MEYGEN

THE TIDE OF CHANGE IN CAITHNESS

MeyGen Phase 1A – Vessel Management & Navigation Safety Plan: Operations

This Vessel Management & Navigation Safety Plan has been prepared by MeyGen Ltd to set out the proposed method for discharging Condition 14 & Condition 17 of the Section 36 Consent for the operation of the Development.

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2	F.Johnson	30/07/20	30/07/20	Update reference to Section 36 Condition & amalgamation of Navigation Safety Plan with the Vessel Management plan
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1 INTRODUCTION

1.1 Purpose

This Vessel Management & Navigation Safety Plan has been prepared by MeyGen Ltd to set out the proposed method for discharging Condition 14 & Condition 17 of the Section 36 Consent for the operation of the Development.

Section 36 – Condition 14:

Vessel Management

14. The Company must, no less than 3 months prior to the Commencement of the Development, submit a Vessel Management Plan, in writing, to the Scottish Ministers for their written approval, in consultation with SNH and any such other ecological or other advisors as may be required at the discretion of the Scottish Ministers. The Vessel Management Plan must include, but is not limited to, the following issues:

a) Individual vessel details;
b) Number of vessels;
c) Whether ducted propellers will be in operation;
d) How vessel management will be coordinated, particularly during construction but also during operation; and
e) Location of working port(s), how often vessels will be required to transit between port(s) and the site and the routes used.

The Development must be constructed and operated in accordance with the Vessel Management Plan, and the Vessel Management Plan must, so far as is reasonably practicable, be consistent with the CMS, the EMP, the PEMP, the Operations and Maintenance Programme, and the Navigational Safety Plan.

Reason: *To minimise the disturbance to seal haul outs, marine mammals and basking sharks as well as consideration of mitigation measures for cork screw injuries to seals.*

Section 36 – Condition 17:

Navigation

17. The Company must, prior to the Commencement of the Development, submit a Navigational Safety Plan, in writing, to the Scottish Ministers for their written approval, in consultation with the Maritime and Coastguard Agency, the Northern Lighthouse Board, the Chamber of Shipping and any other navigational advisors, or such other advisors, as may be required at the discretion of the Scottish Ministers. The Navigational Safety Plan must include, but is not limited to, the following issues:

(a) Navigational safety measures;
(b) Emergency Response and Co-ordination Plan;
(c) Safety zones;
(d) Promulgation of information to mariners;
(e) Buoyage;
(f) Anchoring areas; and
(g) Lighting and marking of cable landfall site(s).

The Development must be constructed and operated in accordance with the Navigational Safety Plan at all times.

Reason: *In the interests of safe navigation.*

The Vessel Management & Navigation Safety Plan also includes elements which support the discharging of conditions listed in:

I. Marine Licence 04577/17/1 (Array)

II. Marine Licence 06234/17/0 (Rock bags)

III. Marine Licence 06978/19/0 (Subsea Hub)

The purpose of this document is to ensure that the Developments marine activities are conducted in a safe manner considerate of the consent conditions and industry best practice. The document covers the operating phase of the MeyGen 6MW Phase 1A tidal array and will be reviewed every two years by the MeyGen O&M Manager.

The document will be reviewed to ensure that it provides detailed information relevant to the key activities to be undertaken through the construction, operation and decommissioning phases.

The marine works must, at all times, be operated in accordance with the approved Vessel Management & Navigation Safety Plan.

The Vessel Management & Navigation Safety Plan includes information relating to the following details:

I. The site and layout of the subsea assets;

II. The works to be conducted during operation of the MeyGen Phase 1A array and the type of vessel to be used;

III. Vessel Management;

IV. Navigational safety;

V. Environmental Protection.

The Vessel Management & Navigation Safety Plan presented within this document is considered sufficient to satisfy Condition 14 & Condition 17 of the Section 36 Consent and enable the operation of the MeyGen Phase 1A array.

Details of the vessels used to carry out the licence activity will be notified to the Scottish Ministers in writing no later than 14 days prior to the commencement of the works.

The Vessel Management & Navigation Safety Plan will be submitted to the licencing authority and consulted on by SNH and any other such ecological or other advisors as may be required as the discretion of the Scottish Ministers.

1.2 Related documents

The Vessel Management & Navigation Safety Plan can be read in isolation, but it may be advantageous that the VMS is read in conjunction with the following:

I. MeyGen Phase 1A - Emergency Response and Co-ordination Plan;

II. MeyGen Phase 1A - Site Entry Procedure;

III. MeyGen Phase 1A – Environmental Management Plan;

IV. Procedure for the discharge of Consent Conditions as part of marine works related to Phase 1A.

1.3 MeyGen Development

MeyGen is the owner and operator of the MeyGen tidal array located in the Inner Sound of the Pentland Firth, Figure 1. Meygen is a subsidiary of Simec Atlantis Energy.

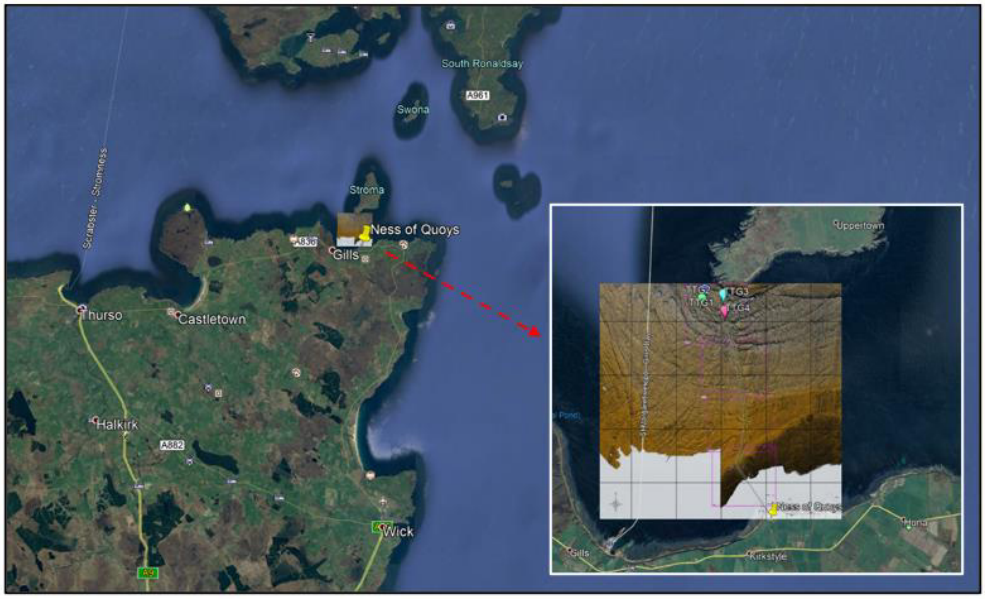


Figure 1 – MeyGen site location

The offshore site is located to the SW of the Island of Stroma, between Stroma and the Scottish mainland. The onshore substation, where the export power cables are landed via a 550m horizontally drilled duct, is located at Ness of Quoys. The onshore substation is shown in Figure 2, the substation is the green building on the shoreline to the right in the image.

Figure 2 – MeyGen onshore substation

1.4 Maintenance and Offshore Operations

The marine works planned in the next 10 years are as follows:

- Site survey:
    - Conducted annually in Q2
- Cable stabilisation:
    - This is a preventative activity informed by the annual site survey.

- MeyGen expect an infrequent requirement to undertake works to stabilise the cables
- An operation is planned in 2021, no further works are currently planned after this intervention.

– Planned turbine maintenance:

- Planned maintenance interventions for the AHH TTG is forecast for Q2 2023, future works would then occur in 2028, 2033 and 2038.
- Planned Maintenance interventions for the AOU TTG are forecast for Q2 2024, future works would then occur in 2030, 2036.

– Unplanned turbine maintenance:

- Unplanned maintenance events are by their nature unplanned

Notification of the above planned works, and any unplanned, works would be as per the procedure outlines in Section 0

1.5 Site layout

The turbines and export cables are located at the positions listed in Table 1. The turbines and export cables are shown in Navigational charts as per Figure 3.

Table 1 – Turbine locations

Turbine	Longitude UTM 30 WGS84	Latitude UTM 30 WGS84	Water depth (m) LAT	TTG Height (m)	Clearance above TTG (m) LAT
TTG 1 - AHH	03º 08.46158 W	58º39.60515 N	33.1	23.5	10.9
TTG 2 - AHH	03º 08.48413 W	58º39.55663 N	34.1	23.5	11.7
TTG 3 - AHH	03º 08.24738 W	58º39.57198 N	33.1	23.5	9.9
TTG 4 - AOU	03º 08.26262 W	58º39.50192 N	34.9	23.5	13.9

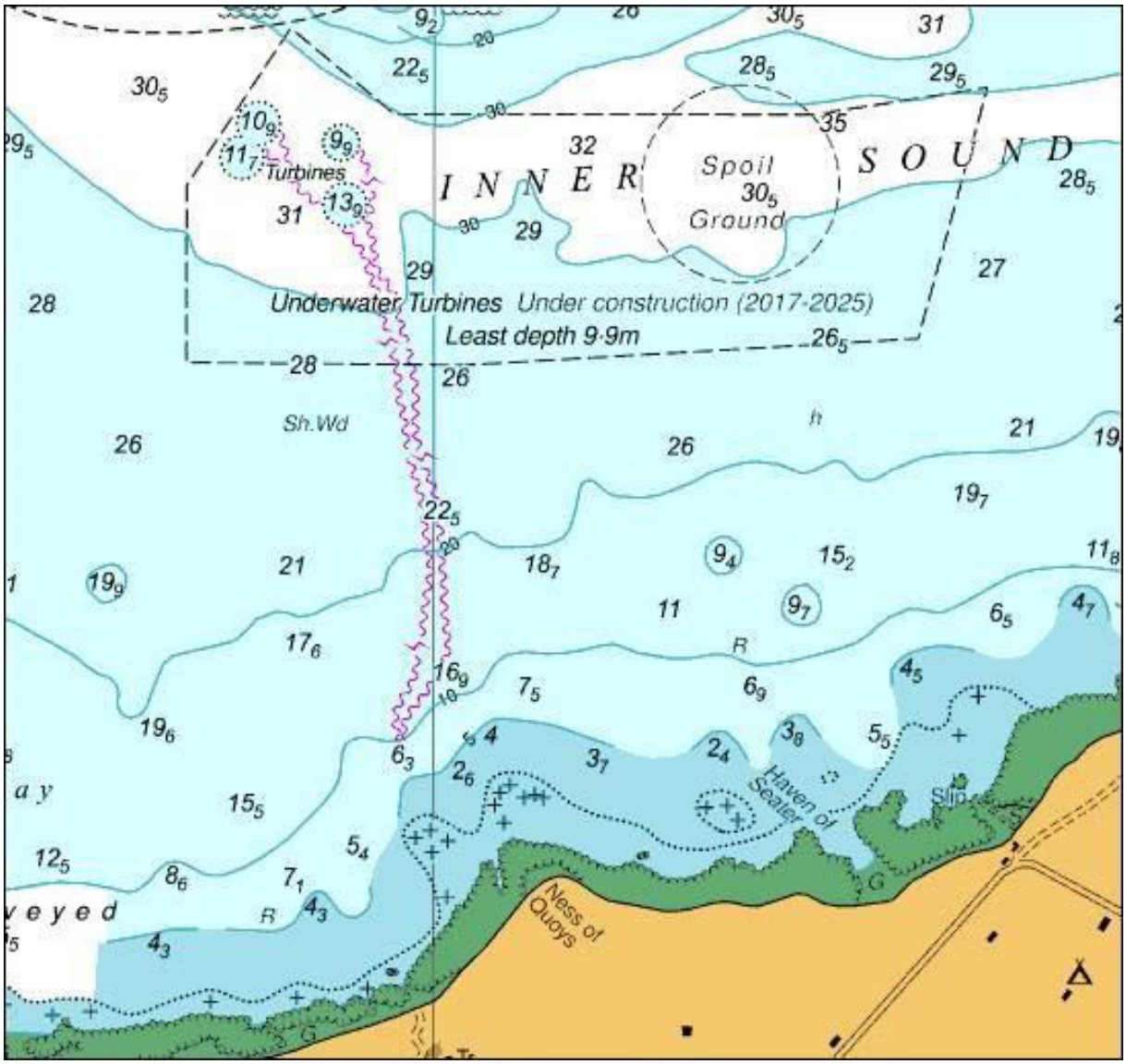


Figure 3 - Export cable and turbines shown in UKHO chart 2581

A more detailed set of site drawings is provided in Section 11

The Inner Sound of the Pentland Firth is unrestricted to marine navigation, but at times is also a work site for the recovery and installation of tidal turbine generators, site survey or cable stability works. Vessels undertaking these works conform to the International Regulations for Preventing Collisions at Sea.

MeyGen manages site entry for vessels working at the MeyGen site in the issuance of a Site Entry Permit. The procedure for the issuance of this permit is detailed in *MEY-1A-70-PRO-001-F_OffshoreSiteEntryProcedure* and the offshore site is shown in Figure 4. A copy of the Site Entry Permit is included in Section 10.

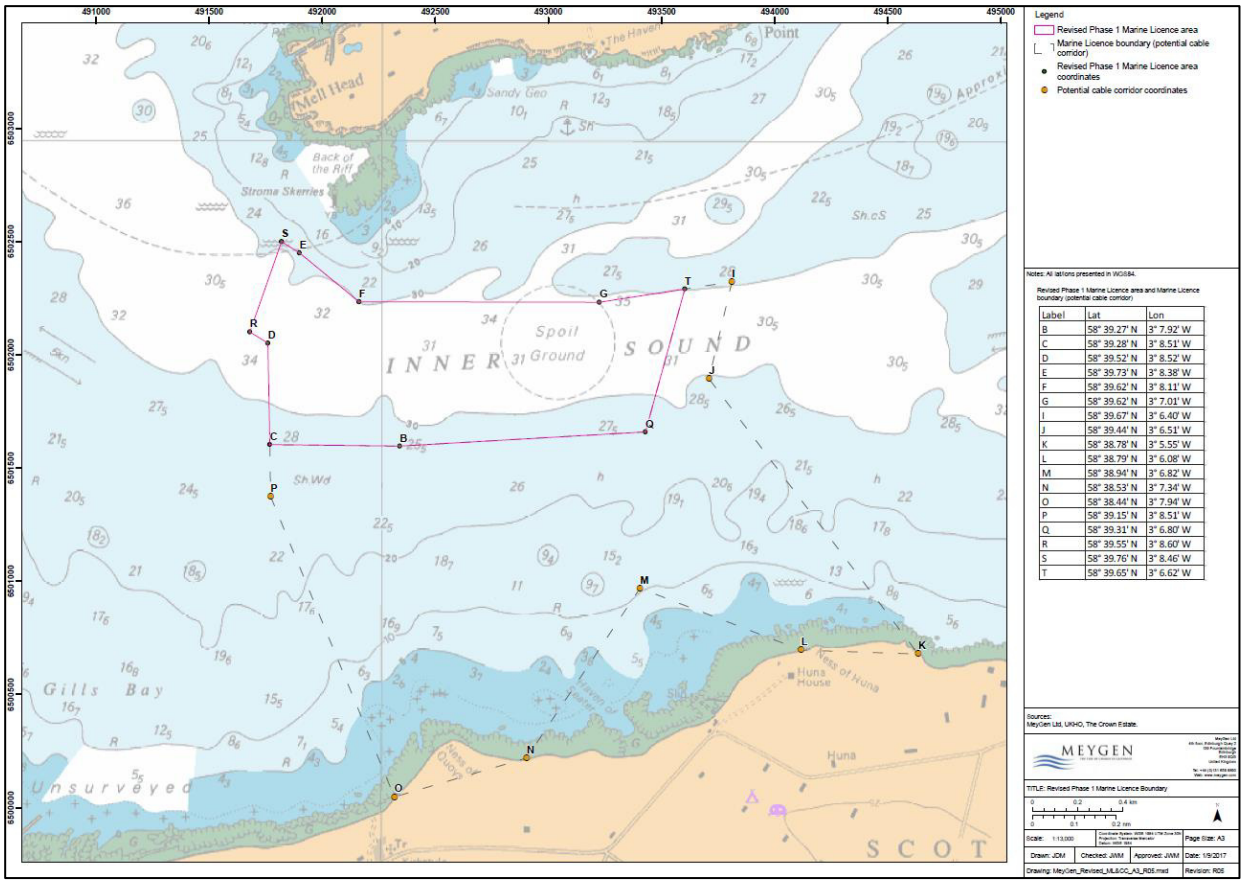


Figure 4 – MeyGen site boundary

1.6 Tidal flows and their prediction

MeyGen have a detailed 2D mathematical model that simulates tidal flows for a 10 minute average, Figure 5. A live feed can also be obtained from the operating turbines via an open access web page. This also provides live data from a weather station located at Ness of Quoys, 50m from the shore line, Figure 6.

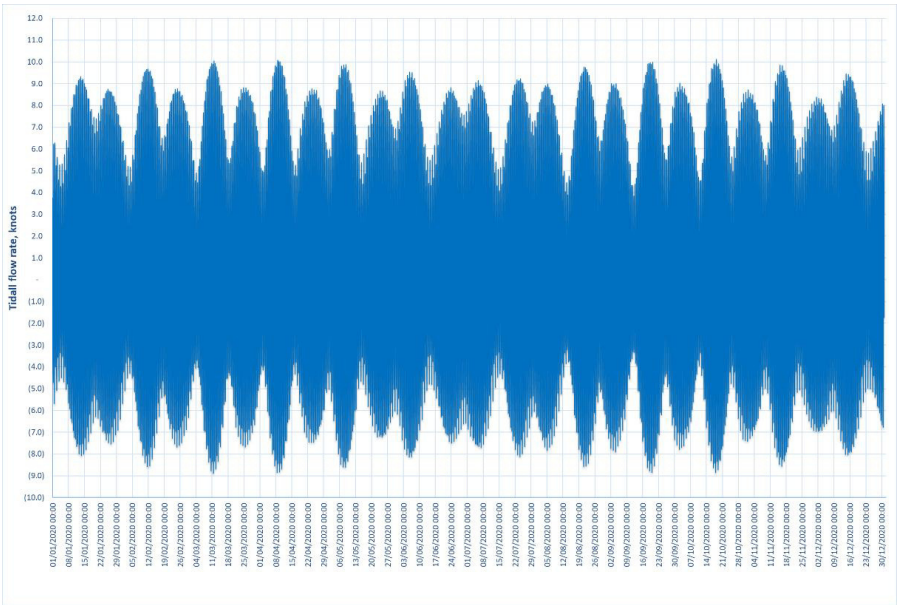


Figure 5 – Tidal prediction

Open access site data can be obtained from the following link:

- http://137.221.2.131:8888/meygen.cfm?key=ksef8lLUHF*US>LKJSsdas8&inst=0&day

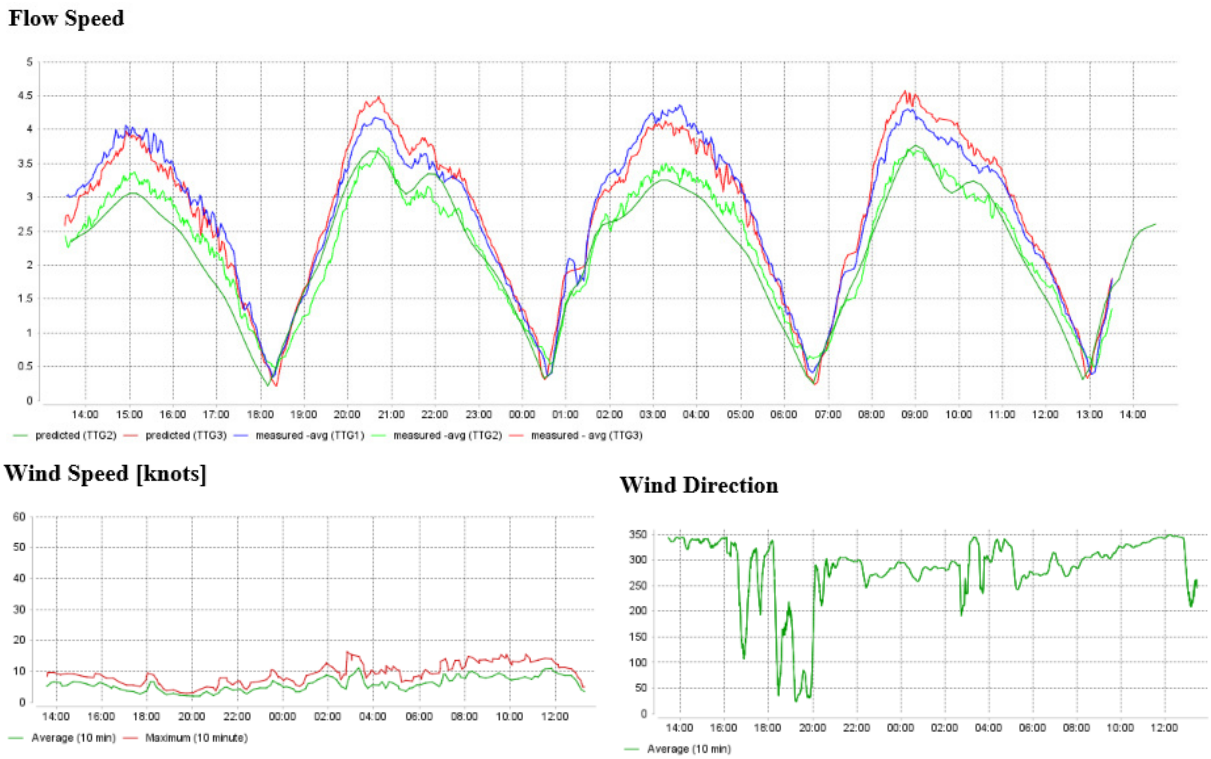


Figure 6 – Open access site data

2 ROLES AND RESPONSIBILITIES

The role and responsibilities related to the safe navigation of vessels at the Meygen site and between the site and the base of operations shall include:

- The MeyGen O&M Manger
- The Marine Contractor / Offshore Works Manager
- The Vessel Master

2.1 MeyGen O&M Manger

The MeyGen O&M Manger is responsible for the maintenance and upkeep of this document to ensure it remains relevant to the phase of operation of the Development, the MeyGen tidal array.

In preparation for the execution of marine works the MeyGen O&M Manger shall:

I. Issue the Vessel Management & Navigation Safety Plan and relating documentation to the Marine Contractor for submission to the vessel owners / operators;

II. Obtain confirmation from the vessels master that the Vessel Management & Navigation Safety Plan have been received, the content understood, and relevant information provided to MeyGen as requested;

IV. Report to the MSLOT as required under the Marine Licences:

   - Marine Licence 04577/17/1 (Array)
   - Marine Licence 06234/17/0 (Rock bags)
   - Marine Licence 06978/19/0 (Subsea Hub))

   that the consent conditions have been suitably discharged.

During the execution of the works the MeyGen O&M Manger shall ensure that the works are suitably monitored to ensure that the works are undertaken in line with the Conditions listed in the Section 36 and Marine licence.

After the works the MeyGen O&M Manger shall Report to the MSLOT as required under the Marine Licences ((Marine Licence 04577/17/1 (Array), Marine Licence 06234/17/0 (Rock bags), Marine Licence 06978/19/0 (Subsea Hub)) that the consent conditions have been suitably discharged.

The MeyGen O&M Manger shall issue the Site Entry Permit to the Marine Contractor as per the requirements listed in the MeyGen Phase 1A - Site Entry Procedure.

2.2 Marine Contractor / Offshore works Manager

The Marine Contractor is responsible for ensuring that the Vessel Management & Navigation Safety Plan is issued to the Vessel master and subsequently that the requirements listed within are met.

During the works the Marine Contractor is responsible for the execution of the works presenting an ALARP risk to personnel, the MeyGen assets and environment.

The Marine Contractor shall adhere to the conditions under which the MeyGen Site Entry Permit is issued and will liaise with the MeyGen O&M Manger to adhere to and not breach any of the consent conditions listed in:

- Marine Licence 04577/17/1 (Array);
- Marine Licence 06234/17/0 (Rock bags);

- Marine Licence 06978/19/0 (Subsea Hub).

2.3 Vessel Master

The Vessel Master is responsible for:

- the safe navigation and operation of the vessel used to undertake the works at the MeyGen offshore site
- provision of the information and documents listed in the Vessel Management & Navigation Safety Plan
- implementation of the standard operating procedures to manage and control risks relating to environmental pollution

The Vessel Master will receive the Vessel Management & Navigation Safety Plan from the Marine Contractor and liaise with the MeyGen O&M Manger where appropriate to ensure that the actions of the vessel operating on the Meygen site does not breach any of the consent conditions listed in:

- Marine Licence 04577/17/1 (Array);
- Marine Licence 06234/17/0 (Rock bags);
- Marine Licence 06978/19/0 (Subsea Hub).

3 VESSEL MANAGEMENT

3.1 Documents issued prior to the works

As a condition precedent the vessel shall as soon as practicable provide the following information to MeyGen:

- Class certification;
- Insurance certificates;
- CMID;
- Certification of Ballast Treatment System;
- DP FMEA.

3.2 Vessel markings

Any vessels operating on the MeyGen site shall be marked in accordance with the International Rules for the Prevention of Collisions at Sea whilst under way, and in accordance with the UK Standard Marking Schedule for Offshore Installations if the vessel is secured to the seabed.

3.3 Vessel stability

Vessel undertaking heave lift operations or transiting with a MeyGen asset between the operations base and the offshore site shall document the vessels stability during the following activities, this information shall be made available for inspection by MeyGen:

- Loading / unloading of the Tidal Turbine Generator;
- Vessel transit to or from the offshore site, with Tidal Turbine Generator aboard;
- Works at site to recover or install a Tidal Turbine Generator at the offshore site.

3.4 Vessel movements

Vessel shall not navigate within 500m of the coastline to the north and south of the Inner Sound Management of vessel access to the offshore site.

See Section 5.2

3.5 Vessel co-ordination

Marine works undertaken at the MeyGen site are normally conducted by a single vessel. If two vessels are to undertake works in parallel at the Meygen site a Sim Ops bridging document shall be provided which is acceptable to the Vessel Masters and subsequently approved by MeyGen.

3.6 Vessel transits

Due to regular transits between the MeyGen site and Nigg Energy Park a series of waypoints have been provided which vessels typically use in the generation of their passage plan, Table 2 and Figure 7.

The Vessel will submit to MeyGen a passage plan in accordance with their companies Standard Operating Procedures for the passage between:

- The operations base and the offshore site, and
- The offshore site and the operations base.

The transit up the North East coast of Scotland will pass close to the Beatrice Offshore Wind Farm and cross active fishing grounds. The vessel passage plan shall make specific reference to these risks to navigation and ensure the Officer of the Watch is made aware of their presence.

Table 2 – Passage waypoints (Co-ordinates are in DM)

Waypoint #	Location	Lat / Long
1	Cromarty Firth	57^0 49'N 003^0 26'
2	Helmsdale	58^0 00'N 003^0 15'W
3	Beatrice WF	58^0 18'N 002^0 56'W
4	Wick North	58^0 27'N 002^0 56'W
5	MeyGen offshore site	58^0 39.85 N 003^0 8.5 W

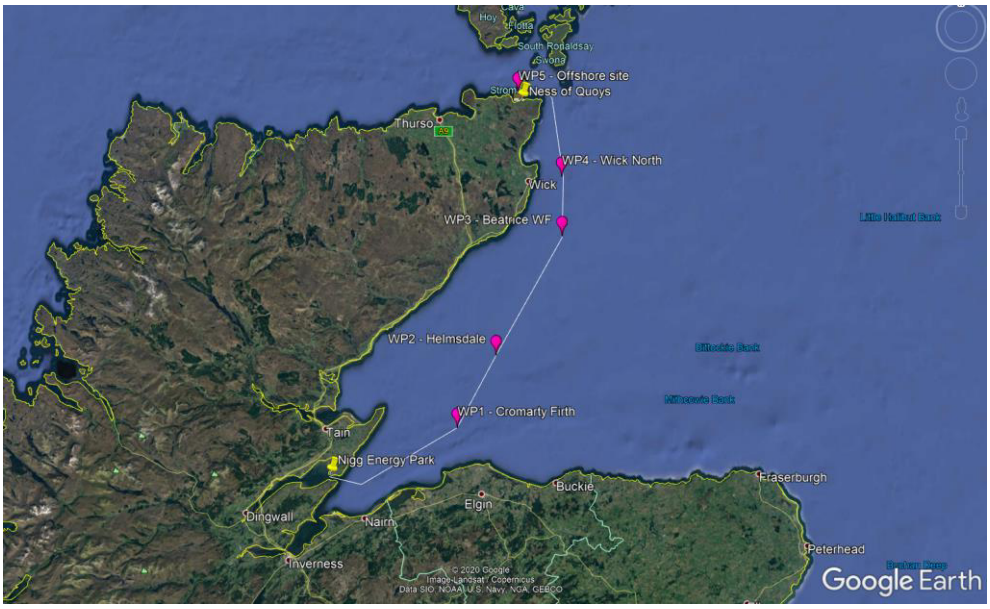


Figure 7 – MeyGen passage waypoints

3.7 Crew transfers

Crew transfers may only be undertaken at the MeyGen offshore site with the express permission of the MeyGen O&M Manager.

All personnel undertaking vessel transfers on the MeyGen site shall be equipped with a 275kN life jacket and a signal beacon with an integrated DCS transmitter, such as Ocean Signal Rescue ME MOB1 – EPI3100 unit.

4 NAVIGATION SAFETY

4.1 Lights and Shapes

The vessel shall adhere to the International Regulations for Preventing Collisions at Sea and shall at all times display the appropriate lights and day marks.

4.2 AIS

The vessel shall have an Automatic Information System (AIS) which shall be operational at all times.

4.3 Means of communications

The vessel shall be equipped with the following communication systems which shall be fully operational:

- VHF
- MF DSC

4.4 Communications plan

MeyGen and the MCGA have agreed the communicate plan shown in Figure 8.

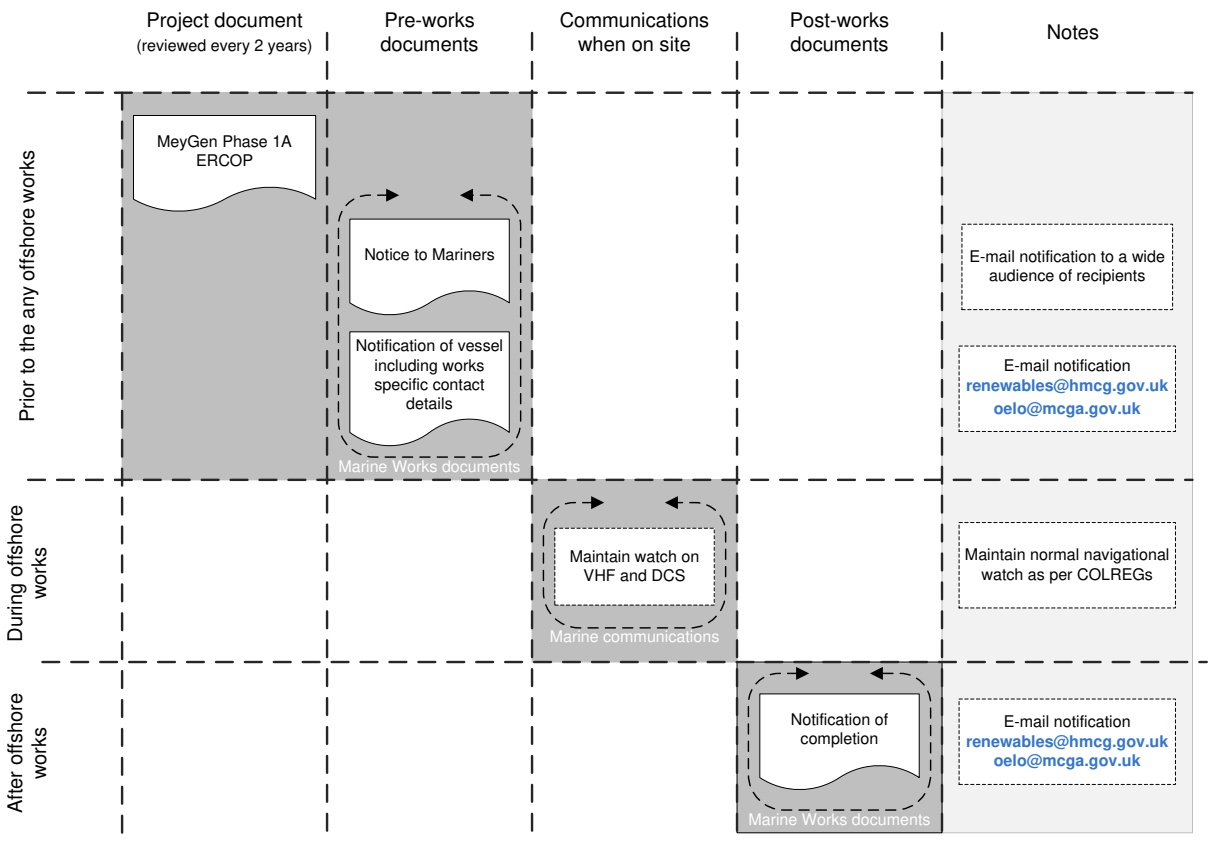


Figure 8 – MeyGen Phase 1A Communications plan

4.4.1 Vessel information issued precedent to the works

As a condition precedent the vessel shall as soon as practicable provide the following information:

- Vessel:
  - Name
  - IMO number
  - Call sign
  - MMIS number
  - Vessel telephone number
  - Fuel and Lub oil aboard (m^3 / Te)
  - Estimated persons on board

4.5 Marine notices

MeyGen shall make other marine users and agencies aware of works at the MeyGen site, Inner Sound of the Pentland Firth, by issuing a Marine Notice. This notice will be issued via e-mail a minimum of 14 days prior to the commencement of the works.

The format of this notice is provided in Section 9.1.

The prolongation list to whom this Marine Notice will be issued is included in Section 9.2.

4.6 Emergence Response and Co-ordination Plan

If an emergence incident should occur, the procedures detailed in the Emergence Response and Co-ordination Plan should be enacted.

5 ENVIRONMENTAL PROTECTION

5.1 Pollution prevention

5.1.1 SOPEP

International Convention for the Prevention of Pollution from ships (MARPOL) covers pollution of the marine environment by ships from operational or accidental causes, with Regulation 37 of Annex I of MARPOL requires that all ships of 400 gross tonnage (GT) or more to have an approved Shipboard Oil Pollution Emergency Plan (SOPEP)

As a condition precedent to the vessel entering the MeyGen site the vessel shall provide Oil Pollution Management Plan / Shipboard Oil Pollution Emergency Plan for inspection by MeyGen.

5.1.2 Ballast treatment

The vessel must ensure that the risk of transferring marine non-native species to and from the MeyGen site is kept to a minimum.

As a condition precedent to the vessel entering the MeyGen site the vessel shall submit for inspection by MeyGen copies of:

- Valid certification for the ballast treatment system
- The vessels ballast log for the last 3 months.

5.1.3 Garbage

All waste materials or debris arising during the works are to be removed from the site and disposed at a location approved by the /Scottish Environmental Protection Agency.

As a condition precedent to the vessel entering the MeyGen site the vessel shall submit for inspection by MeyGen copies of:

- Vessel procedures for the storage and disposal of garbage

5.1.4 Discharge of sewage

- Vessel procedures for the storage and disposal of human waste to be provided as a condition precedent to the works

5.1.5 Environmental risk assessment

The Marine Contractor shall provide to MeyGen a copy of their Environmental Risk Assessment detailing their approach to biosecurity management and actions taken to mitigate the risks identified.

The vessel shall be provided for review and endorsement the Marine Contractors Environmental Risk assessment (ERA) and mitigation measures.

Where additional equipment and materials are listed in the ERA, e.g. Oil spill kits. The vessel shall confirm that the presence of this equipment is aboard prior to entering the MeyGen site.

5.2 Limits of Navigation

The vessel shall not navigate within 500m of a seal haul out location, Figure 9. It is therefore required that the vessel remain a minimum of 500m from the coastline to the north and south of the Inner Sound.

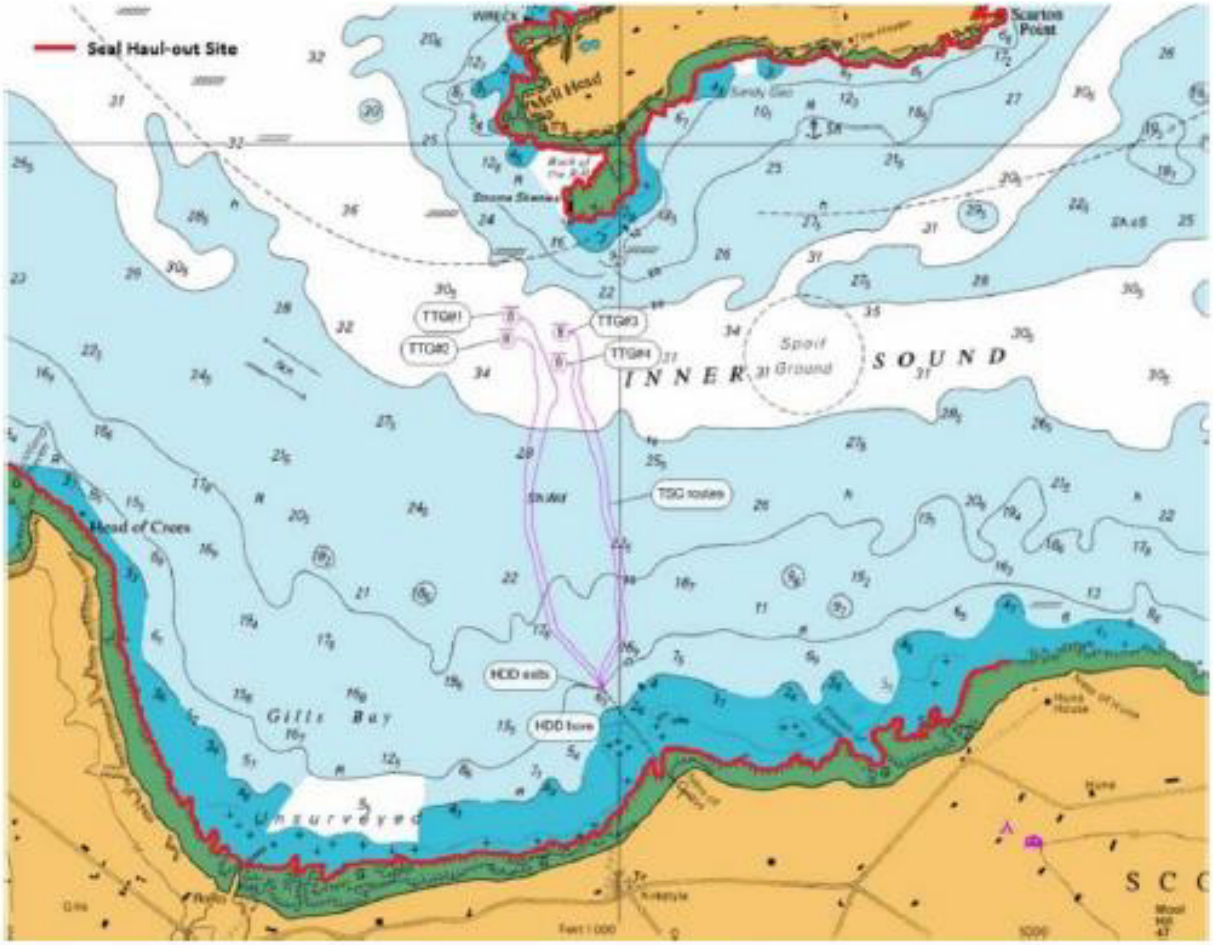


Figure 9 – Seal haul-out sites

5.3 Vessel movements in proximity to wildlife

The vessel master and bridge crew should familiarise themselves with:

- the Scottish Marine Wildlife Watching Code to minimise disturbance from individual encounters, and;
- the Guide to Best Practice for Watching Marine Wildlife with specific regard to vessel movements in proximity to marine wildlife.

Both documents are included in Appendix D9

6 ENVIRONMENTAL REPORTING

MeyGen request that the vessel crew provide support in reporting the sighting of Marine Mammals, these include:

- Atlantic White-sided Dolphin
- Basking Shark
- Bottlenose Dolphin
- Common Dolphin
- Common Seal
- Fin Whale
- Grey Seal
- Harbour Porpoise
- Humbacked Whale
- Minkie Whale
- Northern Bottlenose Whale
- Orca / Killer Whale
- Pilot Whale
- Risso's Dolphin
- Sperm Whale
- Sunfish
- White-Beaked Dolphin

Information to aid identification is included in Appendix A

MeyGen will provide a Marine Mammal Observation reporting sheet in which any sightings can be logged. A copy of this document is also provided in Section 8.

7 DEVELOPMENT SPECIFIC INFORMATION

Having completed the construction and installation of Phase 1A of the MeyGen tidal array the project moved out of the construction and into the Operating phase on the 1st April 2018. The nature of the works conducted during operations has then moved away from the installation of new assets to the preventative and reactive maintenance of existing assets.

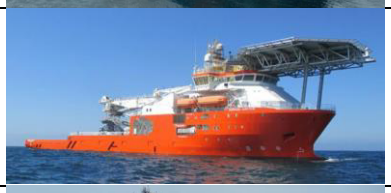
7.1 Recovery and installation of tidal turbines

Tidal Turbine Generator (TTG) are recovery from and installed onto the Turbine Support Structures (TSS) by means of an Offshore Construction vessel. Typical vessels used for these works are listed in Table 3.

All vessels will be equipped with VHF. MF and HF Marine Band Radios as well as satellite communications. Medical facilities will be available onboard. Normal marine channels of communication are monitored at all times.

MeyGen do not require that dedicated medical personnel are provided.

Table 3 – Offshore construction vessels employed at the MeyGen site

Vessel name	Details	Image
Viking Neptune	– Length: 145.6m – Breadth: 31m – Maximum draught: 13m – Crane capacity 400Te – Typical PoB: 30 to 45	
Seabed Stingray	– Length: 120.9m – Breadth: 23m – Maximum draught: 6.6m – Crane capacity 250Te – Typical PoB: 30 to 45	
North Sea Giant	– Length: 153.6m – Breadth: 30m – Maximum draught: 7.5m – Crane capacity 400Te – Typical PoB: 30 to 45	
Normand Jarstien	– Length: 117.35m – Breadth: 22m – Max draught: 7.1m – Crane capacity 250Te – Typical PoB: 30 to 45	
Olympic Ares	– Length: 115.4m – Breadth: 22m – Maximum draught: 7.3m – Crane capacity 250Te – Typical PoB: 30 to 45	
Olympic Challenger	– Length: 105.9m – Breadth: 21m – Maximum draught: 6.6m – Crane capacity 250Te – Typical PoB: 30 to 45	

Siam Daya	– Length: 120.8m – Breadth: 22m – Maximum draught: 6.6m – Crane capacity 250Te – Typical PoB: 30 to 45		

The operations undertaken to recover or install a TTG fall into one of two categories:

1. those which require cable handling to detach or connect the TTG from the Export cable by way of a dry mate, or;
2. those which do not require cable handling to detach or connect the TTG from wet mates.

All works are conducted during slack tide and are limited by the capability of the Work Class ROV aboard the vessel, typically 1.6 knots. The turbines are held onto the turbine foundation under their own weight.

Figure 10 – AHH TTG sat atop a TSS onshore, note that no ballast is on the TSS

7.1.1 Turbines with a dry mate

The three turbines provided by Andritz Hydro Hammerfest are equipped with a dry-mate connector and therefore require cable handling to be conducted during installation or recovery. The typical sequence of

works is listed in Table 4 and a sequence of photos are provided in Figure 11 to Figure 16. The sequence assumes a turbine installation.

Table 4 – AHH turbine installation and recovery sequence

Slack tide	Recovery	Installation
1	Remove rock bags from the export cables.	Install a turning rock bag and inspect the turbine stab on the Turbine Support Structure
2	Recover the dry-mate connector to the deck of the vessel and between slack 2 and 3 break the connector and seal the export cable with a top hat.	Land the turbine onto the Turbine Support Structure and lay the cable tail around the turning bollard and out towards the north where the dry mate is laid to the seabed.
3	Deploy the export cable top hat back on to the seabed and reel in the cable tail towards the turbine.	Recover the export cable top hat from the seabed and between slack 3 and 4 make up the dry-mate connector.
4	Land the lift frame onto the turbine and recover the turbine to deck	Lay the dry-mate to the seabed. Land rock bags onto the dry-mate and export cable as required to ensure the cable is stable on the seabed.

Due to the capabilities of the vessels operating on Differential Position, operations to recover or install an AHH TTG are only conducted in neap tides where the peak flows do not exceed 6 knots. This limits the works to about 7 days every month.

Figure 11 – Export cable recovery

Figure 12 – Landing the export cable on deck

Figure 13 – Dry-mate connected on deck

Figure 14 – Dry-mate being handled for deployment

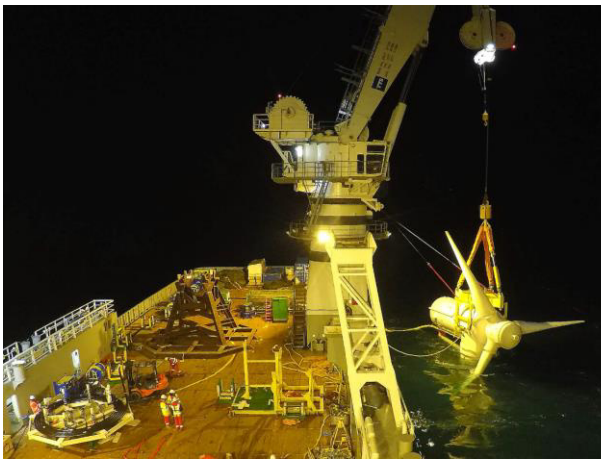


Figure 15 – AHH TTG ready for installation

Figure 16 – Turbine stab being landed onto the TSS

7.1.2 Turbines with wet mates

The single turbine provided by Atlantis Operations UK (AOU) is equipped with wet mate connectors that are passively disconnected or connected as the turbine is recovered or installed. Where the AHH TTG require several slack tides to complete the recovery or installation process, the AOU TTG required just 30 minutes where the flow speed is less than 1.6 knots. Figure 17 shows the AOU TTTG the AR1500 being readied for installation.

Figure 17 – AOU TTG the AR1500

7.2 Operations base

MeyGen utilise Nigg Energy Park as a logistics base from which vessels will mobilise and return and where the TTG are returned for maintenance. The turbines are maintained in Shop1,

Figure 18 – Nigg Energy Park, Shop1 is highlighted in the red box

7.3 Other works

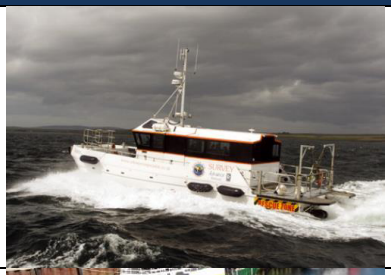
Other planned works include:

- Annual site visual survey
- Cable stabilisation activities

7.3.1 Annual site survey

The annual site survey is conducted over 2 to 5 days depending on the scope of work. The activity uses a small survey vessel, Table 5 and an observation ROV equipped with an HD video camera and survey package.

Table 5 – Survey vessels employed at the MeyGen site

Vessel name	Details	Image
MV Advance	– Length: 15m – Breadth: 5.8m – Maximum draught:0.75m – Typical PoB: 4 to 6	
MV Athenia	– Length: 18.5m – Breadth: 6.1m – Maximum draught: 1.25m – Typical PoB: 4 to 6	

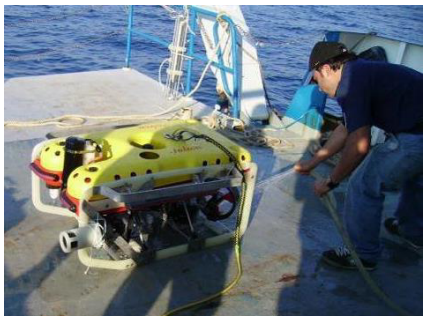


Figure 19 – Falcon ROV being prepared for deployment

All vessels will be equipped with VHF. MF and HF Marine Band Radios as well as satellite communications. Statutory medical equipment will be available onboard. Normal marine channels of communication are monitored at all times.

7.3.2 Infrequent cable stabilisation

The export cables are laid onto the exposed bedrock. Works associated with cable stabilisation are typically focused upon the relocation and installation of 4Te rocks bags onto and up to the cables. The need for these localised stability measures are identified through the annual site inspections.

Visual assessment of the export cables incremental identifies locations where cable stability is recommended. Once a sufficient number of locations have been identified for an offshore operation to the warranted, MeyGen will issue a contract to undertake the prescribed scope. The works will be conducted in a neap tide, but the precise neap tide may be chosen by the marine contractor within an agreed window that could be 4 to 6 months in duration.

The works would be conducted from a multi-cat type vessel being supported by an observation ROV equipped with an HD video camera and survey package. Typical vessels employed in these works are listed in Table 6.

Table 6 – Works vessels employed at the MeyGen site

Vessel name	Details	Image
Isle of Jura	– Length: 33.2m – Breadth: 14.5m – Maximum draught: 4.9m – Speed: – – Typical PoB: 8 to 12	
Green Isle	– Length: 27.7m – Breadth: 12.45m – Maximum draught: 2.85 – Typical PoB: 8 to 12	
C-Odyssey	– Length: 26m – Breadth: 10.5m – Maximum draught: 2.5m – Typical PoB: 8 to 12	

All vessels will be equipped with VHF. MF and HF Marine Band Radios as well as satellite communications. Statutory medical equipment will be available onboard. Normal marine channels of communication are monitored at all times.

8 APPENDIX A: MARINE MAMMAL DESCRIPTIONS

Whales & Dolphins of the Hebrides

The warm water of the North Atlantic Drift enriches the sea around the Hebrides. HWDT have recorded over 15 species of cetaceans in the area.

Common Dolphin (*Delphinus delphis*) Deilf

Description: Distinctive hour-glass pattern on sides. Keen bow-riders & often very active at the surface.
Size: 1.7 to 2.4m
Habitat: Summer visitor to coastal & offshore areas.
Group Size: Usually 30 to 50.

Harbour Porpoise (*Phocoena phocoena*) Peileag

Description: Small size, rounded head (no beak) & triangular dorsal fin. Seldom bow-rides.
Size: 1.4 to 1.9m
Habitat: Seen year-round in coastal areas.
Group Size: Usually 2 to 5.

White-beaked Dolphin (*Lagenorhynchus albirostris*) Deilf-gheal-ghobach

Description: Robust body distinctive white markings. Short beak prominent dorsal fin. May bow-ride.
Size: 2.5 to 2.8m
Habitat: Typically seen in open water and in the northern Hebrides.
Group Size: Usually small groups but larger groups are seen.

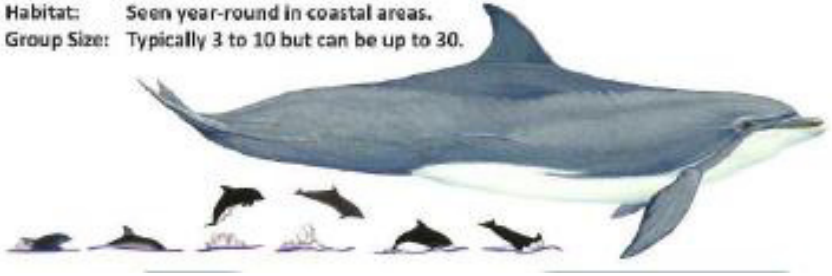
Risso's Dolphin (*Grampus griseus*) Deilf-Risso

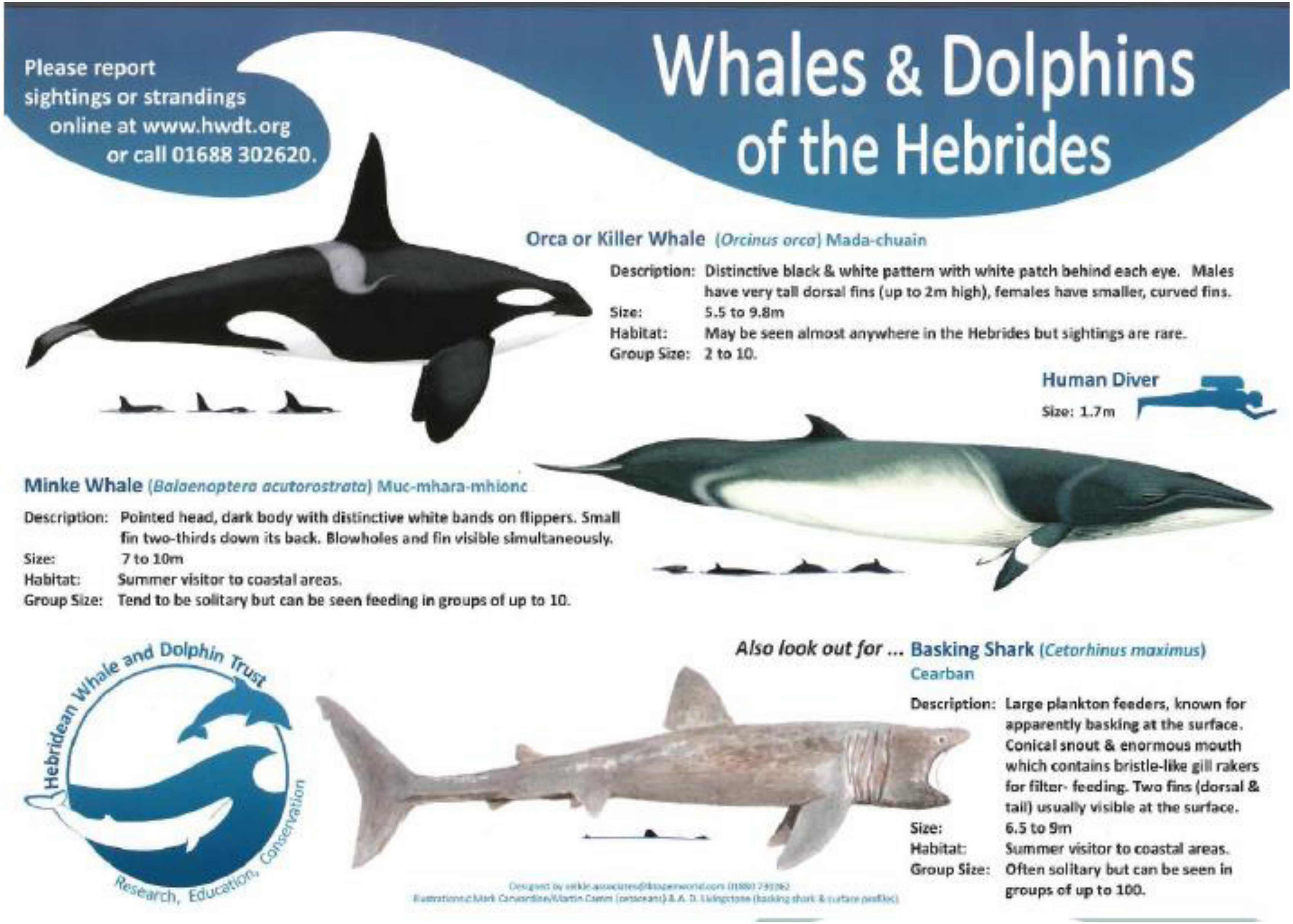
Description: Grey with white scars. Large rounded head (no beak) & tall dorsal fin. Seldom bow-rides.
Size: 2.6 to 3.8m
Habitat: Prefers deep water but may be seen in coastal areas.
Group Size: Usually small groups but can be up to 50.

Human Diver
Size: 1.7m

Bottlenose Dolphin (*Tursiops truncatus*) Muc-bhiorach

Description: Large dolphin with prominent dorsal fin & distinct beak. Highly active & often bow-rides.
Size: 1.9 to 3.9m
Habitat: Seen year-round in coastal areas.
Group Size: Typically 3 to 10 but can be up to 30.





Please report sightings or strandings online at www.hwdt.org or call 01688 302620.
Whales & Dolphins of the Hebrides
Orca or Killer Whale (Orcinus orca) Mada-chuain
Description: Distinctive black & white pattern with white patch behind each eye. Males have very tall dorsal fins (up to 2m high), females have smaller, curved fins.
Size: 5.5 to 9.8m
Habitat: May be seen almost anywhere in the Hebrides but sightings are rare.
Group Size: 2 to 10.
Human Diver
Size: 1.7m
Minke Whale (Balaenoptera acutorostrata) Muc-mhara-mhionc
Description: Pointed head, dark body with distinctive white bands on flippers. Small fin two-thirds down its back. Blowholes and fin visible simultaneously.
Size: 7 to 10m
Habitat: Summer visitor to coastal areas.
Group Size: Tend to be solitary but can be seen feeding in groups of up to 10.
Hebridean Whale and Dolphin Trust
Research, Education, Conservation
Also look out for ... Basking Shark (Cetorhinus maximus) Cearban
Description: Large plankton feeders, known for apparently basking at the surface. Conical snout & enormous mouth which contains bristle-like gill rakers for filter- feeding. Two fins (dorsal & tail) usually visible at the surface.
Size: 6.5 to 9m
Habitat: Summer visitor to coastal areas.
Group Size: Often solitary but can be seen in groups of up to 100.

MARINE MAMMAL RECORDING FORM

From	July	Year	2018
To	January	Year	2019

Marine Works Ref	Vessel name	Sighted by (Rank)	Date of sighting	Time of sighting	Position	Phase of Work	Vessel Activity Transit / on DP	Wind	Sea State	Visibility	Species	Number	Behaviour
Number-Year	Registered Name	Vessel Crew Marine Contractor Client	##/##/## (Local time)	00:00:00 (Local time)	Lat / Long	Pre-Operation Operation Decomissioning	Transit On DP	Beaufort force Direction	Glassy Slight Choppy Rough	Poor (<1km) Moderate (1-5km) Good (>5km)	See Page 2 to 5	Adults / Juveniles	Stationary Travelling (Direction)

9 APPENDIX B: MARINE NOTICE

9.1 Notice format

03-20 NoticeToMariners_August2020.docx

MEYGEN
THE TIDE OF CHANGE IN CAITHNESS

Navigation Warning

Scotland – North Coast – Pentland Firth – Inner Sound

Subsea works

August 2020

Mariners are advised that subsea works are to be conducted at the MeyGen Tidal Array site.

These works will be conducted between **11th to 15th August**, centred on position:

- 58° 39.5'North
- 003° 08.5' West

However, the vessel the Normand Cutter may be encountered anywhere within the Inner Sound.

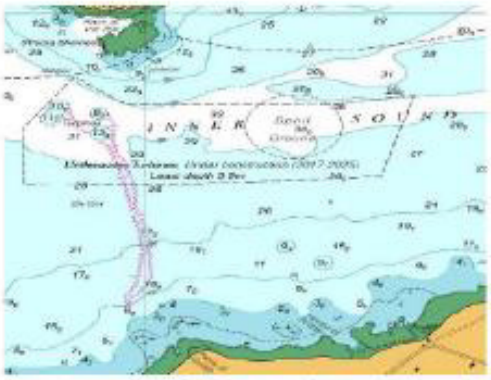


Figure 1 - © UKHO - BA Chart 2581

Vessels involved in operations will be Restricted in their Ability to Manoeuvre (RAM) and will display the appropriate shapes and lights during the operations.

This Navigation Warning expires **20th August 2020**

This notification may be freely distributed

9.2 Prolongation list

Appendix A – Notice to Mariners Prolongation list

- Marine Coastguard: zone2@hmcg.gov.uk, Marine.ops@orkney.gov.uk
- Kingfisher: kingfisher@seafish.co.uk
- UKHO: navwarnings@ukho.gov.uk, sdr@ukho.gov.uk, hdcfiles@ukho.gov.uk
- Marine Scotland: ms.marinelicensing@scotland.gsi.gov.uk, ms.marinerenewables@gov.scot;
- RYA Scotland: admin@ryascotland.org.uk
- Scottish Fishermens Federation: renewables@sff.co.uk
- RNLI: longhope@rnli.org.uk, thurso@rnli.org.uk

  wick@rnli.org.uk
- NLB, Navigation Department: navigation@nlb.org.uk

Local marine contractors:

douglas@leaskmarine.com

jason@greenmarineuk.com

keith.bichan@gmail.com

kris.bevan@northlinkferries.co.uk

malcolm.bremner@wickharbour.co.uk

kathryn@pentlandferries.co.uk

Local ports:

harbour@orkney.gov.uk

info@holylochport.co.uk

Invergordon.Office@seletar.com

Jason.Hamilton@scrabster.co.uk

ops@scrabster.co.uk

Others included in circulation

Richard.wild@orkney.co.uk

b_mowat@yahoo.co.uk

bill.ros1@btopenworld.com

secretary@pentlandcanoeclub.org.uk

10 APPENDIX A – MEYGEN SITE ENTRY PERMIT

MEY-1A-80-TEM-005-F-SITEENTRYPERMIT.DOCX			MEYGEN
1. Project Number:	2. Areas of Access:	3. Date of issue:	
4. Description of work:		5. Valid From:	6. Valid to:
		7. Contractor undertaking the works:	
8. Contractor Person in Charge:		9. Contractor Number & E-mail address:	
10. Vessel Name and Call sign:		11. Number of persons on board:	
12. MeyGen Point of Contact:		13. MeyGen Point of Contact Number:	

14. TTG Status (tick applicable)

TTG#1	TTG#2	TTG#3	TTG#4
Generating ☐	Generating ☐	Generating ☐	Generating ☐
Removed for maintenance ☐	Removed for maintenance ☐	Removed for maintenance ☐	Removed for maintenance ☐
Configured for:	Configured for:	Configured for:	Configured for:
Installation ☐	Installation ☐	Installation ☐	Installation ☐
Recovery ☐	Recovery ☐	Recovery ☐	Recovery ☐
Other:	Other:	Other:	Other:

For installation and Recovery activities the turbine/s shall be / have been configured as per supplier procedures and relevant documentation has been / will be issued.

Signed on behalf of MeyGen:_____(Issuing Authority)

15.TTG isolations (tick applicable)

TTG#1	TTG#2	TTG#3	TTG#4
4.1 kV isolation ☐	4.1 kV isolation ☐	4.1 kV isolation ☐	4.1 kV isolation ☐
1kV isolation ☐	1kV isolation ☐	1kV isolation ☐	1kV isolation ☐
Generation Inhibit[1] ☐	Generation Inhibit[1] ☐	Generation Inhibit[1] ☐	Generation Inhibit[1] ☐
Generation Inhibit – Rotor Locked[2] ☐	Generation Inhibit – Rotor Locked[2] ☐	Generation Inhibit – Rotor Locked[2] ☐	Generation Inhibit – Rotor Locked[2] ☐
Generation Inhibit – Yaw Locked[3] ☐	Generation Inhibit – Yaw Locked[3] ☐	Generation Inhibit – Yaw Locked[3] ☐	Generation Inhibit – Yaw Locked[3] ☐
None ☐	None ☐	None ☐	None ☐

All relevant isolations are / will be in place and where appropriate Permits to Work have been / will be issued under Sgurrenergy Safety Rules.

Signed on behalf of MeyGen:_____(Issuing Authority)

16. Approval of Site Entry Permit

This permit is authorised to requirements of the MeyGen Health and Safety Plan. I the undersigned confirm that safe access to the site exists, and that all persons affected by this task have been informed.

Signed on behalf of MeyGen:_____(Issuing Authority) (E-mail PtW to address in Section 9)

17. Acceptance of Permit to Work

I have read and understand the procedure outlined in MEY-1A-70-PRO-001-F_OffshoreSiteEntryProcedure and have / will provide notification as required to the MeyGen Point of Contact.

Signed:_____(Performing Authority) (*Return scan of the signed PtW to MeyGen PoC)*

18. Project Documents

I have received the MeyGen Phase 1A Emergency and Coordination plan and the MeyGen Phase 1A Vessel Management Plan and shall adhere to any relevant requirements contained within.

Signed:_____(Performing Authority)

19. Completion and closure of Permit to Work

I certify that the works are complete, and all equipment and personnel have departed the site. The works undertaken are reported in _____(Doc Ref)

Signed:_____(Performing Authority) (*Return scan of the signed PtW to to MeyGen PoC)*

[1] Note: TTG rotor may still rotate and TTG may Yaw
[2] Note: TTG rotor shall NOT rotate, but TTG may Yaw
[3] Note: TTG rotor shall NOT rotate AND TTG Shall NOT Yaw

Source document: MEY-1A-70-TEM-016-F-SiteEntryPermit.docx

1

Confidential
Approved for external circulation

11 APPENDIX C – SITE DRAWINGS

Note that the location of the main structures will be accurate to +/-1m and the export cables will be +/-5m.

REV.	DESCRIPTION	APPROVED	DATE
A00	Draft issued for internal review	AH	13/07/17
A01	Final issue	AH	13/07/17
A02	Revised layout based on site inspection	FJ	19/07/19
A03	Project Stroma Assets	FJ	26/07/19

491700.00mE
491800.00mE
491900.00mE
492000.00mE
492100.00mE
492200.00mE
6502300.00mN
6502200.00mN
6502100.00mN
6502000.00mN

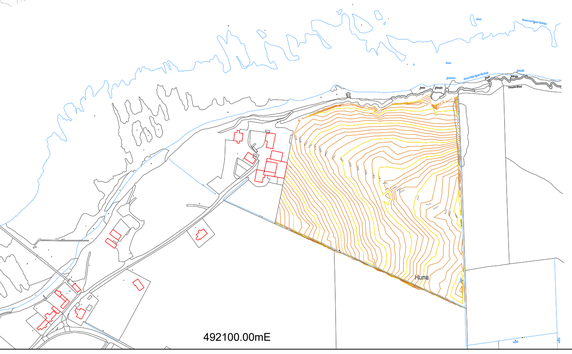
Crown estate Lease (14)
Inner Sound

Section 36 Phase 1 (18)
Marine Licence (17)

NERC
PLATFORM
AREA

Crown estate Lease (14)
Inner Sound

Crown estate Lease
Designated Area (14)



TEL: +44 131 659 9690 - Email: Info@meygen.com

DRAWN BY/DATE	FJ 19/07/19
CHECK BY/DATE	RLH 19/07/19
APPROVED BY/DATE	FJ 25/07/19
DRAWING STATUS	FINAL
DESCRIPTION	MEYGEN_INNER_SOUND
DRAWING/PART NO.	SITE_LAYOUT_25/07/19
REVISION	A03
DO NOT SCALE	REF SCALE 1:750 ON A1
SHEET	7
OF	7

REV.	DESCRIPTION	APPROVED	DATE
A00	Draft issued for internal review	AH	13/07/17
A01	Final issue	AH	13/07/17
A02	Revised layout based on site inspection	FJ	19/07/19
A03	Project Stroma Assets	FJ	26/07/19

491700.00mE
491800.00mE
491900.00mE
492000.00mE
492100.00mE
492200.00mE
6502300.00mN
6502200.00mN
6502100.00mN
6502000.00mN

SEABED DROP-OFF AREA

SEABED DROP-OFF AREA

34.0m

36.0m

36.0m

36.0m

36.0m

TSS 1 Turbine Base
491818.59mE
6502208.52mN
Heading: 272.0°T
Verticality: 1.01°

TSS 2 Turbine Base
491776.28mE
6502123.85mN
Heading: 272.3°T
Verticality: 3.19°

TSS 3 Turbine Base
492027.64mE
6502159.18mN
Heading: 272.0°T
Verticality: 0.56°

TSS 4 Turbine Base
492037.85mE
6502002.53mN
Heading: 269.6°T
Verticality: 1.25°

TTG 2 Export Cable
TTG 1 Export Cable
TTG 3 Export Cable
TTG 4 Export Cable

TEL: +44 131 659 9690 - Email: Info@meygen.com

DRAWN BY/DATE	FJ 19/07/19
CHECK BY/DATE	RLH 19/07/19
APPROVED BY/DATE	FJ 25/07/19
DRAWING STATUS	FINAL
DESCRIPTION	MEYGEN_OFFSHORE
DRAWING/PART NO.	SITE_LAYOUT_25/07/19
REVISION	A03
DO NOT SCALE	
REF SCALE	1:750 ON A1
SHEET	6 OF 7

REV.	DESCRIPTION	APPROVED	DATE
A00	Draft issued for internal review	AH	13/07/17
A01	Final issue	AH	13/07/17
A02	Revised layout based on site inspection	FJ	19/07/19
A03	Project Stroma Assets	FJ	26/07/19

491750.00mE
491800.00mE
491850.00mE
491900.00mE
6502300.00mN
6502250.00mN
6502200.00mN

Rockbags (2x4Te)
RB143 & RB144
491824.32mE
6502301.31mN

TSC1 Export DMC
491810.02mE
6502285.74mN

Rockbag (1x4Te)
RB142
491816.55mE
6502290.89mN

DMC Stabilisation (1 x 4Te RB)
RB141
491810.02mE
6502285.74mN

SEABED DROP-OFF AREA

Rockbag (1 x 4Te)
RB147
491848.20mE
6502295.80mN

Rockbags (2x4Te)
RB145 7 RB146
491826.17mE
6502281.93mN

Turning Bollard (3x4Te)
RB138 & RB139 & RB140
491836.80mE
6502210.50mN

Turning Bollard (1x4Te RB)
RB148
491844.18mE
6502205.69mN

Rockbag (1x4Te)
RB152
491768.25mE
6502193.97mN

Rockbag (1x4Te)
RB153
491773.90mE
6502196.83mN

TSC2 Export Cable DMC
491769.35mE
6502190.90mN

Rockbag (1x4Te)
RB151
491768.43mE
6502191.00mN

TSS 1 Turbine Base
491818.59mE
6502208.52mN
Heading: 272.0°T
Verticality: 1.01°

34.0m

TSC 1 Export Cable
TSC 2 Export Cable

TEL: +44 131 659 9690 - Email: Info@meygen.com

DRAWN BY/DATE	FJ 19/07/19
CHECK BY/DATE	RLH 19/07/19
APPROVED BY/DATE	FJ 25/07/19
DESCRIPTION	MEYGEN_TTG1
DRAWING/PART NO.	SITE_LAYOUT_25/07/19
PROJECT NO.	PHASE1A
CLIENT REF	
REVISION	A03
CERTS/INSPECTION	
MASS - KG	
TOLERANCES UNLESS OTHERWISE STATED: ISO 2768 - mK ALL DIMENSIONS IN mm	
DRAWING STATUS	FINAL
DO NOT SCALE	REF SCALE 1:250 ON A1
SHEET	1
OF	5
3rd ANGLE PROJECTION	

REV.	DESCRIPTION	APPROVED	DATE
A00	Draft issued for internal review	AH	13/07/17
A01	Final issue	AH	13/07/17
A02	Revised layout based on site inspection	FJ	19/07/19
A03	Project Stroma Assets	FJ	26/07/19

491700.00mE 491750.00mE 491800.00mE 491850.00mE

6502200.00mN 6502150.00mN 6502100.00mN

TSC 1 Export Cable
TSC 2 Export Cable
TSCT Jumper Cable

Turning Bollard (3x4Te)
RB138 & RB139 & RB140
491836.80mE
6502210.50mN

Turning Bollard (1x4Te RB)
RB148
491844.18mE
6502205.69mN

Rockbag (1x4Te)
RB152
491768.25mE
6502193.97mN

Rockbag (1x4Te)
RB153
491773.90mE
6502196.83mN

TSC2 Export Cable DMC
491769.35mE
6502190.90mN

Rockbag (1x4Te)
RB151
491768.43mE
6502191.00mN

Rockbag (1x4Te)
RB154
491790.14mE
6502163.43mN

TSS 1 Turbine Base
491818.59mE
6502208.52mN
Heading: 272.0°T
Verticality: 1.01°

34.0m

TSS 2 Turbine Base
491776.28mE
6502123.85mN
Heading: 272.3°T
Verticality: 3.19°

Rockbag (1x4Te)
RB149
491801.97mE
6502119.02mN

Turning Bollard (1x4Te RB)
RB150
491810.51mE
6502121.89mN

TEL: +44 131 659 9690 - Email: Info@meygen.com

DRAWN BY/DATE	FJ 19/07/19
CHECK BY/DATE	RLH 19/07/19
APPROVED BY/DATE	FJ 25/07/19
DESCRIPTION	MEYGEN_TTG2
DRAWING/PART NO.	SITE_LAYOUT_25/07/19
PROJECT NO.	PHASE1A
CLIENT REF	
REVISION	A03
CERTS/INSPECTION	
MASS - KG	
TOLERANCES UNLESS OTHERWISE STATED: ISO 2768 - mK ALL DIMENSIONS IN mm	
DRAWING STATUS	FINAL
DO NOT SCALE REF SCALE 1:250 ON	A1
SHEET	2
OF	5
3rd ANGLE PROJECTION	

REV.	DESCRIPTION	APPROVED	DATE
A00	Draft issued for internal review	AH	13/07/17
A01	Final issue	AH	13/07/17
A02	Revised layout based on site inspection	FJ	19/07/19
A03	Project Stroma Assets	FJ	26/07/19

491950.00mE
492000.00mE
492050.00mE
492100.00mE
6502250.00mN
6502200.00mN
6502150.00mN

Rockbag (1x4Te)
RB161
492023.51mE
6502247.86mN

Rockbag (1x4Te)
RB160
492022.49mE
6502246.98mN

34.0m

TSC3 Export Cable DMC
492046.53mE
6502250.82mN

SEABED DROP-OFF AREA

36.0m

Rockbag (1x4Te)
RB159
492021.09mE
6502245.81mN

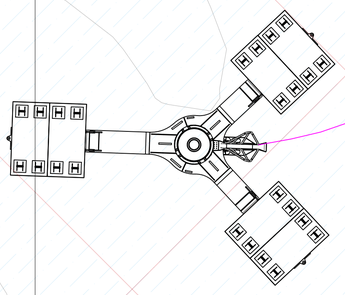
Rockbag (1x2Te)
RB158
492036.64mE
6502242.03mN

Note: Indicative Export Cable Positions. No As-Left Survey Conducted

Note: Indicative Umbilical Cable Positions. No As-Left Survey Conducted

Rockbags (2x4Te) Over Cable Crossing
RB156 & RB157
492065.92mE
6502171.32mN

TSS 3 Turbine Base
492027.64mE
6502159.18mN
Heading: 272.0°T
Verticality: 0.56°



Rockbag (1x4Te) Over Cable Crossing
RB155
492065.92mE
6502171.32mN

Rockbag (1x4Te)
RB162
492062.48mE
6502162.59mN

TSC 3 Export Cable
TSCT 3 Jumper Cable

TEL: +44 131 659 9690 - Email: Info@meygen.com

DRAWN BY/DATE	FJ 19/07/19	DESCRIPTION: MEYGEN_TTG3
CHECK BY/DATE	RLH 19/07/19	DRAWING/PART NO.: SITE_LAYOUT_25/07/19
CERTS/INSPECTION / MASS - KG		
APPROVED BY/DATE	FJ 25/07/19	PROJECT NO.: PHASE1A; CLIENT REF:
TOLERANCES UNLESS OTHERWISE STATED: ISO 2768 - mK, ALL DIMENSIONS IN mm	DRAWING STATUS: FINAL	DO NOT SCALE; REF SCALE 1:250 ON A1; SHEET 3 OF 6; REVISION A03; 3rd ANGLE PROJECTION

REV.	DESCRIPTION	APPROVED	DATE
A00	Draft issued for internal review	AH	13/07/17
A01	Final issue	AH	13/07/17
A02	Revised layout based on site inspection	FJ	19/07/19
A03	Project Stroma Assets	FJ	26/07/19

492000.00mE 492050.00mE 492100.00mE 492150.00mE

6502050.00mN 6502000.00mN 6501950.00mN

Bend Restrictor Apex
492071.94mE
6502029.60mN

TSS4 SITE PREPARATIONS (2Te)
RB169
492020.00mE
6502002.00mN

TSS4 SITE PREPARATIONS (2TE)
RB170
492026.00mE
6501999.00mN

TSS 4 Turbine Base
492037.85mE
6502002.53mN
Heading: 269.6°T
Verticality: 1.25°

Freespan Rectification (4x4Te RB)
RB163, RB164, RB165, & RB166
492091.10mE
6502002.09mN

Flowbec Stabilisation (2x2Te RB)
RB167 & RB168
492058.50mE
6501984.80mN

Note: Indicative Cable Positions

- TSC 2 Export Cable
- TSC 1 Export Cable
- TSC 3 Export Cable
- TSC 4 Export Cable

TEL: +44 131 659 9690 - Email: Info@meygen.com

DRAWN BY/DATE	FJ 19/07/19	DESCRIPTION: MEYGEN_TTG4
CHECK BY/DATE	RLH 19/07/19	DRAWING/PART NO.: SITE_LAYOUT_25/07/19
CERTS/INSPECTION / MASS - KG	APPROVED BY/DATE: FJ 25/07/19	PROJECT NO.: PHASE1A; CLIENT REF:
TOLERANCES UNLESS OTHERWISE STATED: ISO 2768 - mK, ALL DIMENSIONS IN mm	DRAWING STATUS: FINAL	DO NOT SCALE; REF SCALE 1:250 ON A1; SHEET 4 OF 6; REVISION A03; 3rd ANGLE PROJECTION

REV.	DESCRIPTION	APPROVED	DATE
A00	Draft issued for internal review	AH	13/07/17
A01	Final issue	AH	13/07/17
A02	Revised layout based on site inspection	FJ	19/07/19
A03	Project Stroma Assets	FJ	26/07/19

491750.00mE
491800.00mE
491850.00mE
491900.00mE

6502300.00mN
6502250.00mN
6502200.00mN

6.7m
8.7m
8.1m

HDD#1 (2Te)
RB171
492177.4mE
6500638.2mN

HDD#2 (2Te)
RB172
492183.1mE
6500641.9mN

HDD#3 (2Te)
RB173
492190.4mE
6500646.6mN

HDD#4 (2Te)
RB174
492198.5mE
6500646.0mN

TSC 2 Export Cable
TSC 1 Export Cable
TSC 3 Export Cable
TSC 4 Export Cable

	DRAWN BY/DATE: FJ 19/07/19	DESCRIPTION: MEYGEN_HDD_EXIT	
	CHECK BY/DATE: RLH 19/07/19	DRAWING/PART NO.: SITE_LAYOUT_25/07/19	
CERTS/INSPECTION / MASS - KG	APPROVED BY/DATE: FJ 25/07/19	PROJECT NO.: PHASE1A	CLIENT REF / REVISION: A03
TEL: +44 131 659 9690 - Email: Info@meygen.com			
TOLERANCES UNLESS OTHERWISE STATED: ISO 2768 - mK. ALL DIMENSIONS IN mm	DRAWING STATUS: FINAL	DO NOT SCALE REF SCALE 1:250 ON A1	SHEET 5 OF 6 / 3rd ANGLE PROJECTION

12 APPENDIUX D – SMMWC PUBLICATIONS