WESTISLAY TIDAL

ENERGY PARK

volume 1

non technical summary

DP ENERGY MARINE

DBE DEME Blue Energy

Preface

This Non-Technical Summary (NTS) of the Environmental Statement (ES) is prepared, by DP Marine Energy Ltd (DPME), in support of an application for statutory consents for West Islay Tidal Energy Park (the Project).

The Project is being developed jointly by DPME and DEME Blue Energy (DBE) on the behalf of West Islay Tidal Energy Park Limited a special purpose Scottish Company which has been incorporated to build and operate the Project.

The Project consists of the installation of 30MW of Tidal Energy Converters and associated infrastructure including the export cables to landfall on Islay

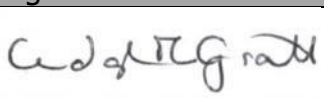
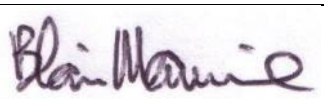
The proposed array of tidal energy devices will be located approximately 6km (at its closest point) from the south west tip of the island of Islay in Argyll and Bute, Scotland. The proposed landfall for the associated electricity export cable will be located adjacent to Kintra Farm on the west coast of Islay.

The Regulatory Authority responsible for assessing the application for consent is Marine Scotland. They will be supported in the assessment process by a number of environmental bodies including Scottish Natural Heritage (SNH).

The Environmental Statement can be viewed during the statutory consultation period at the following locations:

Islay Energy Trust, Custom House, Bowmore, Isle of Islay, PA43 7JJ Tel: 01496 810873	Portnahaven Post Office Portnahaven Isle of Islay PA47 7SH Tel: 01496 860264	Bowmore Post Office, Main Street, Bowmore, Isle of Islay, PA43 7JH Tel: 01496 810366
Port Ellen Post Office, 66 Fredrick Crescent Port Ellen, Isle of Islay, PA42 7BD Tel: 01496 30238	DP Marine Energy Ltd Mill House Buttevant County Cork Tel: +353 22 23955	Scottish Government Library, Victoria Quay, Edinburgh, EH6 6QQ

During the consultation period copies of the Environmental Statement can be purchased from DPME either on CD for a charge of £15 or in hard copy form for £400. Copies of the Non-Technical Summary are available free of charge and a downloadable version is also be available on the West Islay Tidal website: www.westislaytidal.com. Requests for CD and or hard copies of the ES can be made to the DPME address above or by email islay@dpenergy.com

Responsibility	Job Title	Name	Date	Signature
EIA Chapters	EIA Manager	Clodagh McGrath	Monday, 22nd July 2013	
Non EIA Chapters	Project Manager	Blair Marnie	Monday, 22nd July 2013	
Checked	Project Development Engineer	Damian Bettles	Monday, 22nd July 2013	
Approved	Director (DPME)	Simon De Pietro	Monday, 22nd July 2013	
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It should be noted that the NTS and ES has been prepared by DPME supported by DBE with significant input from external sub-consultants on specialist chapters. A review process for Quality Assurance was conducted on all chapters, whether produced by external consultants or internally by DPME.

The NTS has been prepared by DPME with all reasonable skill and care and whilst every effort has been made to ensure the accuracy of the material published in this and associated documents, West Islay Tidal Energy Park Ltd, DPME or DBE will not be liable for any inaccuracies.

These documents remain the sole property of DPME. They are submitted to the Regulators and Local Authorities solely for their use in evaluating the Environmental Impact Assessment for the West Islay Tidal Energy Project. No part of this publication (hardcopy or CD-ROM) or any attachments, addenda and/or technical reports may be reproduced or copied in any form or by any means or otherwise disclosed to third parties without the express written permission of DPME, except that permission is hereby granted to the Regulators to evaluate this Environmental Statement in accordance with their normal procedures, which may necessitate the reproduction of this response to provide additional copies strictly for internal use.

DPME would like to acknowledge the technical support provided by Siemens/MCT, Alstom/TGL and Bluewater/BlueTEC for their considerable assistance in enabling the design envelope to be defined.

The licence numbers for proprietary data referenced in diagrams and maps can be found on individual figures.

Acronyms:

ABC	Argyll & Bute Council
AfL	Agreement for Lease
AIS	Automatic Identification System
ALARP	As Low as Reasonably Practicable
APQ	Area of Panoramic Quality
CFA	Clyde Fishermen`s Association
CMS	Construction Method Statement
DBE	DEME Blue Energy NV
DDV	Drop Down Video
DFO	District Fisheries Office
DIO	Defence Infrastructure Organisation
DPME	DP Marine Energy Ltd
EIA	Environmental Impact Assessment
EMEC	European Marine Energy Centre
EMF	Electro-motive Force
EMaP	Environmental Management Plan
EMP	Environmental Monitoring Programme
ES	Environmental Statement
ERCoP	Emergency Response Co-operation Plan
EU	European Union
FIR	Fishing Industry Representative
FTE	Full Time Equivalent
GVA	Gross Value Added
HRA	Habitat Regulations Appraisal
HSEMS	Health, Safety & Environmental Management System
IET	Islay Energy Trust
MAIB	Marine Accident Investigation Branch
MCA	Maritime & Coastguard Agency
MCT	Marine Current Turbines Ltd
MNNS	Marine Non Native Species
MoD	Ministry of Defence
MS	Marine Scotland
NSRA	Navigational Safety Risk Assessment
NTS	Non-technical Summary
OREI	Offshore Renewable Energy Installation
OSPAR	Oslo & Paris Conventions for the Protection of the Marine Environment
PAD	Protocol for Archaeological Studies
PEXA	Practice & Exercise Area
PIRP	Pollution Incidence Response Plan
PMF	Priority Marine Feature
ReDAPT	Reliable Data Acquisition Platform for Tidal
RN	Royal Navy
RNLI	Royal National Lifeboat Institute
SAC	Special Area of Conservation
SCU	Seascape Character Unit
SFF	Scottish Fishermen`s Federation
SNH	Scottish Natural Heritage

SPA	Special Protection Area
SRSL	SAM`s Research Services Ltd
SSE	Scottish & Southern Energy
TCE	The Crown Estate
TEC	Tidal Energy Converter
TGL	Tidal Generation Ltd
UKBAP	UK Biodiversity Action Plan
UKHO	UK Hydrographic Office
WITEP	West Islay Tidal Energy Park
WSA	Wider Study Area
ZTV	Zone of Theoretical Visibility

Figures:

Tables:

West Islay Tidal Energy Park: Non-Technical Summary (NTS)

1.0 Introduction

This Environmental Statement (ES) has been prepared by DP Marine Energy Ltd (DPME) on behalf of West Islay Tidal Energy Park Ltd (WITEP), a special purpose Scottish Company which has been incorporated to build and operate the project. The project is being jointly developed by DPME and DEME Blue Energy NV (DBE).

The ES has been prepared in support of an application for consent for the WITEP project (the "Project"), a proposed development of a 30MW tidal energy park covering an area of approximately 2.28 km^2 around 6km off the Rinns of Islay in Argyll and Bute in Scotland. The scope of the application includes:

- Tidal Energy Converters (TEC`s);
- Electrical Marshalling or collection hub;
- Inter-array Cabling; and
- Export cabling to the high water mark at Kintra on Islay (the western cable).

Excluded from the application are the following:

- Onshore cabling (overhead or underground);
- Sub-station and cable connection infrastructure;
- Sub-sea Cable from Islay to Kintyre (the eastern cable); and
- Service/monitoring facilities.

This NTS provides an overview of the Project, including information related to the relevant surveys and studies undertaken to inform the EIA process. It outlines the key findings of the impact assessment, mitigation measures to be put in place to reduce or remove impacts and monitoring that will be carried out in order to better understand the resulting impacts identified within the EIA.

2.0 Importance of Tidal Energy

The UK Government and devolved Scottish Government have committed to an 80% reduction in the emission of greenhouse gases by 2050. To contribute to this the Scottish Government has set an ambitious target of generating the equivalent of 100% of Scotland's electricity demand from renewable sources by 2020, compared with the UK wide target of 15%. This is in line with the European Commission's binding legislation, aimed at increasing the average renewable share across the EU to 20% by 2020.

The West Islay Tidal Energy Park and similar renewable energy projects will contribute to achieving these targets. Power generated by Tidal Energy

Converters is a clean source of renewable energy that is not dependent upon finite reserves of fossil fuels.

As the renewable contribution to the energy mix increases, there will be an increased challenge to balance grid supply and demand due to the short term predictability of many renewable sources. In contrast, tidal energy is cyclic and entirely predictable. This gives it the potential to play a more important role in a balanced renewable energy portfolio.

The first developments of small tidal arrays are an essential stepping stone towards a large scale tidal industry.

In addition to contributing to energy targets, the 2010 Marine Energy Action Plan(1) highlights that the development of a strong marine renewables sector in the UK will secure energy supply, create jobs and develop skills which can be utilised by a wider global market.

3.0 The Project Proposers

The Project is being jointly developed by DPME and DEME Blue Energy NV (DBE) on behalf of West Islay Tidal Energy Park Ltd, a special purpose company established to build and operate the Project.

Background information is given below.

3.1 DP Marine Energy Ltd (DPME)

The name DP Energy encompasses a number of companies which operate in the field of renewable energy and sustainable development. Each DP Energy company is a private limited company with the controlling shareholdings being held by Maureen De Pietro and Simon De Pietro.

With a common core of key team members working on projects across the group of companies, there is extensive experience of more than 15 years of developing a range of renewable energy projects. Together they have developed over 180MW of built wind energy projects comprising seven projects and 114 turbines. There is currently a further 109MW in build/ready to build, and 100MW in Ireland, Canada and Australia with grid connection offers in permitting and a further 130MW at various stages of consent.

The team's key strengths and capabilities include managing the site assessments, identifying key environmental and other development issues, stakeholder engagement, risk mitigation and consenting.

DPME is a member of the DP Energy group of companies and was established in 2007 specifically to develop marine energy projects. Together with its development partners, DPME currently holds AfL's for 130MW of tidal energy generation projects.

Since its identification of the Islay site as a potential tidal energy park, DPME has been progressing the development: gathering site specific data, carrying out resource modelling and undertaking environmental assessment in conjunction with our specialist assessors and statutory consultees.

3.2 DEME Blue Energy NV (DBE)

DEME is a large marine construction group with roots dating back 150 years and is one of the leading contractors in the sector and one of the pioneers in the development of offshore wind energy. The DEME group has significant in-house resources for marine construction and installation works including a large specialised fleet and support plant and equipment. DBE was established to develop and invest in Blue Energy (wave and tidal energy) projects. DEME's direct experience with installing the SeaGen device at Strangford Lough in Northern Ireland attributes them a unique position to assess and minimise the risks for future installation of similar devices.

4.0 Project Location

4.1 Tidal Site

The tidal energy site is centred on latitude 55.65°N and longitude 6.60°W and is illustrated in Figure 1.1 on Admiralty Chart 2723.

It occupies an area of around 2.28km^2. The outline of the development area is shown on Figure 1.2 and is marked by the labels A1 to A14 (coordinates given in Table 1.1 below).

ID	Latitude (Deg)	Longitude (Deg)
A1	55.66015	-6.59656
A2	55.65348	-6.59727
A3	55.65253	-6.59004
A4	55.65787	-6.58909
A5	55.65754	-6.58472
A6	55.65753	-6.58424
A7	55.64893	-6.58668
A8	55.64821	-6.59026
A9	55.64757	-6.59351
A10	55.64702	-6.59794
A11	55.65778	-6.62045
A12	55.66206	-6.62527
A13	55.66693	-6.61607
A14	55.66056	-6.61121

(WGS 1984)

Table 1.1: Co-ordinates of Proposed Development Area.

4.2 Marine Cable Route

The proposed cable route, illustrated in Figure 1.1, runs from the tidal energy site approximately 21km east to landfall at Kintra (131700E and 648200N) on the island of Islay. The route proposed is defined by the labels A1 to A4 (coordinates shown in Table 1.2 below).

ID	Latitude (Deg)	Longitude (Deg)
1	55.65583	-6.58774
2	55.65929	-6.58465
3	55.65915	-6.55336
4	55.65492	-6.51843
5	55.65976	-6.37797
6	55.65897	-6.32329
7	55.65801	-6.2796
8	55.65622	-6.26187

(WGS 1984)

Table 1.2: Co-ordinates of Sub-sea Cable Route to Islay.

5.0 Project Details

5.1 General

The development comprises of between 15 and 30 Tidal Energy Converters (TECs) delivering a maximum installed capacity of 30MW together with the associated infrastructure required to export the generated energy to the shore on Islay.

5.2 Project Design Envelope

Although tidal energy generation is not new, the technology intended for wide scale extraction of energy from the ocean tidal streams and conversion to electricity is. There is wide design divergence and rapid technology advancement amongst manufacturers. In addition there is considerable fluidity in the industry with major companies taking over smaller technology suppliers.

Full scale devices have only been deployed relatively recently. Information from these deployments, at the European Marine Energy Centre (EMEC) and elsewhere is being continually fed back into ongoing product and deployment development.

In order to take advantage of this continuous, and often stepped, improvement of the technology it is essential in the consenting process to retain a degree of flexibility in the final device selection.

Thus, the Environmental Impact Assessment (EIA) has been completed whilst there remains a degree of uncertainty relating to installation techniques, foundation types, turbine size, exact location and specific technology design. The challenge for the EIA process is to ensure all of the possible impacts are considered to accommodate this uncertainty and this is accomplished by defining a "Project Design Envelope" or "Rochdale Envelope" [(2)]. This approach allows a meaningful EIA to be undertaken by defining a set of "worst-case" parameters

that would accommodate a range of devices and thereby enable decision makers to consider the wider envelope in order to evaluate the acceptability of the environmental impacts of a project.

As long as a project's technical and engineering parameters fall within the limits of the envelope and the EIA process has considered the impacts of that envelope and provides robust and justifiable conclusions, then flexibility within those parameters is deemed to be permissible within the terms of any consent granted.

5.3 Tidal Turbines

Although standardisation of technology solutions for extracting tidal energy is yet to be reached, there is a clear mainstream technology strand developing based on a turbine utilising an un-ducted horizontal axis rotor. Manufacturers that have adopted this approach include: MCT Siemens, TGL Alstom, Hammerfest Strom, Voith Hydro, Kawasaki, Tocardo and Atlantis.

For the purposes of the EIA and definition of the Design Envelope, two specific models of TEC have been used as a reference. These are the Siemens Marine Current Turbines (MCT) SeaGen S Mark 2, a twin rotor 2MW machine as shown in Figure 1.3 and the Alstom Tidal Generation Ltd (TGL) single rotor 1MW turbine as shown in Figure 1.4. Alternative floating support structure systems have also been considered as part of the EIA using the Bluewater BlueTEC floating platform (Figure 1.5) as reference for the design envelope.

The requirement for the different reference devices, is that whilst the rotor and turbine designs are similar in terms of the EIA evaluation, the support structures are fundamentally different.

Figure 1.3: Siemens Marine Current Turbines (MCT) SeaGen S Mark 2

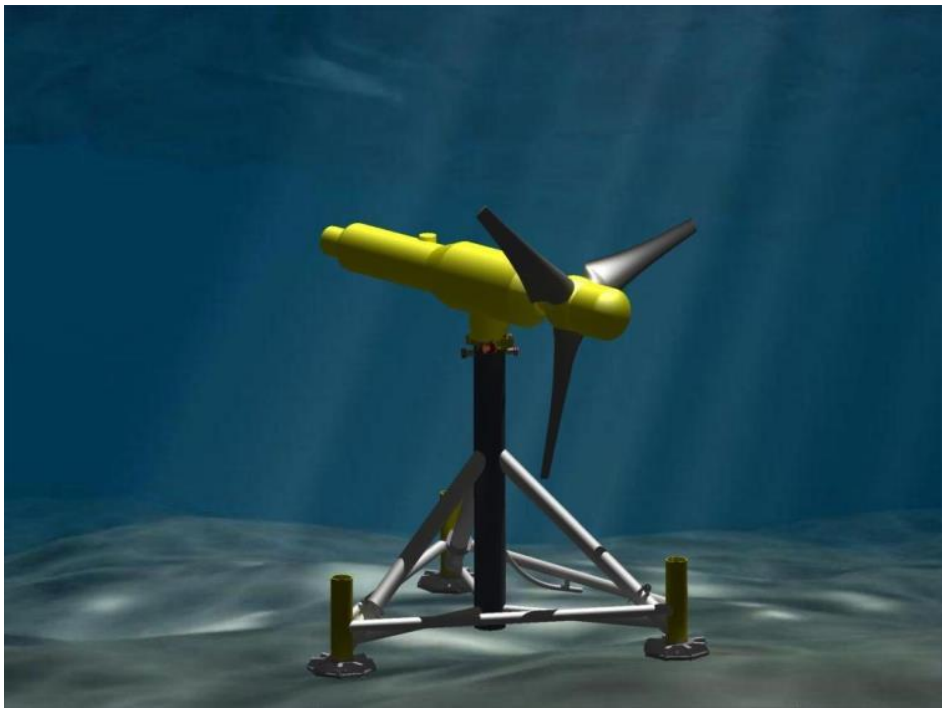

Figure 1.4: Alstom Tidal Generation Ltd (TGL) 1MW Turbine

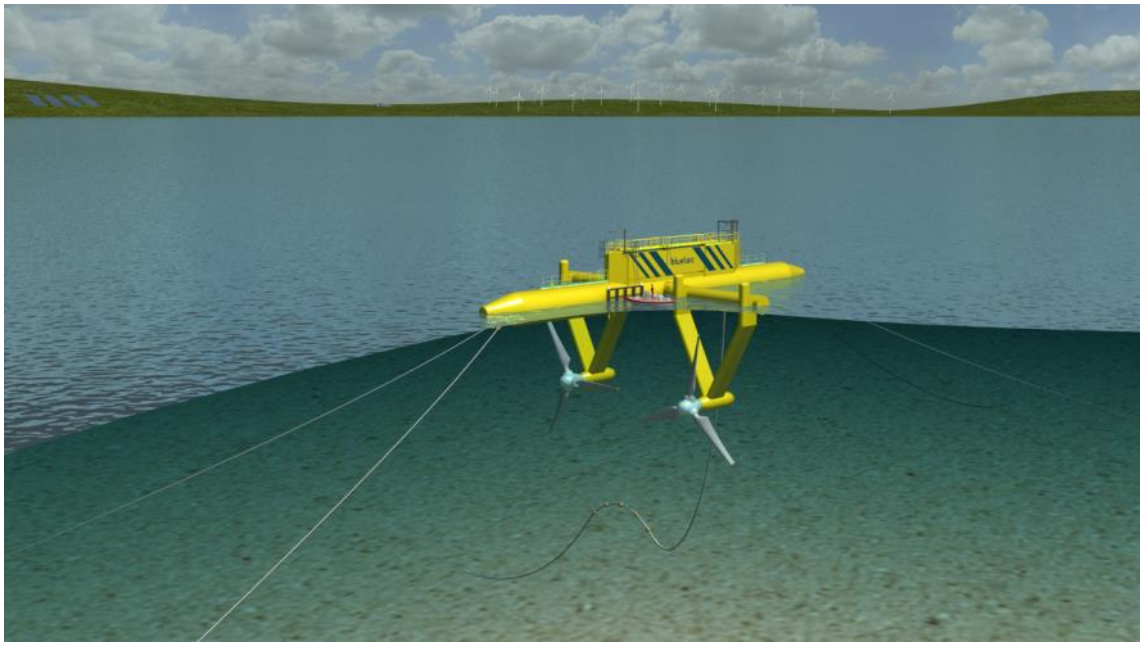

Figure 1.5: Bluewater BlueTEC Floating Platform

5.4 Inter-array Cabling

The exact nature of the inter-array cabling will be dependent on the TEC selection, however it is likely that the TECs will be clustered in to as many as three groups and either individually connected to a localised marshalling unit before export to shore, or connected in a "daisy-chain" fashion. The marshalling point could be either a dedicated seabed mounted or floating unit, or, in the case where Seagen S units are selected it could be within the structure itself.

The inter-array cables are typically 3-core copper conductors with insulation, conductor screening and steel wire armouring. All cables will contain optical fibres embedded between the cores. The cable dimensions will depend on the load current that the cable is required to carry and this will be dependent on the layout design and whether machines are daisy chained or individually connected back to the marshalling points.

Approximately 20km of inter-array cabling will be installed directly onto the rock seabed and configured to utilise localised fissures where possible and to be laid in parallel to the tidal flow where this is not possible. Where necessary, the cables will be weighed down by the use of cable protectors, concrete mattresses or rock bags

5.5 Export Cabling

One or more double wire armoured sub-sea cables per defined cluster will be installed back to landfall on Islay with an expected export voltage of 33kV. The exact number of clusters is still to be defined. Higher voltage options are also being considered in order to reduce transmission losses.

The 3-core cable being considered comprises copper conductors with integral insulation, core screening, and steel armour (for stiffness and impact resistance). The cable would have a polypropylene outer sleeve with an external diameter of approximately 150mm (33kV) and 300mm (132kV). The AC cable will also include internal fibre optic communication links for control purposes.

Similar techniques as those used for the inter-array cabling described above will be used for installation of the export cable(s). It is likely that rock bags will be used at intervals on the western end of the export cable where the tide is more aggressive and the sea-bed is made up of rock. Further east there is the potential for self-burial. However, the ES considers a worst case scenario of 100% of the cable covered with ballast to a width of 4m either side of the cable.

5.6 Cable Landfall

Due to the characteristics of the chosen landfall location, it is anticipated that the cable will be laid in a trench approximately 2m deep through the surf zone and across the beach. After the cable has been pulled ashore the trench in the tidal zone will be backfilled to its original condition with beach sand. The trench will extend a suitable distance from the shoreline to ensure the cable is not visible and safely away from human contact.

5.7 Turbine Layout

The turbines are generally aligned in rows perpendicular to the most energetic ebb and flood currents. For Islay these primary flows are orientated approximately 160 and 340 degrees from North respectively as illustrated in Figure 1.6 and Figure 1.7. The two indicative layouts include one option for 15 SeaGen S turbines and one for 30 TGL turbines. The exact turbine locations will be confirmed following detailed site geotechnical survey, turbine selection, resource assessment and foundation design.

6.0 Environmental Impact Assessment

6.1 Legislative Context

The ES is submitted as part of the consent application for the Project, as required under European, UK and Scottish legislation. The EIA process required regular communication with the consenting authority, Marine Scotland and their advisor, Scottish Natural Heritage (SNH) to ensure that the ES will provide the information needed for an informed consenting decision to be made.

The Project will require consent under the following legislation:

- Section 36 of the Electricity Act, 1989; and
- A Marine Licence under Section 20 of the Marine (Scotland) Act 2010.

Under the EC Directive on the conservation of natural habitats and of wild fauna and flora (also known as the 'Habitats Directive') it is necessary for a Habitats Regulation Appraisal (HRA) to be carried out for a development which has potential to impact a European designated site, including Special Areas of Conservation (SAC) or Special Protection Areas (SPA). An HRA was undertaken to

evaluate the likely significant effects (LSE) arising from the Project addressing Special Areas of Conservation for marine mammals, along with Special Protection Areas for birds.

As part of the HRA, for marine mammals and basking sharks SNH concluded that there are no likely significant effects arising from the development, either alone, or in-combination with other plans or projects, and therefore appropriate assessment is not required. The HRA screening report for birds concluded that there is no potential for the development to have an LSE on any qualifying ornithological feature at a Natura site. SNH advised, through applying their screening criteria, that there is potential for LSEs on breeding auk qualifying features (guillemot, razorbill and puffin) at six Natura sites. These potential LSEs will require to be examined in more detail through the process of Appropriate Assessment by the regulator. A document of supporting information has been provided to accompany the application for the Project and to inform the HRA process.

6.2 EIA Process

6.2.1 Scoping Opinion and Consultation

The EIA for the project commenced in 2008, with collation of available information to identify the likely impacts and data gaps, to define which specific surveys and other studies would be required to inform the EIA. Pre-scoping meetings were held with statutory consultees including SNH, RSPB, Argyll & Bute Council and the Consents Unit of the Scottish Government. In addition, letters were sent to statutory consultees advising of the proposed project and requesting views as to the potential issues.

In May 2009 a Request for a Scoping Opinion [(3)] was submitted to The Consents Unit (the consenting authority prior to Marine Scotland) formally requesting a scoping opinion. Prior to responses being issued a series of clarification meetings were held with key consultees (SNH, RSPB, Clyde Fishermen's Association, Argyll and Bute Council and The Scottish Government Consents Unit). Consultation has being ongoing with Marine Scotland and SNH to discuss the progress of the EIA and supporting studies, ensuring that it meets their requirements. Further consultation and briefing on the project has been carried out with a range of other statutory and non-statutory organisations.

Public consultation has also been on-going with two sets of open days held in 3 different locations on Islay, one in September 2012 and one in April 2013. Consultation will continue beyond the submission of the ES. Assuming successful award of project consent, licence condition implementation will require continued engagement and consultation with the regulators and their statutory consultees. In addition, DPME will continue its communication with the local community to keep them informed of project progress and key milestones.

6.2.2 Data Collection

In order to assess the likely impacts of the Project it is important to understand the baseline environmental conditions at the site. A wide range of surveys were conducted by specialists, including:

- Mammals and Basking Sharks;
- Benthic Ecology;
- Otters;
- Birds;
- Archaeology
- Shipping and Navigation
- Landscape & Seascape, and
- Noise;

Studies for other receptors such as natural fish, commercial fisheries, Recreation & amenity, Socio-Economic and the Ministry of Defence (MOD) have been undertaken through desk based literature review as well as consultation with relevant experts and stakeholders.

6.2.3 Impact Assessment

Each impact assessment follows a procedure which considers the magnitude of the impact, based on extent and longevity, as well as the sensitivity of the receptor. The impact is then given a significance rating of major, moderate, minor or negligible. Where possible, mitigation is suggested to reduce the potential impact, particularly if the impact is predicted to be of major or moderate significance. The assessment is ultimately informed by the judgement of impartial experts in each field.

7.0 Site Selection

Islay is one of a number of potential tidal energy sites that DPME assessed against the following principal criteria:

- Available resource;
- Resource constraints;
- Social and environmental considerations;
- Installation, maintenance and operation considerations; and
- Grid connection feasibility.

The individual merits of each site were subsequently examined in more detail and the project site was finally selected as the preferred option based on the following attributes:

- The potential installed capacity is in excess of 300MW;
- The tidal flow velocity has a magnitude around 3.0m/s (msp);
- The bathymetry (between 25m and 50m) and sea bed profile match the requirements of potential TEC devices;
- There is no major shipping activity across the site;
- There are no areas designated for their nature conservation importance (SACs and SPAs), important fish spawning areas or important habitat sites for cetaceans within or in the immediate vicinity of the site; and
- There are no significant fishing or recreational activities on the site.

The most significant development risk identified at the preliminary review stage after technology is that of electrical grid availability although this is something the West Islay Tidal site has in common with most of the tidal energy park site alternatives.

8.0 Potential Impacts

This section describes the potential impacts on the Project on various receptors.

8.1 Marine Physical Environment and Coastal Processes

The Project has the potential to impact upon three elements of the marine physical environment and coastal processes, namely:

- Hydrodynamic regime (water flow);
- Sediments and sedimentary processes; and
- Geological and geomorphological formations.

Potential changes to the hydrodynamic regime are expected to be relatively localised around the device foundations and the cables that link the devices. This has been informed by Siemens/MCT in their recent assessment of their Kyle Rhea project [(4)] which drew on data obtained from Strangford Lough following the installation of the SeaGen S Mk 1 device.

The geology of the south-eastern half of the site is dominated by sea-bed outcrops of very hard crystalline rock of the Rinns Complex. The north-western half of the site has sandy gravel at the sea-bed overlying variably thick firm to thick glacial till (boulder clay) which overlies the crystalline rock. The Kintra cable route geology consists of a variably thick layer of till overlying the above mentioned crystalline rock at the turbine site then gravely sand overlying the glacial till (boulder clay) as the route heads east. This till outcrops at the sea-bed at the eastern end of the route. Therefore, the potential for the foundations and cabling to alter sedimentary processes are restricted through the absence of mobile sediment as the seabed is mostly bedrock and cobbles.

The Project will have a small effect on tidal currents over a downstream distance of several kilometres, but will only have a significant effect on currents, waves and sediment distribution over a distance of about 100m. The cables and cable landfall will affect surface sediment processes over a narrow corridor of 50m due to trenching and placement of protection. Suspended sediment due to cable trenching and pile installation will be dispersed rapidly over a wide area.

There are no predicted cumulative impacts with other existing or proposed developments.

8.2 Mammals and Basking Sharks

A marine mammal and basking shark baseline report (Technical Appendix 7.1) was produced using a combination of a desk-based study and an analysis of the baseline data collected during two years of visual and acoustic surveys.

Both cetaceans and pinnipeds representing five species were positively identified on the transect legs within the development site and associated buffer region. The cetaceans were harbour porpoises (*Phocoena phocoena*), bottlenose (*Tursiops truncatus*) and Risso's dolphins (*Grampus griseus*) while the pinnipeds were common (or harbour, *Phoca vitulina*) and grey seals (Halichoerus grypus), all of which occur regularly within the UK shelf area.

In summer of year 1 the survey effort was expanded (on behalf of bird surveys) with additional legs being added northward up to Colonsay (visual and acoustic effort) and southward to Rathlin (acoustics only). The seven Colonsay trips added two other species (minke whales and basking sharks) to the sightings list.

In addition to the ship-based surveys, a seabed mounted passive acoustic recorder (C-POD) was tested for three months in the summer of 2010. This proved capable of recording odontocete echolocation sounds and was not overly disrupted by high levels of ambient sound normally experienced in tidal sites. Porpoise click trains were recorded throughout the 94 day deployment and totalled 291 separate detections.

Marine mammal species occur in low numbers at the development site. Species that were recorded at the site, or considered likely to occur regularly are considered in the impact assessment. The site hosts a representative selection of cetacean and seal species which are widely distributed in the northeast Atlantic. Certain species (e.g. minke whale) were not observed in the area during the surveys but might occasionally occur in or near the development site.

Population structures of marine mammals and other species in the area would suggest that all species range widely across a large area that may include the development site, but there is currently no data to suggest that particular individual animals or subpopulations are preferentially associated with the site. It should be noted that the species composition and relative abundance of the large marine vertebrate fauna in this area may change over time, including under direct or indirect influence of anthropogenic climate change.

For certain species, it could not be concluded that they would never occur at the site, but their occurrence would be sufficiently low that the risk of any interaction resulting in impact would be likely to be insignificant.

A summary of impacts before and after proposed mitigation measures is provided in Table 1.3 below. The differences in sensitivity between different marine mammal (and basking sharks) species were considered throughout the EIA, and the representative category assigned in this table is applicable to all species (considering the most sensitive where relevant).

Potential Effect	**Residual Impact Significance**	**Mitigation**
Injury and disturbance due to noise and presence of construction vessels and activities	Minor - insignificant	No mitigation deemed necessary, although a Marine Mammal Observer (MMO) may be used during construction activities to halt operations if marine mammals (or basking sharks) are observed within close range of the

Potential Effect	Residual Impact Significance	Mitigation
		construction activities.
Injury and disturbance due to noise and presence of construction vessels and activities	Minor - insignificant	No mitigation deemed necessary, although a Marine Mammal Observer (MMO) may be used during construction activities to halt operations if marine mammals (or basking shark) are observed within close range of the construction activities.
Displacement leading to habitat exclusion and barrier effects	Negligible	No mitigation deemed necessary.
Collision with operating turbines	Moderate	No mitigation is deemed necessary. To the extent feasible at this site, DPME commit to undertaking monitoring studies to assess the actual level of impact arising from the West Islay Tidal Energy Park.
Collision with maintenance vessels	Minor	See above (corkscrew)
Electromagnetic Fields (EMF)	Negligible	No mitigation deemed necessary.
Accidental release of contaminants	Minor	No mitigation deemed necessary.
Indirect impacts of changes to prey resource	Negligible	No mitigation deemed necessary.

Table 1.3: Summary of Potential Impacts, Mitigation Measures & Overall Significance

The proposed turbine array is predicted to have a negligible or minor effect on marine mammals and basking sharks relative to most impacts. Only the assessment of collision risk resulted in a conclusion of moderate which is to a great extent due to the uncertainty inherent in the modelling exercises, and will be treated accordingly through the development of a monitoring plan. This will ensure that knowledge is gained regarding the actual level of impact, with mitigation measures to be developed where necessary.

As marine mammals range across the wide area to the west of Scotland, there is potential for cumulative displacement of marine mammals from the Islay Offshore Windfarm and the West Islay Tidal Energy site, during construction of the windfarm. It is considered that due to the open ocean nature of the area to the south west and west of Islay, and the lack of apparent importance of any particular area for marine mammals, the use of alternative locations for behaviour such as foraging is considered feasible and sufficient to enable a conclusion that this risk is insignificant.

An Environmental Management Plan (EMaP) will be developed through discussion with the regulatory authorities to ensure that the purpose of the monitoring is agreed, that objectives are set according to consensus on the ability to detect change attributable to the development; and that this is considered according to a reasonable cost / scale of studies, proportionate to the level of risk identified.

8.3 Benthic Ecology

8.3.1 Tidal Site

A desk based review of available literature was carried out, detailing the benthic ecology of the region around the proposed Tidal Site and Western Export Cable Route. The review of the existing information and data was used to develop an appropriate survey strategy for site specific characterisation within and around the proposed Tidal Site and Western Export Cable Route, and to place the subsequent results in a regional context

Site specific surveys were undertaken in and around the tidal site and western export cable route in July and August 2012. Sampling techniques included Drop Down Video (DDV) survey, Epibenthic Beam Trawls and Benthic Grab Sampling, as well as intertidal biotope surveys. The site specific DDV surveys (Technical Appendix 8.1) provided the evidence that the benthic habitat at this location is predominantly rugged bedrock and boulders. These findings support the results of the earlier DDV survey within the site (ERT, 2008)[5] and are broadly in line with the UKSeaMap 2010 [6].

Two biotopes were found within the Tidal Site (Table 1.4). *A mixed turf of bryozoans and erect sponges with Sagartia elegans on tide-swept ciraclittoral* rock was found on the shallower bedrock.

Biotope Description	**Number of Video Stations**	**Video image**
Tubularia indivisa on tide-swept circalittoral rock	16	
Alcyonium digitatum with dense *Tubularia indivisa* and anemones on strongly tide-swept circalittoral rock	4	
Mixed turf of bryozoans and erect sponges with *Sagartia elegans* on tide-swept circalittoral rock	17	

Table 1.4: Biotopes Assigned in and Around the Tidal Site.

The biotopes found within the Tidal Site are listed under the European Habitats Directive as indicative of Reef Habitat. No UKBAP species were recorded during the DDV survey of the Site Survey Area, and no PMF or OSPAR habitats or species have been recorded. Thus, although some of the habitats may represent those listed under protection mechanism; the areas do not represent outstanding examples of these habitats, which are found throughout south west and western regions of Scotland.

The habitats on which these biotopes are recorded (high energy circalittoral rock) are widely represented along the west coast of Scotland, and as such the footprint of the turbines and inter array cable within the 2.28km^2 Tidal Site is considered to represent a very small proportion of the potential distribution of these biotopes. In addition, the benthic communities associated with these biotopes are adapted to high energy environments, and as such are likely to be subject to natural environmental change.

During construction and decommissioning of the Project pressures within the Tidal Site are expected to largely be localised to the foundations of the devices and inter array cable, and since they are temporary in nature, are thus of minor or negligible magnitude.

During operation, while potential pressures are exerted over a longer term, they are considered to be of minor magnitude, and it should be noted that the presence of additional hard substrate available for colonisation may mitigate against loss of original habitat as reported within the Strangford Lough SeaGen Environmental Monitoring Programme [(7)].

8.3.2 Western Export Cable Route

The site specific surveys (Appendix 8.1) revealed that the Western Export Cable Route close to the Tidal Site is comprised of bedrock and rocky substrate with sparse sedimentary materials. Moving east towards Laggan Bay the Western Export Cable Route crosses a deep water channel and the substrate here is predominately comprised of pebbles and shelly gravel. The sea floor gradually rises eastwards along the proposed Western Export Cable Route and large boulders become prevalent across the gravelly sand and pebble substrate. Some predominantly sandy stations were located along the route, but were scattered with boulders. The eastern end of the Western Export Cable Route within Laggan Bay lies at a depth of about 23m 2.5km from the shoreline and the substrate here is characterised by a large number of boulders. Geophysical data collected in March 2013 confirms the depth and distribution of substrate types along the Western Export Cable Route

Biotopes found at the western end of the Western Export Cable Route may represent examples of Annex I habitats as listed under the European Habitats Directive [(8)]. No UKBAP species were recorded during the DDV survey of the Site or Export Cable Route Survey Area, and no PMF or OSPAR habitats or species

have been recorded either. Reef habitats may represent those listed under international protection mechanisms; however, the areas do not represent outstanding examples of these habitats and are widespread in the waters west of Islay.

An assessment of potential pressures relevant to benthic ecology was carried out for the construction, operation and maintenance and decommissioning phases of the Western Export Cable Route for the Project. This assessment identified a number of key pressures, including loss of habitat and associated species through direct physical impact and substratum loss (both temporarily during construction and installation, and for the operational life of the project), introduction of MNNS, smothering, hydrodynamic change, contamination and habitat change.

The area of seabed habitat which will be impacted by the Western Export Cable Route is considered to be very small, and the habitat is represented widely across west and south west Scotland. The biotopes present vary in sensitivity to pressures that are likely to occur during construction, operation and maintenance and decommissioning of the project. Many of the species present are sedentary and so are vulnerable to many of the pressures. However, in an inherently high energy environment such as a tidal energy site, it is likely that there is frequent movement of bounders, and associated habitat disturbance leading to continual successional development. The quick recovery times of associated species and limited geographical extent relative to the natural range of the affected biotopes mean that the overall effects of the proposed development will not adversely affect the distribution of benthic ecology receptors in the region.

8.4 Otters

An otter survey was conducted on 15th and 16th September 2012 at the intertidal zone at the export cable landfall site plus a 200m Buffer Zone at Kintra on Islay using standard methodology and using an appropriate field guide.

The intertidal field survey was completed under optimal weather conditions, and no evidence of otters was found at the export cable landfall site at Kintra. However, the Hebrides are a stronghold for this species and the coastal waters around Islay offer excellent foraging habitat. Therefore, although otters are not resident at the export cable landfall site, it is possible that they will at least forage in the area on occasion.

An assessment of potential effects on otters at the export cable landfall site at Kintra was carried out. This assessment identified the potential for a significant effect during the construction and installation phase, which may be repeated during the decommissioning phase if the cable cannot be left in-situ. However, measures are detailed to mitigate this potential impact. After mitigation is employed, no significant effects are predicted for otters in the intertidal zone.

8.5 Birds

The Birds baseline survey work was undertaken over two years and informed the environmental impact assessment and the results for each species in the context

of regional population estimates are presented in chapter 10: Birds and the associated Technical Appendices

Eleven seabird species were regularly recorded using the development area during the 20 baseline bird surveys visits undertaken between October 2009 and August 2011.

During the breeding season the numbers of individuals of each seabird species that use the development area (and surrounding nominal 1km buffer) are small or very small in the context of the size of regional breeding populations. It is concluded that the development area is of low or very low importance for regional populations of seabirds during the breeding season. The marine element of the project is too far offshore (approximately 6km at its closest from the nearest land on Islay) to cause effects on terrestrial bird species.

All anticipated impacts are considered to be of negligible or minor magnitude to seabird species and in all cases are judged to be either of negligible or minor significance under the terms of the EIA Regulations.

Predicted impacts, mitigation and residual impacts are summarised in Table 1.5 below.

Impact description	**Receptor populations**	**Initial impact**	**Mitigation**	**Residual impact**
Construction phase				
1: Vessel disturbance of seabirds	All seabird species	Negligible significance	Not required, but good practice will be for project vessels to stick to the defined routes and adopt a voluntary speed limit of 15km/hr.	Negligible significance
2: Direct habitat loss	All seabird species	Negligible significance	None.	Negligible significance
Operational phase				
3: Vessel disturbance of seabirds	All seabird species	Negligible significance	See Impact 1.	Negligible significance
4: Seabird displacement from, and attraction to, marine habitats	All seabird species	Negligible significance	Ensure that all potential perching locations are safe for birds.	Negligible significance
5: Collision risk to diving seabirds.	Guillemot, razorbill, puffin	Negligible significance	Should there be evidence of collision mortality, measures will be considered that aim to prevent it occurring.	Negligible significance
6: Marine pollution and contamination	All seabird species	Negligible significance	Ensure that all potential perching locations are safe for birds.	Negligible significance
Decommissioning phase				
7: Vessel disturbance of seabirds	All seabird species	Negligible significance	See Impact 1.	Negligible significance
8: Habitat reinstatement	All seabird species	Negligible significance	Good practice guidance on habitat reinstatement prevailing at the time will be followed.	Negligible significance

Table 1.5: Summary Predicted Impacts, Mitigation & Residual Impacts on Birds

It is also concluded that the likely cumulative effects of the proposed development together with the other proposed renewable energy developments in the region on bird populations of all species are not significant under the terms of the EIA Regulations.

8.6 Natural Fish

A natural fish baseline report (Technical Appendix 11.1) was produced using a variety of sources. Where data was available in areas adjacent to the Tidal Site and Western Export Cable Route, this has also been used in order to increase the overall data set for producing the baseline. The methods used to gather data were as follows:

- Literature relevant to the Tidal Site and Western Export Cable Route was sourced using internet searches (Google scholar, Marine Scotland website and Web of Science). Additional data was downloaded from the Scottish west coast trawl surveys conducted in adjacent areas by Marine Scotland and lodged with ICES. Data were processed to reveal the range of species caught in the vicinity of the proposed development and temporal patterns in dominant and species of conservation concern;
- Beam trawl surveys were conducted using a 2m beam trawl fitted with an iron tickler chain and 24mm mesh net. A total of 8 tows were undertaken lasting from 5 to 13 minutes in length, at a speed over ground of between 2 and 3 knots. Total swept areas thus ranged from 802m^2 to 1845m^2. One tow failed due to a ripped net resulting in a total of seven valid hauls. The trawls were undertaken along the Western and Eastern Export Cable Routes. None were undertaken at the Tidal Site due to the risk of net snaring on the seabed surface. This is reflected locally in that, there is no commercial fish trawling undertaken at the Tidal Site due to its rocky nature;
- Video surveys undertaken at the Tidal Site and across the Western Export Cable Route to Islay, taken via a drop down video frame with tows lasting from 2-5 minutes each; and
- Organised discussions with local fishermen, through fisheries liaison on Islay and also on Kintyre.

The investigation results indicate that the fish and shellfish communities at the Tidal Site and along the Western Export Cable Route to Islay are characterised by relatively low abundances of largely common and widespread species suited to a coarse rock/boulder strewn substratum, with strong water movement.

There is no evidence that the Tidal Site or Western Export Cable Route to Islay are important nursery or spawning grounds, although spawning and nursery grounds for some species are reported within approximately 20 nautical miles of the Tidal Site.

Although some PMF species have been recorded in and adjacent to the Tidal Site and Western Export Cable Route, there is no evidence to suggest that the Tidal Site and/or Western Export Cable Route act as significant habitats for these species.

The Project is considered to present a negligible or minor consequence of impact in relation to shellfish and natural fish species, present at the Tidal Site and along the Western Export Cable Route to Islay. This takes account of the low abundance of species found, lack of sensitive species, low importance of the area in respect of nursery, spawning and migration activity and siting of the development in open waters. For similar reasons, the assessment also considers potential cumulative and trans-boundary effects to be negligible.

Although the overall consequence of impact is negligible or minor for all potential effects considered, a number of good practice management and mitigation actions are proposed during design, construction, maintenance, operational monitoring and decommissioning activities.

8.7 Commercial Fisheries

A desk based review and consultation with the local and wider fishing industry provided information for the commercial fisheries baseline assessment (Technical Appendix 12.1 and 12.2). Fisheries stakeholder meetings were held in Campbeltown and on Islay. Information provided by fishermen at these meetings has been incorporated anonymously into the assessment. Consultation has been undertaken, and will continue, with the following organisations:

- Scottish Fishermen's Federation (SFF);
- Clyde Fishermen's Association (CFA);
- Campbeltown District Fisheries Office (DFO);
- Marine Scotland (MS); and
- Individual Fishermen.

The principal species targeted within the vicinity of the Project (Tidal Site and Western Cable Route) are as follows:

- Edible crab;
- Lobster;
- King Scallop; and
- Velvet crab.

Exclusion zones of 50m are likely to be required around each TEC as a minimum, although due to safety considerations it is considered that the site will effectively be closed to fishing activities. As commercial fishing activity within the Tidal Site has historically been low the impacts were not assessed as significant. Similarly, the Tidal Site was not assessed to contribute to cumulative impacts on any commercial fisheries receptors.

Impacts were identified for the local creel, Scallop and Nephrops fisheries during construction and operational phases. These were assessed primarily in relation to the surface laid export cable. These were at worst moderate, and

implementation of suggested mitigation will result in residual effects which are of minor significance.

The primary mitigation measure identified was, where feasible, the burial or covering of the cable with rock ballast although this will be confirmed following a detailed analysis of the geotechnical data with respect to the most appropriate protection methodologies. The covering of the cable and the addition of the cable route and turbine locations to the Kingfisher Information System will also address a potential safety issues, with suitable monitoring.

Due to the identification of impacts relating to the loss or restricted access to creel and scallop fishing grounds it is proposed that a working group is established with key fisheries stakeholders to establish a forum for on-going engagement with the fishing industry. It advised that in order to reach agreements that are both feasible and acceptable to the fishing industry that the group would include representatives from the following:

- Nominated local FIRs;
- Scottish Fishermen's Federation (SFF);
- Marine Scotland (MS);
- The Crown Estate; and
- DP Marine Energy (DPME);

In the first instance a construction management plan would be developed via the working group with direct inputs from those fishermen potentially impacted by the development. Once more information is available with respect to construction schedules and methodologies it may be possible to work collaboratively to minimise interference throughout the construction period to acceptable levels. The construction management plan would aim to establish clear protocol for engagement between the developer and fishermen throughout the construction period in order to minimise potential conflict

The second key function of the working group would be to identify and develop options for mitigation in collaboration with the fishing industry where it is not possible to minimise impacts through the construction management plan alone (e.g. through refinement of construction schedules/design). Potential alternative mitigation options to be explored through the working group could include:

- Provision of appropriate training and subsequent employment for local fishermen/vessels e.g. as offshore personnel/guard vessel duty;
- Improvement of port facilities such as derricks, gear, fuel, and catch storage;
- Stock enhancement of local scallop and lobster fisheries from hatchery/wild seed; and
- Development of alternative shellfisheries such as mussel or oyster cultivation.

It is recognised that during the installation of the Western Cable Route there may be a requirement for a small number of local vessels to temporarily remove static gear from areas in which they are normally deployed. Should this be the

case, engagement with the owners of the vessels concerned will be undertaken in order to determine the most appropriate compensation measures.

8.8 Archaeology

A baseline technical report incorporating an archaeological desk-based assessment, an archaeological assessment of geophysical data for the West Islay Tidal Project and targeted walkover surveys of the intertidal area and to sites under consideration was produced (Technical Appendix 13.1). The report identified sites and features of cultural heritage significance within and in proximity to the proposed project and export cable route that may be affected by the proposal, and outlined the archaeological potential of the marine environment.

The assessment considered the projects impact on the following cultural resources:

- Designated cultural heritage assets, comprising proposed Historic Marine Protected Areas/ designated wrecks, scheduled monuments and other designated cultural heritage assets;
- Undesignated cultural heritage assets, including maritime losses such as wrecks, aircraft and their associated debris; and,
- Submerged archaeology and palaeoenvironmentally significant deposits.

The assessment has established that there are no proposed Historic Marine Protected Areas, Designated Wrecks or other cultural heritage assets with legal designations within the West Islay tidal park or western cable route study areas. One recorded wreck has been identified within the western cable route immediate study area. Six wrecks and two obstructions have been identified from the UKHO records within the wider study area (figure 1.8), with a further 31 historic losses without accurate coordinate information listed in the National Monument Record of Scotland dataset.

The assessment of marine geophysical survey data identified one target of high archaeological potential definitively identified as a wreck, four targets considered to be of medium archaeological potential and of possible archaeological interest, and 20 targets of low archaeological potential identified as likely natural features within the Project immediate study area.

The assessment of key onshore receptors has identified five Scheduled Monuments, one Category A listed building and one Conservation Area within the Zone of Theoretical Visibility (ZTV). These have been examined in detail for potential impacts on their setting.

Setting - The devices will be visible from five Scheduled Ancient Monuments (SM2334 Tobar an-t Sagairt Chapel; SM2357 Cill Eathain Chapel; SM2315 Orsay Island, Chapel); one Category A Listed Building (HB11944 Rinns of Islay Lighthouse); and also on Portnahaven /Port Wemyss Conservation Area. The potential impact on the setting of these sites is considered to be minor to not significant.

The archaeological potential within the Offshore Study Area is considered to be low to moderate and there is low to medium potential for the discovery of unrecorded cultural heritage remains within the offshore study area. Should sites be discovered in the offshore area one would expect them to be of high/ medium sensitivity. In the absence of mitigation the magnitude of the impact could be medium to high. Therefore the significance of the impact could be moderate to major. The mitigation measures for these impacts are; to implement a Written Scheme of Investigation (WSI) and Protocol for Archaeological Discoveries (PAD) for the approval of Historic Scotland/ Highland Council Archaeological Service to mitigate construction effects in the event of any unexpected archaeological discoveries during installation.

8.9 Shipping and Navigation

A detailed description of the existing marine environment for both commercial and military shipping containing the tidal site is provided in the Navigational Safety Risk Assessment (NSRA).

A vessel traffic analysis was undertaken to define shipping activities in terms of current traffic patterns, densities and types. To complement the availability of existing AIS data an onshore radar survey was carried out for two weeks in the winter and two in the summer to capture all traffic movements within these periods.

In the vicinity of the proposed development there is a concentration of traffic of routes between the Minches/Oban and the North Channel or the Sound of Jura. This concentration shows densities of between less than 10 and up to 40 vessel journeys per square kilometre over the total survey period. This is equivalent to 0.5 – 2 vessels per day per km^2. The data further shows that there is, on average, some 10 transits per day within 10 n miles of the area or ~1.5 transits per day through the proposed area.

Military usage of the area to the west of Islay consists of Practice and Exercise Areas (PEXAs) mainly used for surface vessel activities. Discussions with Ministry of Defence (Royal Navy) (MoD RN) staff responsible for water-space management have established that the site presents no significant concerns with regard to surface navigation in the area.

Concerns have been raised by MoD RN and Defence Infrastructure Organisation (MoD DIO), the body responsible for safeguarding Defence interests, concerning underwater noise and its potential impact on submarine navigation. Discussions between MoD DIO, facilitated by The Crown Estate (TCE) are on-going.

The main commercial navigational effects of the Project are assessed as obstruction to vessel navigation and increased risk of vessel collision, between vessels and the devices (surface and subsea elements).

The principal Safety Requirements for the proposed array are as follows:

- All significant hazards associated with the installation, operation, maintenance and decommissioning of the proposed array shall be

identified and the risks assessed as tolerable and as low as reasonably practicable (ALARP);
- The site will comply with MCA Marine Guidance Note MGN 371 (M+F): Offshore Renewable Energy Installations (OREIs) - Guidance on UK Navigational Practice, Safety and Emergency Response Issues;
- The installation shall co-exist safely with other marine users with minimum increase to the baseline level of navigational risk during construction, operation, maintenance and decommissioning. The devices should not cause or contribute to an unacceptable obstruction of, or danger to, navigation or marine emergency services; and
- The risks presented by the array devices and their operation will be effectively managed by an appropriate Safety Management System meeting the requirements of the MCA's Guidance.

The NSRA concluded the following with respect to commercial shipping and navigation:

1. That the risks to navigation from the cable laying and device installation operations are considered to be "Tolerable with monitoring" subject to the application of such risk controls as are identified in the NSRA;

2. The risk to navigation arising from the proposed clearance depths over the rotors of the MCT SeaGen and Alstom-TGL turbines (which present a hazard to shipping in a range of tidal and sea-state conditions to a significant proportion of vessels currently operating in the immediate vicinity of the proposed area if they were to enter the Energy Park) can be considered as "Tolerable with Monitoring" subject to the application of such risk controls as are identified in the NSRA;

3. The risk from vessels drifting into the site is considered as sufficiently low as to be considered "Tolerable with Monitoring" given the vessel traffic levels and the numbers of recorded incidents from RNLI and MAIB data;

4. That the development area should be charted appropriately as a "Marine Limit in General, implying physical obstructions". This does not exclude navigation but, along with appropriate annotation showing that limiting depths apply (either against the individual devices or as a chart note), provides the mariner with adequate information on the hazards presented by the project.

5. Whilst pelagic and demersal fishing activities do not take place in the area or its immediate vicinity, creeling vessels do operate off the Rinns in the local area. As such there is a risk to these vessels due to the potential for gear entanglement when recovering or laying static gear. This would require the imposition of a "No Fishing" area coincident with the charting of the area as a "Marine Limit in General containing hazards";

6. The export cable presents a hazard to scallop dredging activities between the site and Kintra.

7. That the individual devices/sub arrays require to be charted appropriately subject to the limitations of the scale of the chart and the need to avoid congestion of information;

8. That the extent of the sub-sea devices may not be adequately indicated by the lighting and marking applied to any surface devices in the array and will, therefore, require to be marked with buoys or other devices;

9. The in-combination effects from the SSE Renewables have not been able to be established fully due to the lack of appropriate data on vessel traffic for the windfarm area.

10. That the scale and nature of the risks requires the development of a Safety Management System of which an ERCoP is an integral part.

8.10 Landscape and Seascape

A baseline study was undertaken to consider the specific details of the proposed development context, with the aim of identifying the key seascape, landscape and visual receptors that may experience effects as a result of the construction and operation of the proposed Project.

The following seascape, landscape and visual receptors have been assessed:

- Seascape / landscape character;
- Designated landscapes; and
- Views and visual amenity experienced by local residents, users of transport routes, and tourists / visitors.

As agreed with Argyll and Bute Council (ABC) and SNH, the Study Area and Cumulative Study Area is based on a 15km radius around the proposed development, the extent of which is shown in Figure 1.9

The proposed Project would result in indirect effects upon seascape character across the Study Area. The most prominent effects on local seascape character would be associated with views from the Rubha na Faing to Rinns Point Seascape Character Unit (SCU) sub-type and the Lossit Bay SCU sub-type, although the effects would not be significant. The proposed TECs would also be visible from other local-level SCU sub-types and the Rocky Moorland LCT, albeit would predominantly represent a distant, background feature resulting in a Negligible magnitude of change. Overall, there would be no significant effects on seascape / landscape character.

The Islay Area of Panoramic Quality (APQ) represents the only landscape designation within the 15km Study Area, located within approximately 4.8km of the proposed development at its closest point (measured from Orsay). Views of the proposed development would be intermittent across the APQ and would be oblique to the primary direction of view. Overall, there would be no significant effects on landscape planning designations.

Portnahaven and Port Wemyss represent the only settlements within the 15km Study Area. Visual effects experienced by residents would vary, based on localised screening and the orientation of the properties. Residents with open, unobstructed views of the proposed development (including a limited number of residents within Queen Street, Portnahaven) would experience a Slight magnitude of change and a Moderate level of effect. The majority of residents within these settlements would experience lesser or no effects based on increased screening by neighbouring built form and / or the underlying landform.

Effects experienced by residents within dispersed dwellings (out with the settlements of Portnahaven and Port Wemyss) would also vary dependent upon orientation of view and intervening screening. Residents with open, unobstructed views of the proposed development would experience a Slight magnitude of change at most, and a Moderate level of effect.

Visual effects as a result of the proposed TECs would be experienced intermittently from a range of roads in the Study Area. Overall, there would be no significant effects on motorists and other road users.

Recreational receptors considered in the assessment include those using recreational footpaths, those visiting key destinations / attractions, and those undertaking recreational sailing / fishing activities in the coastal waters.

Recreational footpaths within the Study Area include the Core Path extending to Claddach, as well as the Portnahaven to Port-a-Reidhleinn Core Path, Portnahaven to Octofad Core Path, and the Kilchiaran to Machir Bay Core Path. In each case, the magnitude of change would be Slight or less, leading to a Moderate level of effect on localised sections, decreasing to Moderate/Minor or no change from lengthy sections from which there would be very limited / no view of the proposed development.

Visitors to the beach at Lossit Bay would experience a Slight to Negligible magnitude of change, leading to a Moderate to Moderate/Minor level of effect. Effects experienced by visitors to other recreational destinations (including the Picnic site at Port Wemyss, the summits of Ben Cladville and Beinn Tart a' Mhill, the Cultoon Stone Circle, the Gearach hunting estate, and the American Monument on the Mull of Oa) would be less; i.e. Moderate/Minor or less

Effects experienced by recreational passengers on boat trips extending up Loch Indaal would typically be Moderate or less (based on a Slight magnitude of change or less), which would not be significant. Effects experienced by passengers on other recreational fishing / sailing vessels (including those sailing around the south western end of the Rinns Peninsula) would also typically be Moderate and not significant (based on a Slight magnitude of change).

Recreational passengers aboard vessels sailing within 1-2km of the proposed development would experience close proximity views of the TECs which could be perceived as significant; however, the turbulent nature of the tide within the locality of the site dictates that the area is not typically used for recreational

sailing or fishing activities (thus limiting the likelihood of recreational vessels sailing into such close proximity to the TECs).

8.10.1 Cumulative Effects

There are no operational, consented or in-planning developments within the 15km Study Area. The proposed Islay Offshore Wind Farm (currently at scoping-stage) represents the only cumulative development within the Study Area.

Considering the combined effect of the Project with the Islay Offshore Wind Farm; there would be significant cumulative effects on a number of seascape, landscape and visual receptors within the Study Area. However, in all cases these effects would be primarily associated with views of the proposed Islay Offshore Wind Farm alone, which would represent a new characteristic in north westerly views based on the horizontal spread of the turbine array, in combination with the movement of the turbine rotors. Conversely, the proposed Project would represent a relatively discreet background feature with limited cumulative influence. In the majority of cases, the two developments would be located in completely different sectors of the view, with sufficient separation distance between them to prevent coalescence. Overall, the additional cumulative effect of the Project (assuming the prior presence of the Islay Offshore Wind Farm) would not be significant.

8.11 Traffic and Transportation

The traffic and transportation requirements during the life of the Project covering installation, operation and maintenance and decommissioning of the marine elements of the project only are outlined in Chapter 16. Traffic and transportation associated with onshore infrastructure will be defined as part of the onshore consents process.

There will be no major onshore vehicle movement associated with the project. The only likely vehicles required relate to the pulling of the 33kV cable to shore and the provision of a local excavator for digging and back-filling the trench and these movements are considered to be insignificant.

A navigational risk assessment has been carried out for the project which concluded that with the application of the recommended controls, the risk from the proposed installation is "tolerable with monitoring" and As Low As Reasonably Practicable (ALARP).

If local maintenance is adopted then a further impact assessment with respect to onshore facilities will accompany an additional application for consent for onshore infrastructure.

8.12 Recreation and Amenity

A series of consultation meetings arranged by the Islay Energy Trust (IET) were carried out on Islay on the 11th and 12th of December 2012 to gauge local opinion on the proposed development and to discuss whether Islay could benefit from the Project. Meetings were held with the Islay Community Councils Renewable Energy Sub-Committee, South Islay Development Group, Port Ellen Harbour Association and local businesses. In summary, the consensus from the

meetings was that individuals and businesses were generally positive about the Project.

There were concerns raised about potential negative visual impacts off the Rinns of Islay. A full record of the issues raised in the consultation meetings is set out in technical appendix 17.2.

Of the 227 different recreational facilities and amenities within the local area, none will experience a significant negative impact. It can therefore be concluded that the impact of the Project on the recreation facilities in the local area will be limited and only of minor and not significant scale.

8.13 Socio-economic

At the consultation meetings in December (discussed above in section 8.12) many of the consultees considered that local businesses on the island could and would benefit and will encourage the developer to implement their philosophy of employing local people on projects wherever possible and commercially viable. Moreover, many were enthusiastic about potential job creation on the island and the opportunity for Islay to have the potential of becoming a renewables hub. There was also concern that the fishing industry in the location of the Project could potentially be affected. A full record of the issues raised in the consultation meetings is set out in technical appendix 18.1

An estimate of the likely potential economic benefits from the Project to the local and wider area's economy in terms of construction, operation & maintenance, and decommissioning employment was undertaken. This is based upon data on the employment and economic output likely to be generated from both the developers and also from industry benchmark research. Further, an economic model was established to assess the scale and nature of the resulting economic impacts.

The Project could have the potential to act as a catalyst to create a critical mass of marine energy activity on Islay, particularly in conjunction with the Sound of Islay Tidal Array. The key issue for the island is the provision of high quality and skilled jobs, which can provide permanent employment for the local population and the infrastructure required to service the Project's needs and requirements.

Depending upon the turbine technology and development scenario adopted for the Project this could result in a moderate or significant positive impact at the wider Argyll and Bute level and a moderate to major positive impact at a local Islay level during both the construction and operation & maintenance phases. Table 1.6 sets out all those potential significant impacts, which would result from the Project.

Development Phase	**Scenario**	**Study Area Benefit**	**Level of Impact and Residual Effect**	
Construction			Argyll &Bute	Islay
Most Likely Scenario	FTE Jobs	2-3	Minor	Minor
	GVA	£0.176m-£0.264m	Minor	Minor
O&M				

Low Impact	FTE Jobs	2	Minor	Minor
	GVA	£0.14m	Minor	Minor
Medium Impact	FTE Jobs	5	Minor	Minor
	GVA	£0.268m	Minor	Minor
High Impact	FTE Jobs	16	Moderate	Major
	GVA	£0.9m	Moderate	Major
Decommissioning				
	FTE Jobs	13	Minor	Moderate
	GVA	£0.854m	Minor	Moderate

Table 1.6: Summary of Potential Economic Impacts and Residual Effects

Socio-economic mitigation would only apply as a result of there being a number of national, regional and local initiatives involving the Scottish Government, regional and local development agencies with the aim of providing enhanced skills training, supply chain enhancement provision, and support for business improvement working in the offshore marine devices industry, in the West of Scotland. These will not act to reduce negative impacts, as no such impacts have been identified in the assessment. However, they would assist in realising and maximising the opportunities in the study area and where appropriate the applicants will support these initiatives. These initiatives would contribute to enhancing the likelihood of construction employment and output being based within the local and wider area

8.14 Noise

Chapter 19 of the ES presents a quantitative prediction of noise and vibration levels generated at each stage of the project and references this to the measured baseline noise characteristics of the site.

The installation and operational noise includes: noise generated during construction by installation vessels and installation techniques (e.g. rock drilling and pin piling), during operation by the turbines, by visiting maintenance vessels and during decommissioning both by vessels and the disassembly and removal of the turbines. It also includes noise generated during inter-array and export cable installation by cable laying vessels and when implementing measures to secure the cables to the seabed.

Quantitative predictions were referenced to baseline ambient noise measurements which were made using the "Drifting Ears" approach specifically developed by SRSL for high energy tidal sites.

Noise propagation models were developed and evaluated based on the modelled sound field of both the MCT Siemens and Alstom TGL devices. These sound field models were used to evaluate the near and far-field acoustic propagation and the impact of the project generated noise above the baseline ambient noise.

The results of the baseline noise report and noise propagations models were used to assess the impacts of noise on marine mammals (chapter 7) and natural fish (chapter 11).

8.15 EMF

A brief review of the literature, an overview of the electromagnetic fields typically generated by power transmission cables, and an assessment of the potential for the subsea electric inter-array and export cables for the proposed Project to cause adverse effects in marine organisms is presented in chapter 20. The potential impact assessments associated with individual receptors can be found in the relevant chapters.

9.0 Environmental Management and Mitigation

A number of key mitigation and best practice measures have been proposed throughout the ES spanning a number of receptors and/ or a number of different impacts. These are as follows:

- Development of an Environmental Management Plan (EMaP) to be agreed with SNH and Marine Scotland, following submission of this ES. The EMaP will be a working document detailing the environmental actions highlighted in the ES, all activities to be carried out on site, responsibilities for those activities, environmental risks and the management protocols to be put in place to control these, as well as identification of personnel responsible for each element of the EMP;
- An Environmental Monitoring Programme (EMP), to be agreed with Marine Scotland (MS) and Scottish Natural Heritage (SNH);
- A detailed Construction Method Statement (CMS) and a Pollution Control and Spillage Response Plan to be prepared and agreed with SEPA, SNH and MS-LOT prior to commencement of construction;
- All work will be undertaken to an overarching Health, Safety and Environmental Management System (HSEMS), which will include the CMS, the PIRP and the EMaP. The project will be supervised in accordance with the Construction Design and Management Regulations (2007); and
- Pollution Control and Spillage Response Plans to be developed and included in the EMaP;

10.0 Environmental Monitoring

Currently there are no arrays of tidal turbines operating anywhere in the world as tidal energy devices are an emerging technology, with limited operational developments upon which to base aspects of assessment. Where devices have been operating and potential environmental interactions have been monitored, the results to date indicate no significant adverse environmental impacts (Strangford Lough for example). However, it is appreciated that the potential interactions of an array of devices is to some extent unknown, and assessments must be necessarily based on data for single devices from expert judgement based on knowledge of potential receptors and current understanding of the potential effects of single devices extrapolated to encompass an array.

In the rapidly developing tidal energy sector, research and environmental monitoring works are either on-going, or planned, at a number of locations in the

UK and internationally. In this evolving climate, there is no significant benefit to proposing detailed monitoring plans, the details and premise of which may require considerable revision in the light of new knowledge expected post consent.

An Environmental Monitoring Programme (EMP) will be developed through discussion with the regulatory authorities to ensure that the purpose of the monitoring is agreed; that objectives are set according to consensus on the ability to detect change attributable to the development; and that this is considered according to a reasonable cost / scale of studies, proportionate to the level of risk identified. This will be programme defined over an appropriate timescale, with defined reporting intervals.

11.0 Conclusions

The Environmental Impact Assessment (EIA) has been carried out by DPME in accordance with relevant EU, UK and Scottish regulations and has robustly assessed the potential environmental impacts of the proposed Project.

The EIA has assessed the worst-case scenario that would have the greatest effect on the environment. This approach results in a maximum impact assessment, giving security and confidence to the consenting authorities that the environmental impact will be no greater than that which is set out within the Environmental Statement and in fact may be considerably less.

The initial array will provide information on the interactions between the array and the environment, increasing the knowledge for the remaining phases of the Project and the tidal stream industry as a whole.

The West Islay Tidal Energy Park represents an important development step for tidal stream technology in terms of the scale of development and in the transition from prototype technology to full development. The development of marine renewables is a key objective for Scotland and the Project represents a key part of the Scottish and UK renewable energy strategies.

12.0 References

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2. R. V Rochdale MBC ex parte Milne (No 1) and R. v Rochdale MBC ex parte Tew (1999) and R. v Rochdale MBC ex parte Milne (No. 2) [2000].

3. Request for Scoping Opinion by DP Marine Energy Ltd in respect of Islay Tidal Energy Project Environmental Impact Assessment Scoping Report May2009, http://www.scotland.gov.uk/Topics/marine/Licensing/marine/scoping/DPMarineEnergy

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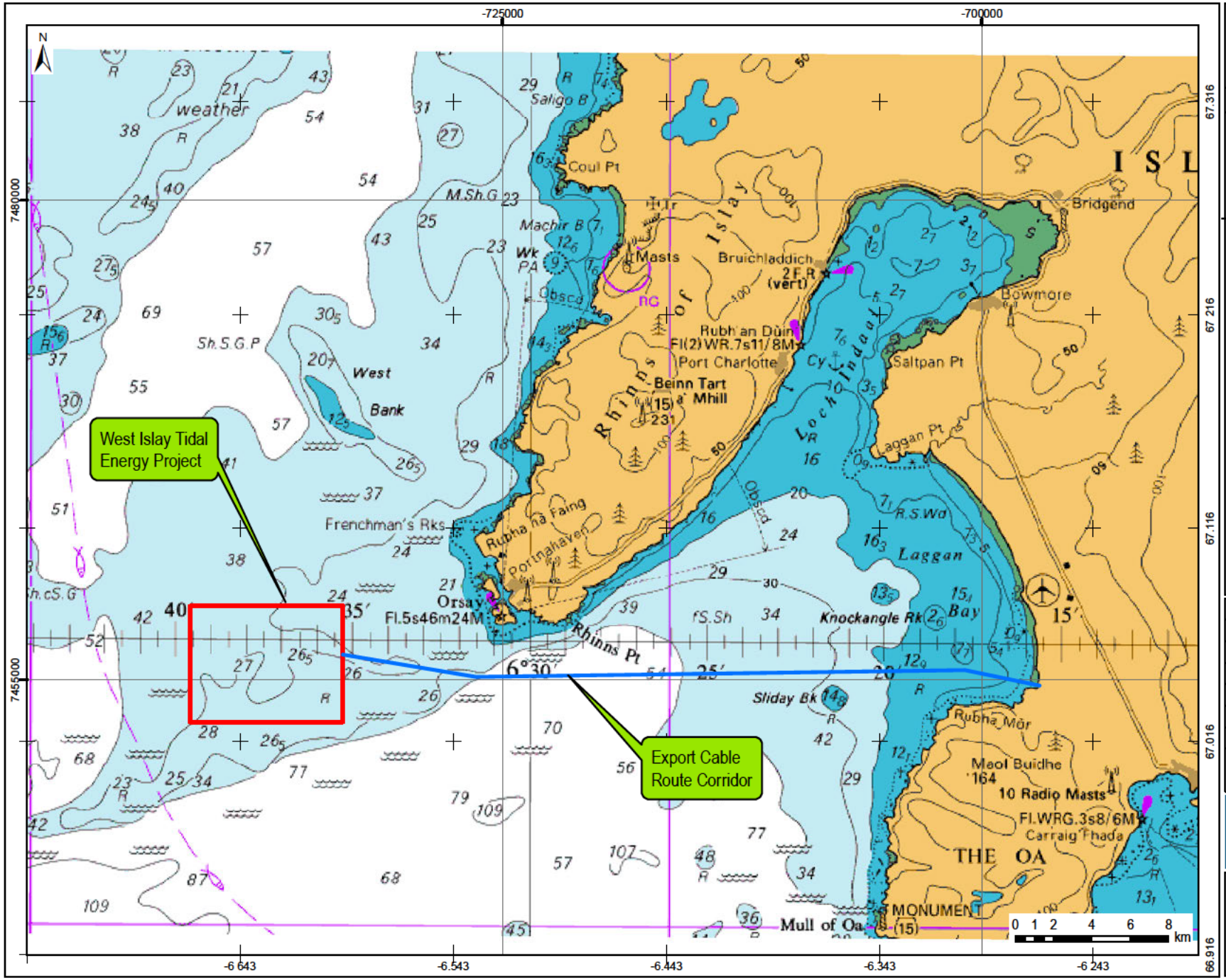
5. Sub-tidal Survey of Rhinns of Islay, Argyll for DP Energy, Sept 2008, Final Report 1975, ERT.

6. McBreen, F., Askew, N., Cameron, A., Connor, D., Ellwood, H., Carter, A., (2011) UK SeaMap 2010 Predictive mapping of seabed habitats in UK waters, JNCC Report 446, ISBN 0963 8091

7. Royal Haskoning (2011). SeaGen Environmental Monitoring Programme. Final Report. MCT, 16TH January 2011, 9S8562/R/303719/Edin

8. Irving, R. (2008) The identification of the main characteristics of stony reef habitats under the Habitats Directive. Summary report of an inter-agency workshop 26-27 March 2008. JNCC Report No. 432



WESTISLAY TIDAL

FIGURE 1.1

Site location

West Islay Tidal Project

Export Cable Route Corridor

Date	By	Size	Version
Jan 13	MCE	A4	1
Projection		WGS84	
Scale		1:280,000	
QA		GMH	
4081-01_Fig1.1_Site_Location.mxd			
Produced by ABPmer			

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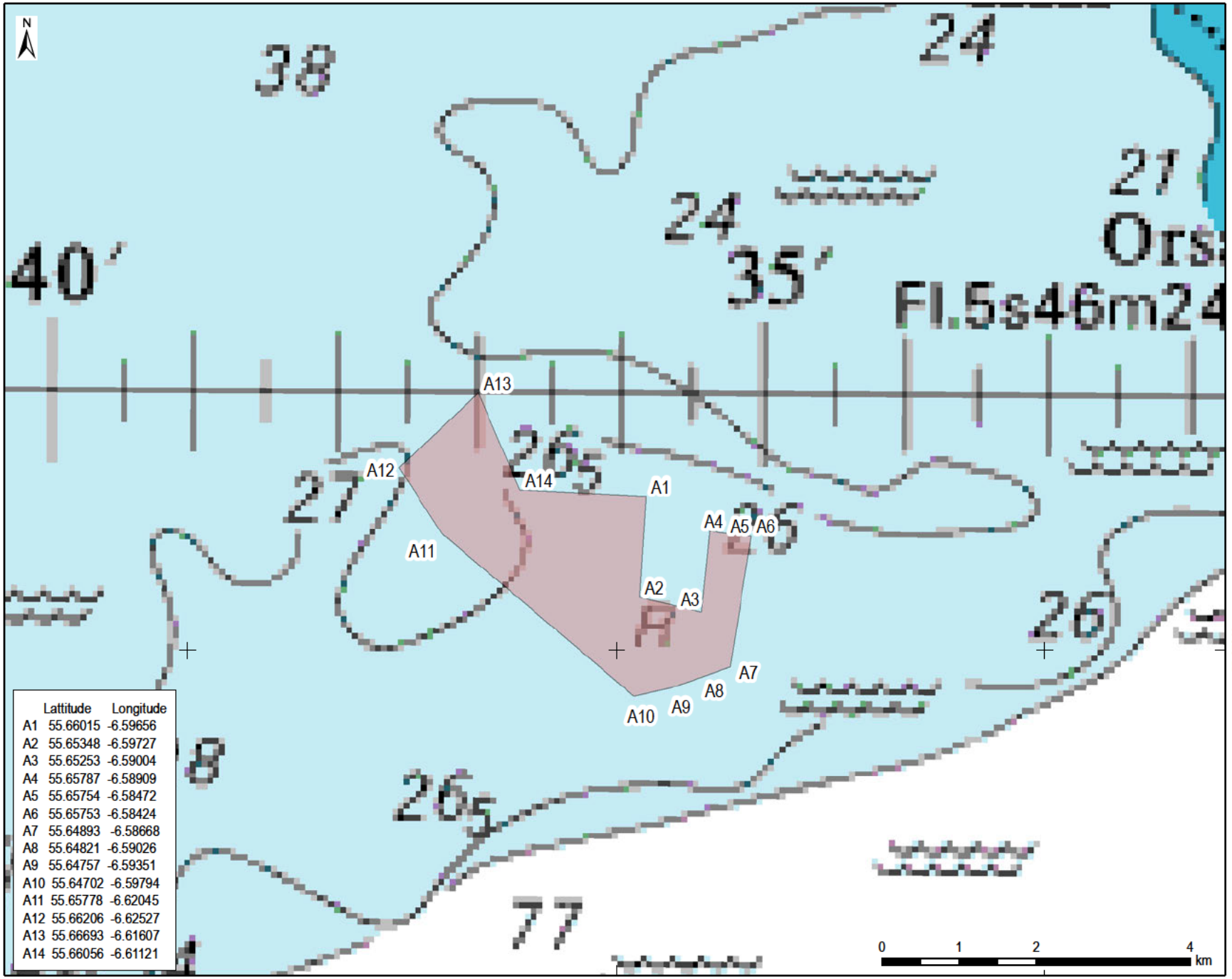
marine environmental research

DP ENERGY MARINE



	Lattitude	Longitude
A1	55.66015	-6.59656
A2	55.65348	-6.59727
A3	55.65253	-6.59004
A4	55.65787	-6.58909
A5	55.65754	-6.58472
A6	55.65753	-6.58424
A7	55.64893	-6.58668
A8	55.64821	-6.59026
A9	55.64757	-6.59351
A10	55.64702	-6.59794
A11	55.65778	-6.62045
A12	55.66206	-6.62527
A13	55.66693	-6.61607
A14	55.66056	-6.61121

WESTISLAY TIDAL

FIGURE 1.2

Development Area

Revised Development Area

Date	By	Size	Version
Jun 13	MCE	A4	1
Coordinate System		WGS 1984 Web Mercator	
Projection		Mercator	
Scale		1:70,000	
QA		JDB	
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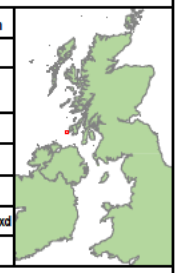

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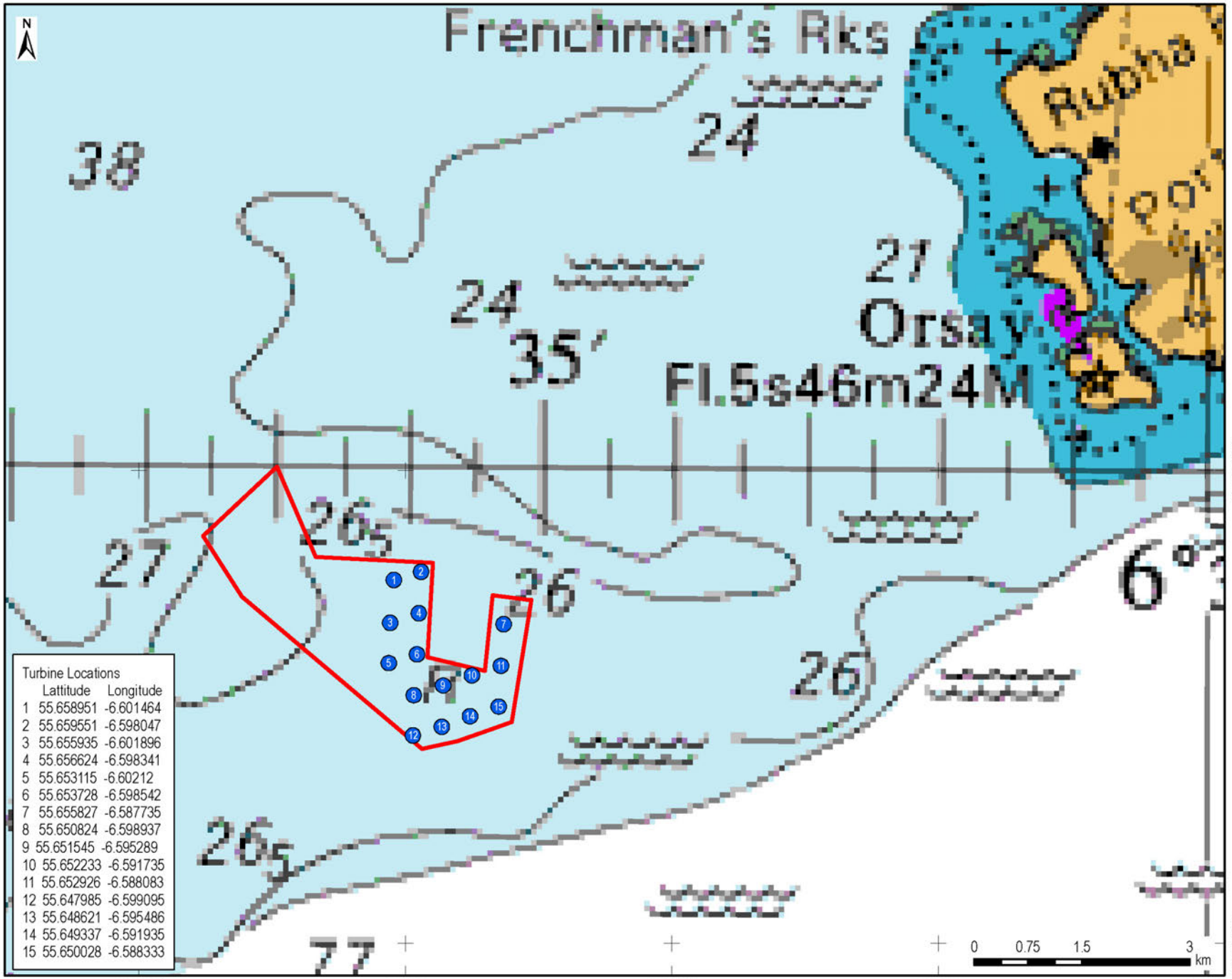
DP ENERGY MARINE



WESTISLAY TIDAL

FIGURE 1.6

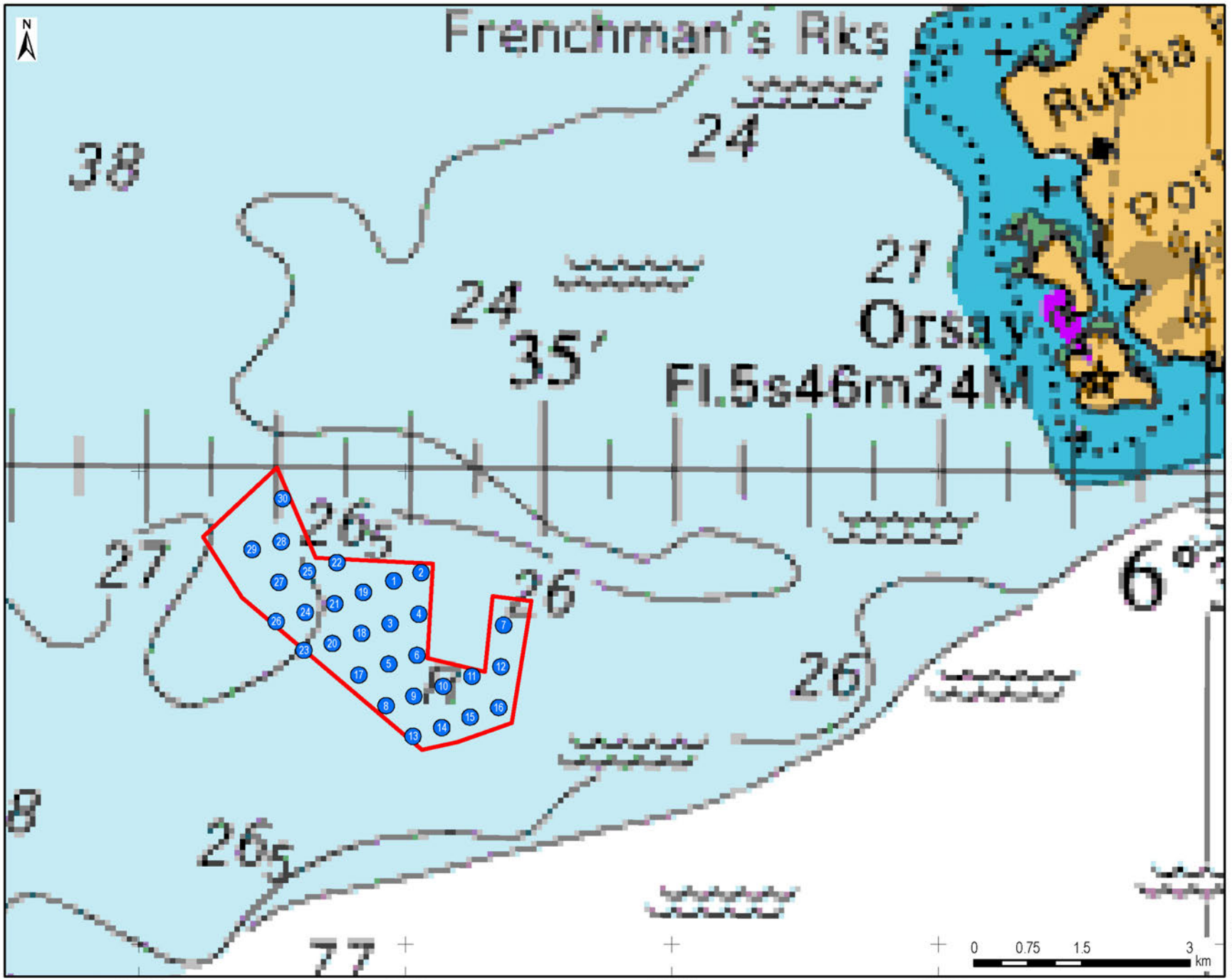
Islay Energy Park
Typical 15 Turbine Layout

- Revised Turbine Locations
- Revised Development Area v2

Date	By	Size	Version
Mar 13	MCE	A4	1
Coordinate System		WGS 1984 Web Mercator	
Projection		Mercator	
Scale		1:75,000	
QA		JDB	
4081-Fig513a_15_Turbine_Layout.mxd			
Produced by ABPmer			

ABP mer marine environmental research

DP ENERGY MARINE



WESTISLAY TIDAL

FIGURE 1.7

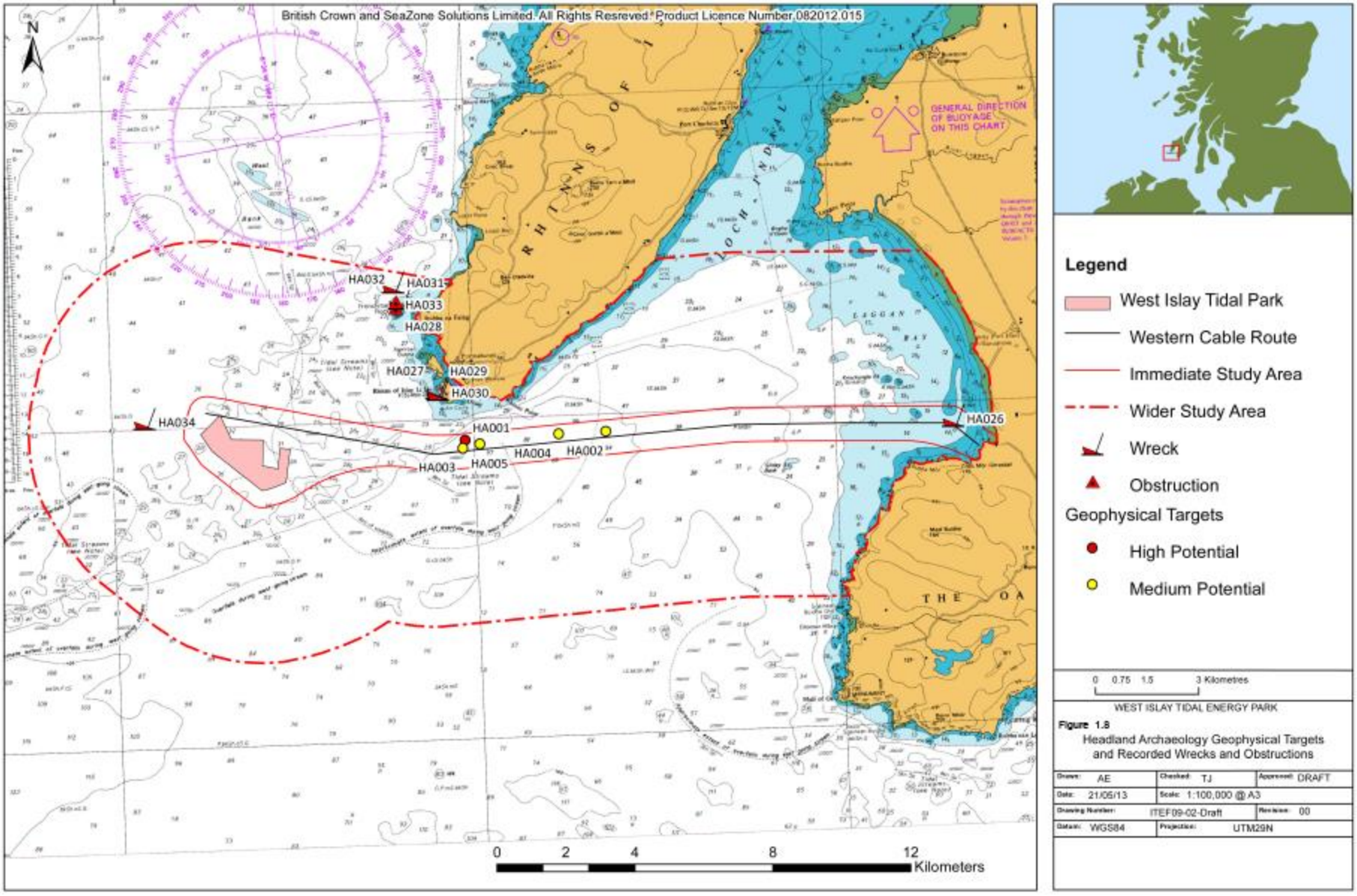
Islay Energy Park
Typical 30 Turbine Layout

- Revised Turbine Locations
- Revised Development Area v2

Date	By	Size	Version
Mar 13	MCE	A4	1
Coordinate System	WGS 1984 Web Mercator		
Projection	Mercator		
Scale	1:75,000		
QA	JDB		
4081-Fig513_30_Turbine_Layout.mxd			
Produced by ABPmer			

ABP mer marine environmental research

DP ENERGY MARINE


British Crown and SeaZone Solutions Limited. All Rights Resreved. Product Licence Number 082012.015
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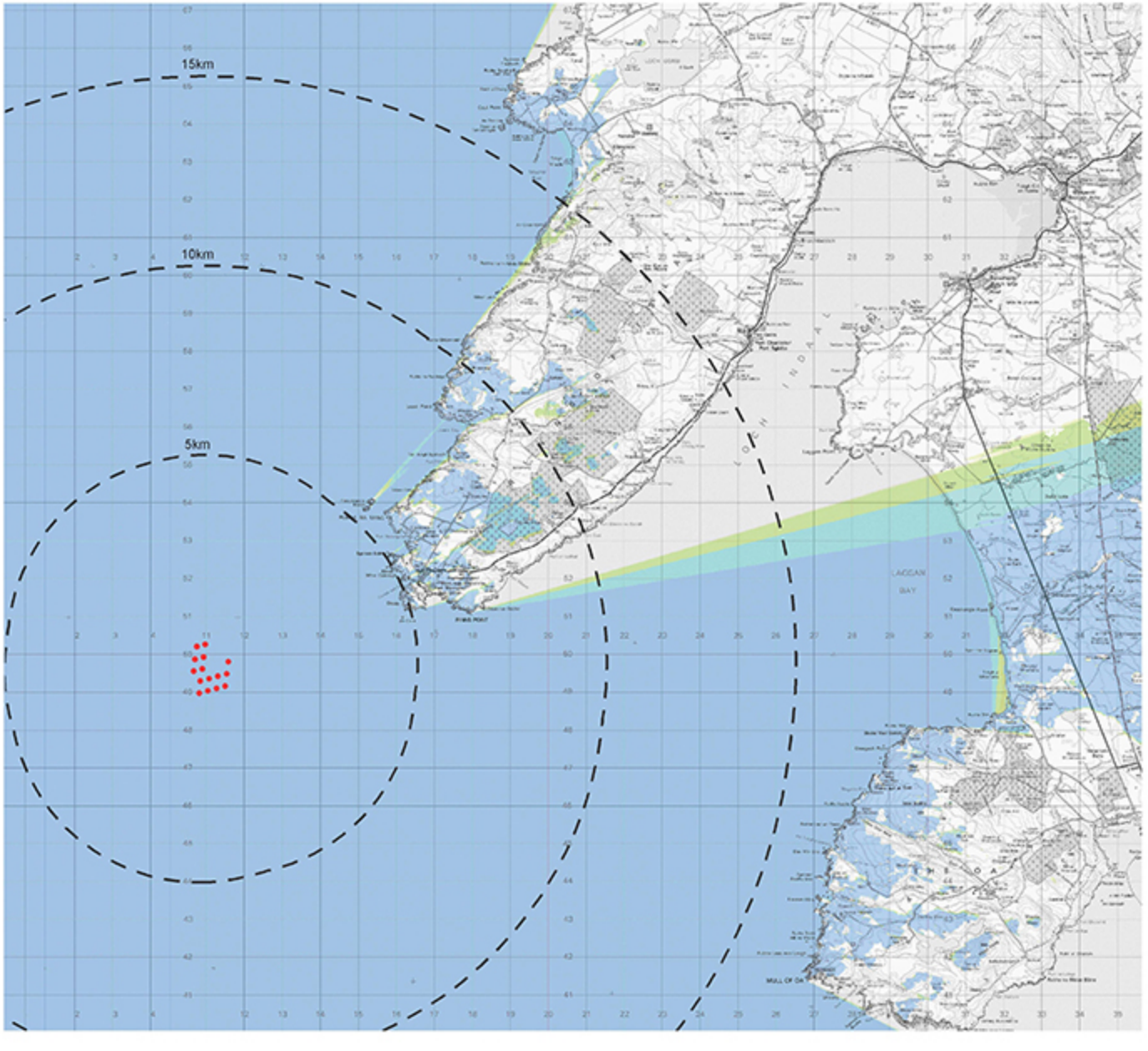
GENERAL DIRECTION OF BUOYAGE ON THIS CHART
RHINNS OF ISLAY
LAGGAN BAY
THE OA
HA032
HA031
HA033
HA028
HA027
HA029
HA030
HA034
HA001
HA004
HA002
HA003
HA005
HA026
0 2 4 8 12 Kilometers
Legend
West Islay Tidal Park
Western Cable Route
Immediate Study Area
Wider Study Area
Wreck
Obstruction
Geophysical Targets
High Potential
Medium Potential
0 0.75 1.5 3 Kilometres
WEST ISLAY TIDAL ENERGY PARK
Figure 1.8
Headland Archaeology Geophysical Targets and Recorded Wrecks and Obstructions
Drawn: AE
Checked: TJ
Approved: DRAFT
Date: 21/06/13
Scale: 1:100,000 @ A3
Drawing Number: ITEF09-02-Draft
Revision: 00
Datum: WGS84
Projection: UTM29N



WESTISLAY TIDAL

STEPHENSON HALLIDAY

WEST ISLAY TIDAL PROJECT

FIGURE 1.9

ZONE OF THEORETICAL VISIBILITY: 15KM RADIUS

KEY

- IslayTidal Energy Converters (TEC) Locations
- 5, 10 and 15km Radii from the TECs

TEC VISIBILITY:

- 1 to 3 TECs visible
- 4 to 7 TECs visible
- 8 to 11 TECs visible
- 12 to 15 TECs visible

TEC Data:
The ZTV has been calculated on a TEC height of 16m above mean sea level, equivalent to 21m above Lowest Astronomical Tide (LAT).

(Layout LITE 002.WFL).

NOTES:
The calculations of this map are based on the 'bare earth' model of the landform and do not allow for any effects of screening from obstacles such as buildings and vegetation. The landform data was taken from Ordnance Survey Profile 10m digital terrain model - gridded height data at 10m intervals. The visibility maps are calculated for a viewer's eye height of 2m above ground height to the top of theTidal Energy Converters (TEC) using a calculation grid size of 20m.

0km 2km 5km

NORTH

Date	By	Paper	Scale	Rev
APR. 2013	CD	A3	1:100 000	