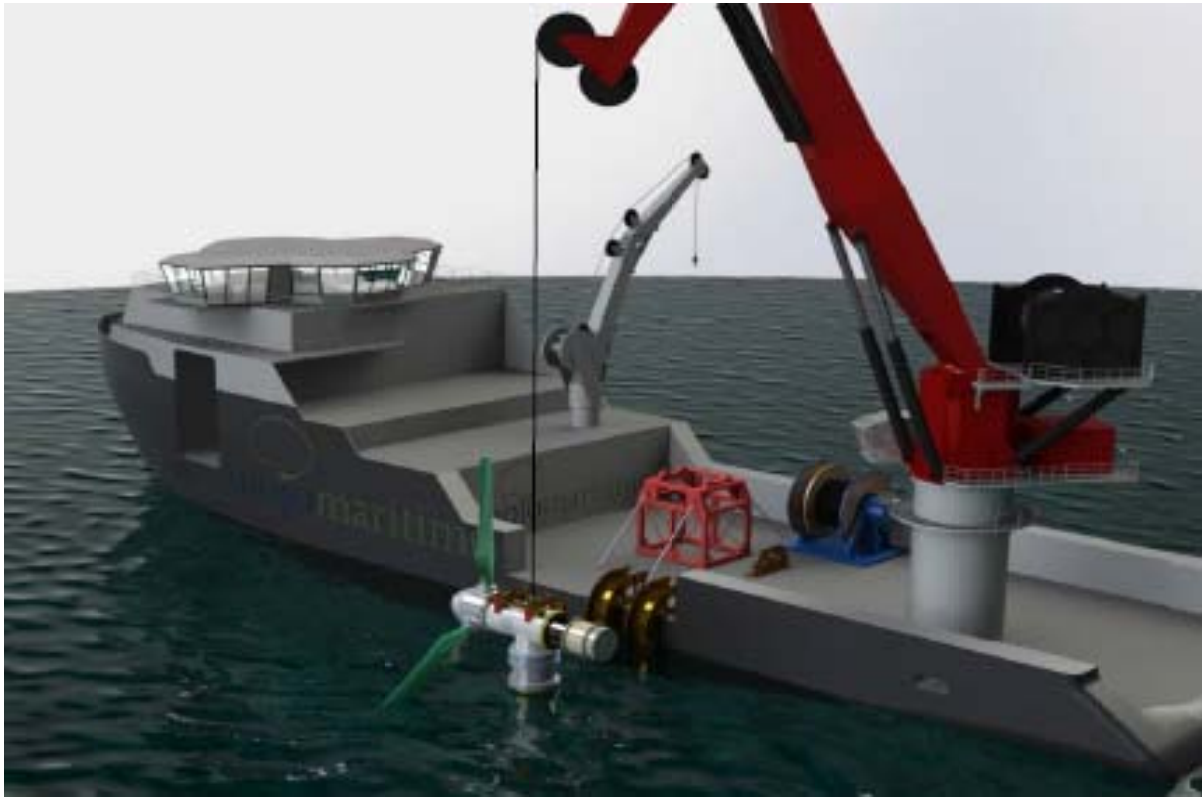


Figure 11 TTG over-boarding from DP vessel

5.5 Environmental Mitigation

The EMP describes the mitigation measures and methodologies to be used for the Construction Works. These have been taken from the mitigation described in the ES and SEIS. These are summarised below.

5.5.1 Vessels and Lifting Operations

Navigation Safety

Navigation safety notices, warnings and demarcations will be conducted under the procedures of and to meet the requirements of the NSP.

Marine Mammals

Mitigation measures detailed for the protected of marine mammal species will be conducted under the procedures of and to meet the requirements of the EMP and VMP. These include:

- Training of all on site / on vessel personnel regarding the importance and sensitivity of marine mammals and their legislative protection;
- Provision of advice to staff detailing the types of activity potentially disturbing, and therefore to be avoided; and
- Maintenance of a daily marine mammal log by the Principal Contractor, into which any interaction will be noted. It is important to make clear that such a log is likely to

record many approaches by marine mammals to the vessels and personnel undertaking the Construction Works. Marine mammals are intelligent and naturally curious about any construction works, regularly approaching vessels engaged in marine works.

- Vessels to remain a safe distance where possible from sensitive seal haul-out sites.

Pollution Prevention

Mitigation measures detailed for the prevention of marine pollution from oil and chemical spills and objects overboard will be conducted under the procedures of and to meet the requirements of the Marine Pollution Contingency Plan in the EMP.

Invasive Non-Native Species Management

A short non-native management report will be provided by the Principal Contractor to Marine Scotland for each vessel used in the Construction Works, including the details listed in the management plan in the EMP.

Waste Management

Waste management will be conducted under the procedures of and to meet the requirements of the Waste Management Plan in the EMP.

5.5.2 Moorings

Moorings for multi-cat vessel activity at the HDD exit have been considered in the EMP, CMS, NSP and VMP for the HDD Marine Works¹. Below is a summary of mitigation measures for the moorings that will be in place for the duration of the TSC installation.

Navigation Safety

Navigation safety notices, warnings and demarcations will be conducted under the procedures of and to meet the requirements of the NSP.

Marine Mammals

Mitigation measures detailed for the protected of marine mammal species will be conducted under the procedures of and to meet the requirements of the EMP and VMP. These include:

- Training of all on site / on vessel personnel regarding the importance and sensitivity of marine mammals and their legislative protection;
- Provision of advice to staff detailing the types of activity potentially disturbing, and therefore to be avoided; and
- Maintenance of a daily marine mammal log by the Principal Contractor, into which any interaction will be noted. It is important to make clear that such a log is likely to record many approaches by marine mammals to the vessels and personnel

¹ RHK-1A-40-HSE-F-001-EnvironmentalManagementPlanHDD; MEY-1A-40-HSE-F-001-ConstructionMethodStatementHDD; MEY-1A-40-HSE-F-002-NavigationSafetyPlanHDD; MEY-1A-40-HSE-F-003-VesselManagementPlanHDD

undertaking the Construction Works. Marine mammals are intelligent and naturally curious about any in water construction works, regularly approaching vessels engaged in the marine works.

- Vessels to remain a safe distance where possible from sensitive seal haul-out sites

Pollution Prevention

Mitigation measures detailed for the prevention of marine pollution from oil and chemical spills and objects overboard will be conducted under the procedures of and to meet the requirements of the Marine Pollution Contingency Plan in the EMP.

Archaeology

A reporting protocol for the discovery of marine archaeology has been produced to address the accidental discovery of marine cultural material during development, maintenance and monitoring. Full details and requirements of the Reporting Protocol for the Discovery of Marine Archaeology are in the EMP.

5.5.3 Dive Activity

Dive activity will be required to assist the TSC Works.

Navigation Safety

Navigation safety notices, warnings and demarcations will be conducted under the procedures of and to meet the requirements of the NSP.

Marine Mammals

Mitigation measures detailed for the protected of marine mammal species will be conducted under the procedures of and to meet the requirements of the EMP and VMP. These include:

- Training of all on site / on vessel personnel regarding the importance and sensitivity of marine mammals and their legislative protection;
- Provision of advice to staff detailing the types of activity potentially disturbing, and therefore to be avoided; and
- Maintenance of a daily marine mammal log by the Principal Contractor, into which any interaction will be noted. It is important to make clear that such a log is likely to record many approaches by marine mammals to the vessels and personnel undertaking the Construction Works. Marine mammals are intelligent and naturally curious about any in water construction works, regularly approaching vessels engaged in marine works.

Pollution Prevention

Mitigation measures detailed for the prevention of marine pollution from oil and chemical spills and objects overboard will be conducted under the procedures of and to meet the requirements of the Marine Pollution Contingency Plan in the EMP.

Archaeology

A reporting protocol for the discovery of marine archaeology has been produced to address the accidental discovery of marine cultural material during development, maintenance and monitoring. Full details and requirements of the Reporting Protocol for the Discovery of Marine Archaeology are in the EMP.

6 EMERGENCY PREPAREDNESS AND RESPONSE

Pollution prevention measures included in the EMP (Marine Pollution Contingency Plan) will be adhered to at all times on vessels and working at quayside.

Emergency Response Procedures are an intrinsic part of the Scope of Works relating specifically to the works being executed, the ERCoP is detailed in the NSP.

These procedures include:

- Man Overboard
- General MOB Procedure
- Fire & Explosion
- Personnel Injury or Medical Evacuation
- Serious Injury or Illness
- Medical Advice
- Request for medical assistance
- Evacuation of a sick or injured person from a vessel
- Adverse Weather Procedure
- Environmental Response Plan
- Clean up actions specific to hazardous materials
- Spill Notification
- Spill Documentation
- Immediate actions
- Clean-up actions
- Spill notification
- Spill Documentation
- Location and Content of a Spill Kit
- Post incident reporting
- Training

7 LICENCES AND LEGAL REQUIREMENTS

Licence / Consent	Legislation	Granted
Section 36 Consent	Electricity Act 1989	09/10/2013
Marine Licence (licence number 04577/14/0)	Marine (Scotland) Act 2010	31/01/2014
Decommissioning Programme	Energy Act 2005	Submitted

Table 5 Consent

8 LINKAGES WITH OTHER STRATEGIES AND SHE MANAGEMENT SYSTEMS

The CMS complies with the Principal Contractor's Construction Phase Health and Safety Plan (under the Construction (Design and Management) Regulations 2007) and their Health, Safety and Environment Manual.

9 CMS REVIEW AND CONSULTATION

Under Condition 9 of the Section 36 the CMS will be reviewed and commented on by the licensing authority and SNH, SEPA, MCA, NLB, the planning authority and any other such advisors that may be required at the discretion of the Scottish Ministers. The CMS must be approved by the licensing authority.

The CMS will be submitted to the licensing authority for distribution to the stakeholders and for approval.

Any changes the CMS deemed necessary (working methods or procedures) must be reviewed and approved by the ECoW before it is submitted for approval to the licensing authority (Figure 12).

Version control will be conducted by the revision review block on the front page of the CMS.

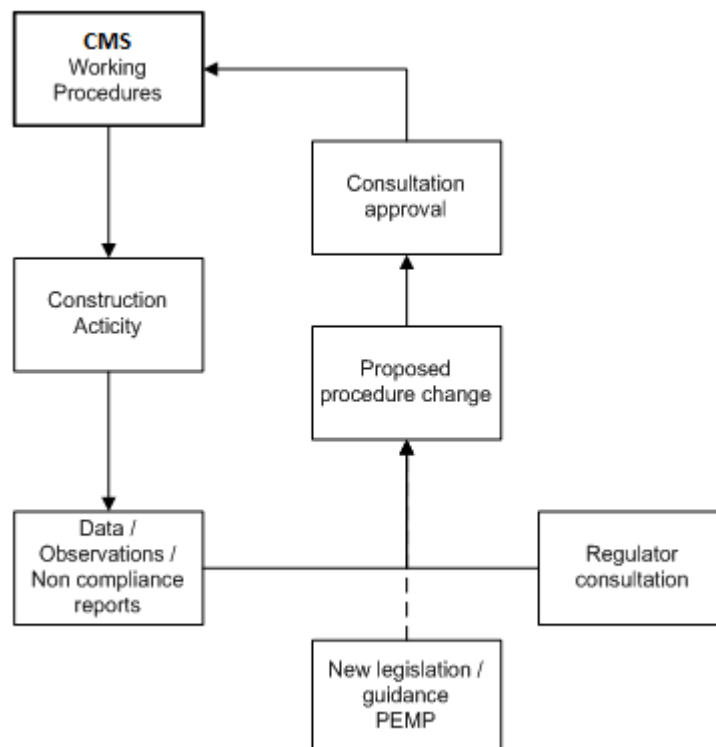


Figure 12 CMS Change Process

10 LIST OF ABBREVIATIONS

Abbreviation	
CDM	Construction (Design and Management) Regulations 2007
CLV	Cable Laying Vessel
CMS	Construction Method Statement
COSHH	Control of Substance Hazardous to Health
DP	Dynamic Positioning
ECow	Ecological Clerk of Works
EIA	Environmental Impact Assessment
EMF	Electromagnetic Field
EMP	Environmental Management Plan
ERCoP	Emergency Response and Co-operation Plan
ERP	Emergency Response Procedures
EPS	European Protected Species
ES	Environmental Statement
HDD	Horizontal Directional Drilling
HSE	Health, Safety and Environment
IOSH	Institute of Occupational Safety and Health
JNCC	Joint Nature Conservation Committee
NSP	Navigation Safety Plan
MCA	Maritime Coastguard Agency
MHWS	Mean High Water Springs
ML	Marine Licence under the Marine (Scotland) Act 2010

MLWS	Mean Low Water Springs
MMO	Marine Mammal Observer
PC	Principal Contractor – James Fisher Marine Services
PEMP	Project Environmental Monitoring Programme
RAMS	Risk Assessments and Method Statements
SAC	Special Area of Conservation
SCIMS	Seal Corkscrew Injury Monitoring Scheme
SEIS	Supplementary Environmental Information Statement
SEPA	Scottish Environment Protection Agency
SHESQ	Safety, Health, Environment, Security and Quality
SNCA	Statutory Nature Conservation Agency
SNH	Scottish Natural Heritage
SPA	Special Protected Area
S36	Section 36 of the Electricity Act 1989
TSC	Turbine Submarine Cable
TSS	Turbine Support Structure
TTG	Tidal Turbine Generator
VMP	Vessel Management Plan