



Environmental Statement Chapter 1. Introduction



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1.0 Introduction

1.1 Purpose of the document

- 1.1.0.1 Tidal Lagoon (Swansea Bay) plc (referred to as TLSB or Tidal Lagoon Swansea Bay plc) is proposing to develop a tidal energy generating station (the Project) in Swansea Bay (the Bay), South Wales. This Environmental Statement (ES) has been prepared to present the likely environmental effects of the Project. The main text of the ES (Volume 1) reports on the environmental impact assessment (EIA) of the Project. It provides a description of the Project, identification of the existing environment known at the time of writing, an assessment of the potential likely effects of the Project, and environmental mitigation measures. Volume 1 is supported by figures and technical appendices contained in Volumes 2 and 3 respectively. The ES has been prepared to accompany the applications for a Development Consent Order (DCO) and a Marine Licence (ML).

1.2 The Project

- 1.2.0.1 The general location of the Project in Swansea Bay and in relation to Wales can be seen in Figure 1.1 below and is also included in Volume 2 of this ES.

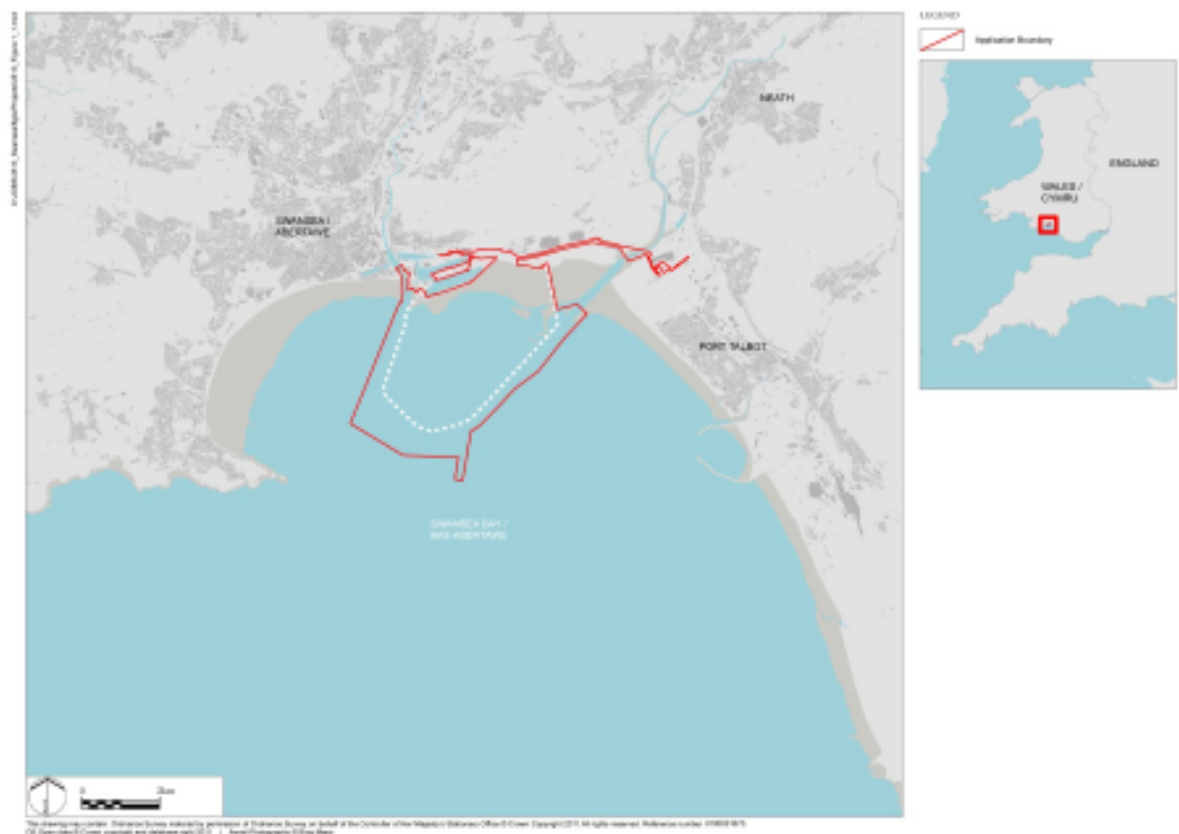


Figure 1.1 Project location

- 1.2.0.2 The generating station that TLSB is proposing to construct is the world's first purpose-built tidal energy lagoon. The Project will have a nominal rated capacity of 240 Mega Watts (MW) and will generate electricity using kinetic energy captured by hydro turbines from the large tidal range (the difference between high and low water) that is a distinguishing feature of the Bay, and the wider Severn Estuary of which it forms part.



- 1.2.0.3 The hydro turbines used for the Project will be bi-directional, meaning they are able to generate power with flows of water in both directions (i.e. on both incoming and outgoing tides). At high water a “head” of water (a difference in water level between the inside and outside of the Lagoon) will be held within the Lagoon using sluice gates located within the turbine and sluice gate housing. About 2.5 hours after high water, the water held within the Lagoon is released, and power will be generated when the resulting flow is channelled through the turbines on the outgoing tide. This process is repeated on the flood tide for bi-directional generation. The Project will generate electricity four times per day (on each of two ebb and flood tides) totalling, on average, 14 hours of generation every day. The electricity will be exported from the Project using an underground cable to the National Electricity Transmission System (NETS) via the nearest National Grid substation, which is located in Baglan.
- 1.2.0.4 The Lagoon will enclose part of Swansea Bay, from the eastern side of the River Tawe (the western landfall) to the eastern edge of the new Swansea University Bay Campus (SUBC, previously known as the Science and Innovation Campus, and currently under construction) (the eastern landfall). The new seawalls of the Lagoon will extend approximately 1.5km directly offshore from SUBC, adjacent to Crymlyn Burrows SSSI. The seawalls will then extend in a southwest direction along the western boundary of the training wall of the River Neath Channel. A turbine and sluice gate housing will be located in the south west of the Lagoon, at an oblique angle to the dredged channel of the river Tawe. The seawall will then extend north towards the Port of Swansea, close to the mouth of the River Tawe, parallel but off-set by 100m from the dredged channel for the River Tawe and Port of Swansea. In total, this will form an approximately 9.5km-long, U-shaped, seawall which will encompass approximately 11.5km² of the seabed, foreshore and intertidal area of Swansea Bay.
- 1.2.0.5 Access to the Project (western and eastern landfalls and supporting onshore facilities) will be from Fabian Way, the main route from the M4 into Swansea city centre, via the two (western and eastern) landfalls.
- 1.2.0.6 A route along the crest of the seawall will be open to the public for walking, running, cycling, etc., though access will be controlled outside daylight hours and in extreme weather conditions. The Project also includes operation and maintenance facilities with integrated visitor and sporting/recreational facilities as well as other embedded amenities including art, education and mariculture.
- 1.2.0.7 The red line boundary of the Project, encompassing all the elements proposed and the maximum extent of land over which powers are sought, is shown in Figure 1.2 (also shown in A3 format in Volume 2).
- 1.2.0.8 The location and main elements of the Lagoon are shown in Figure 1.3. An indicative proposals plan and further details of the Project, its construction and operation, and supporting amenities can be found in Chapter 4, Project Description.



Figure 1.2 Application Site

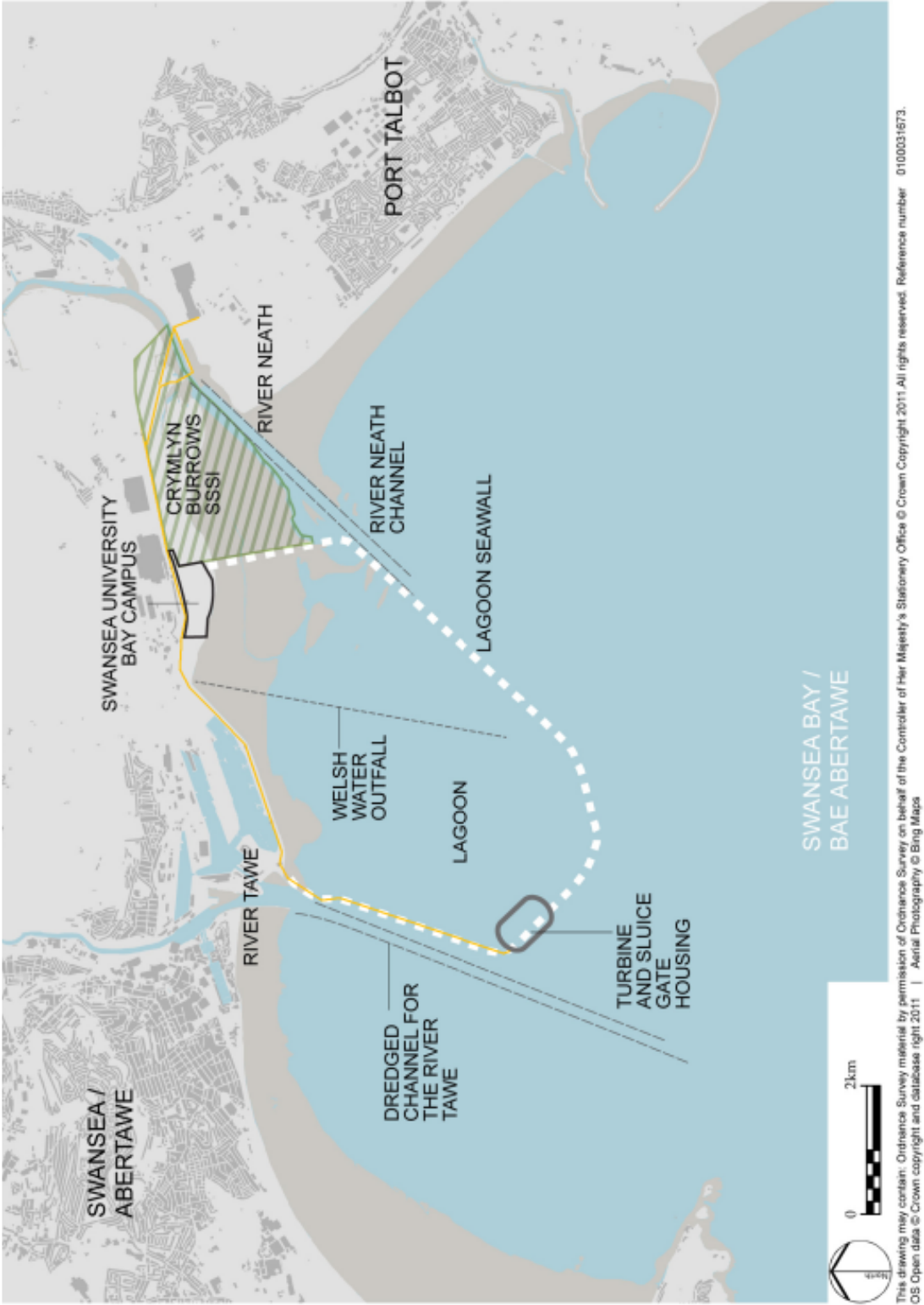


Figure 1.3 Location of the Project and masterplan



1.3 Consents

- 1.3.0.1 The Project is an offshore generating station, which will have a nominal rated capacity of 240 MW. Consequently, the Project is a nationally significant infrastructure project (NSIP) as defined in the Planning Act 2008 (PA 2008) with a generating capacity above the threshold of 100MW, as set out in s15(3)(b) of PA 2008. On this basis, an application for development consent will be made to the Secretary of State for Energy and Climate Change (the Secretary of State), via the Planning Inspectorate, which will examine the application. An Examining Authority will examine the application and make a recommendation to the Secretary of State in respect of grant of development consent, following consideration of which, the Secretary of State will make a decision. If the Secretary of State decides to grant development consent, a development consent order (DCO) will be made, authorising construction and operation of the Project and other matters.
- 1.3.0.2 Under s104 of PA 2008, the Secretary of State must have regard to any National Policy Statement which has effect, any Local Impact Report and any important and relevant matters in making a decision.
- 1.3.0.3 The DCO for the Project will embrace a number of separate consents formerly required for a project of this type. Section 33 of the PA 2008 dispenses with the need for separate planning permission or deemed planning permission under the Town and Country Planning Act 1990 (TCPA 1990) and consents under Section 36 of the Electricity Act 1989. Any additional permissions required under TCPA 1990 for matters relating to delivery of the Project will be sought in parallel with or following grant of development consent, as these elements will not be integral to the construction or operation of the elements of the Project as defined by the DCO.
- 1.3.0.4 The DCO will authorise construction and operation of the generating station and its component parts. These include both offshore and onshore elements of the Project, including the electrical grid connection works and recreational amenities which form an integral part of the seawalls and/or the onshore operation and maintenance facilities.
- 1.3.0.5 As the Project lies within Welsh waters, an application for a Marine Licence (ML) will be made to the Marine Licensing Team within Natural Resources Wales (NRW). The process for granting a ML is set out by the Marine and Coastal Access Act 2009 (MCAA 2009) which gives the appropriate licensing authority (NRW in this case) powers to grant a ML to an applicant who wishes to carry out licensable activities in territorial waters. In order to construct and operate the Project, TLSB will undertake two licensable activities (as defined in MCAA 2009): construction of marine energy works; and dredging and disposal of dredged material.
- 1.3.0.6 An application for a ML under MCAA 2009 will be submitted and considered concurrently with the application for development consent. The requirement for a ML is broadly defined by works taking place in the offshore environment that affect the seabed or the movement of materials related to it. In this sense, elements of the offshore Project that are subject to the DCO application are also subject to a separate ML application.
- 1.3.0.7 In determining an application for a ML, Section 69(1) of MCAA 2009 sets out that the appropriate licensing authority must have regard to: (a) the need to protect the environment; (b) the need to protect human health, (c) the need to prevent interference with legitimate uses of the sea.



- 1.3.0.8 The legislation also requires the licensing authority to have regard to any representation it receives in respect of the application, whilst the Marine Works (Environmental Impact Assessment) Regulations 2007 require a 42-day period for the receipt of such representations. TLSB intends to publish a notice pertaining to the ML requirements simultaneously with the notices in respect of acceptance of the DCO application. Alongside this, the 42-day period for the receipt of representations about the ML will run concurrently with the period for the receipt of relevant representations made on the DCO.
- 1.3.0.9 Section 70 of MCAA 2009 allows the licensing authority to hold inquiries relating to the determination of the licence if they are required; the legislation provides for this inquiry to be combined together with other inquiries if the issues are considered to be far enough cognate as to be considered together. This should allow for an inquiry relating to the determination of the ML to be conjoined as part of the DCO hearing procedures, should one be considered to be necessary.
- 1.3.0.10 Table 1.1 presents the schedule of consents which sets out the principle elements of the Project and the permissions that are anticipated to be required for them. This groups the elements of the Project into three broad categories. These comprise Offshore Works, Grid Connection Works and Onshore Works, all of which are considered to form part of the NSIP that is the Project. It is possible that some elements of the Project may require authorisation under TCPA 1990. These elements are not considered integral to the NSIP proposal and consent will be sought from the appropriate local planning authority following the grant of a DCO and ML.
- 1.3.0.11 Construction will start following the DCO coming into effect and securing other relevant licences and consents required for the Project. It is anticipated that this will commence in spring 2015 and extend to the beginning of 2019, with the first power generated by the Project expected to be exported during the summer of 2018. Further details of the construction programme are given in Chapter 4: Project Description.

Table 1.1 Schedule of consents

Consent required:	Development Consent Order	Marine License	Planning Permission
Decision-maker:	SofS (via PINS)	NRW (MLT)	LPA (CCSC/NPTCBC)
Legislation:	PA 2008	MCAA 2009	TCPA 1990
Offshore project components - temporary			
Cofferdam	Y	Y	
Temporary workspace/rock storage	Y	Y	
Dredging of seabed materials for re-use in seawall	Y	Y	
Disposal of unsuitable materials at Swansea Bay Outer licensed site		Y	
Temporary navigation/lighting requirements	Y	Y	
Offshore project components - permanent			
Seawall incorporating access track	Y	Y	
Turbine /sluice gate housing and scour protection	Y	Y	
Offshore Building including water access	Y	Y	
Western Landfall O&M boating facilities including pontoons, mooring, emergency facilities, slipway	Y	Y	
Navigation/lighting requirements	Y	Y	



Consent required:	Development Consent Order	Marine License	Planning Permission
Decision-maker:	SofS (via PINS)	NRW (MLT)	LPA (CCSC/ NPTCBC)
Legislation:	PA 2008	MCAA 2009	TCPA 1990
Intertidal and subtidal mariculture facilities	Y	Y	
Works to Swansea Port channel	Y	Y	
Works to Neath Harbour channel	Y	Y	
Sewage outfall extension and buoys	Y	Y	
Lagoon water-shuttle pontoon works	Y	Y	
Dolphin piles	Y	Y	
Ecological mitigation (saltmarsh/raft/island)	Y	Y	
Onshore project components - temporary			
Onshore construction compounds	Y		
Onshore decontamination works	Y		
Temporary construction accesses	Y		
Onshore project components - permanent			
Onshore cable route to grid connection	Y		
Western Landfall Building	Y		
Eastern landfall viewing platform and landscaping works.	Y		
Seafront access between landfalls	Y		
Horizontal directional drilling below River Neath, for cable	Y		
Demolitions	Y		
Highways improvements for access	Y		

1.4 Project need

- 1.4.0.1 The UK Government has made clear the urgent need for new energy generating capacity in the Overarching National Policy Statement for Energy (EN-1) and the accompanying National Policy Statement for Renewable Energy (EN-3). The applicability of these policy documents to the Project is set out in Chapter 4 of the Planning Statement.
- 1.4.0.2 EN-1 (paragraph 3.3.15) states that there is an urgent need for new (and particularly low carbon) energy infrastructure to be brought forward as soon as possible, and certainly in the next 10 to 15 years, in order to secure energy supplies that enable the UK to meet its 2050 emissions targets. This is particularly the case given the crucial role of electricity in decarbonising the UK energy sector.
- 1.4.0.3 EN-3 sets out the urgent need for renewable energy projects to form part of a diverse energy mix. It considers that the need for any renewable energy NSIP is already established in the consideration of consent.
- 1.4.0.4 In determining a DCO/ML application, significant weight should be attached to considerations of need for energy generating capacity in line with the statements above, and the potential of the Project to contribute to meeting that need (paragraph 3.2.3 of NPS EN-1).



- 1.4.0.5 The Project's energy generation is estimated at approximately 400,000MWh per year. As the average household use is 3300kWh per year (Ofgem typical domestic energy consumption figures, 2011) the Project should supply the equivalent of 121,200 homes. Details of the energy optimisation studies used to determine the energy generation capability of the Project and how it contributes to meeting international and national energy policies and targets are given in Chapter 5 Planning and Policy Context.

1.5 Requirement for an Environmental Statement

- 1.5.0.1 The design of the Project as a generating station is dependent on its ability to hold back water prior to its controlled release. Under Schedule 1 Regulation 15 (Dams and other installations designed for the holding back or permanent storage of water exceeding 10 million cubic metres) of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (the 'EIA Regulations') and the Marine Works (Environmental Impact Assessment) Regulations 2007 an Environmental Impact Assessment (EIA) is required as part of an application for both a DCO and ML. Schedule 2 Regulation 3(h) of the EIA Regulations (installations for hydroelectric energy production) is also engaged. It is therefore considered that the Project constitutes Schedule 1 development.
- 1.5.0.2 TLSB requested a scoping opinion from the Planning Inspectorate under Regulation 8 of the EIA Regulations in October 2012¹; this request stated that TLSB intended to submit an Environmental Statement with its applications for development consent and for a ML. Following this, the Planning Inspectorate was notified of the TLSB's intention to submit an application for a DCO under s46 PA 1008 on 1 July 2013. This notification informed the Planning Inspectorate that the development is EIA development and that an Environmental Statement (ES) will be submitted as part of an application for development consent.

1.6 Rochdale Envelope

- 1.6.0.1 Planning Inspectorate Advice Note 9: Use of the 'Rochdale Envelope' (2012) (the Note) provides guidance on the degree of flexibility that is considered appropriate in relation to an application for a NSIP under PA 2008. The Note states:
- 1.6.0.2 *"The challenge for the EIA will be to ensure that all the realistic and likely worst case variations of the project have been properly considered and clearly set out in the ES and as such that the likely significant impacts have been adequately assessed."*
- 1.6.0.3 *"It may be possible to draft a DCO in such a way as to allow some flexibility in the project. The project should be described in such a way that a robust EIA can be undertaken."*
- 1.6.0.4 On this basis, this ES has been prepared to examine all the realistic and likely worst case scenarios of the Project. Following submission of an application for the DCO, there may be ongoing design work on the Project based on the envelope provided within this ES to develop the detailed design of the generating station, given any changes in technology and parameters that are likely to occur between submission and consent. During this stage, the design and the environmental mitigation measures will be refined and developed to ensure efficiency and effectiveness of these elements of the Project.

¹ <http://infrastructure.planningportal.gov.uk/projects/wales/tidal-lagoon-swanea-bay/>



- 1.6.0.5 As the ES has considered the likely worst case scenario within this envelope, there will be no material adverse change to the assessed environmental impacts of the Project. Furthermore, opportunities may be identified that reduce the impacts of the Project. The variables being considered for the Project are detailed in Chapter 4: Project Description of this ES.

1.7 Structure of the Environmental Statement

- 1.7.0.1 The ES has been prepared in three volumes as follows:

Volume 1 (this volume) (Folders 1 and 2): Non-Technical Summary and Main Text

Volume 2: Figures

Volume 3 (Folders 1 and 2): Appendices

- 1.7.0.2 Volume 1 has been prepared in chapters to present a complete picture of the EIA and effects of the Project for individual environmental subject areas. The following ES chapters, as shown in Table 1.2, have been determined from consultation with regulators and Schedule 4 of the EIA Regulations.

- 1.7.0.3 Each assessment chapter (Chapters 6 to 22) sets the baseline environmental conditions for each subject area. The chapter then evaluates the potential effects that may occur as a result of the construction, operation/maintenance and decommissioning phases of the Project. Cumulative effects are also considered within each of the assessment chapters.

- 1.7.0.4 Supporting figures and technical appendices are presented in Volumes 2 and 3 of the ES.

Table 1.2 Contents of Environmental Statement

Chapter	Title and overview
Non-Technical Summary	A Non-Technical Summary (NTS) detailing the key aspects of the Project and the findings of the EIA process in non-technical language. This has been provided as a separate document available in print and online. The non-technical summary is available in Welsh and English.
Chapter 1	Introduction. This Chapter introduces the purpose of the ES. It then provides a summary of the Project, the consenting requirements, the benefits of tidal power and an overview of the Government's commitments to renewable energy. Finally, the structure of the ES is given along with information on the Applicant and Project Team.
Chapter 2	EIA Process and Assessment of Significance. This Chapter provides further detail on the ES requirements and an overview of the EIA process. It provides information on the consultation process as well as an outline assessment methodology employed within the EIA. Finally, information is given on other projects which have been screened for cumulative or in-combination effects.
Chapter 3	Site Selection and Option Appraisal. This Chapter provides an overview to the Project development. It includes marine renewables and wider site selection ("why Swansea Bay?"); positioning of the lagoon within Swansea Bay; option assessment for lagoon design; turbine selection; and concepts for the operational lagoon including sports, mariculture, education and art.
Chapter 4	Project Description. Detailed information is provided on the Project as a whole from construction through to operation and maintenance. An overview is also given of concepts for decommissioning.
Chapter 5	Planning and Policy Context



Chapter	Title and overview
Chapter 6	Coastal Processes, Sediment Transport and Contamination
Chapter 7	Marine Water Quality Assessment
Chapter 8	Intertidal and Subtidal Benthic Ecology
Chapter 9	Fish including Recreational and Commercial Fisheries
Chapter 10	Marine Mammals and Turtles
Chapter 11	Coastal Birds
Chapter 12	Terrestrial Ecology
Chapter 13	Seascape and Landscape Visual Impact Assessment
Chapter 14	Navigation and Marine Transport Assessment
Chapter 15	Onshore Transport Assessment
Chapter 16	Air Quality
Chapter 17	Hydrology and Flood Risk
Chapter 18	Land Quality and Hydrogeology
Chapter 19	Noise and Vibration
Chapter 20	Cultural Heritage: Marine Archaeology
Chapter 21	Cultural Heritage: Terrestrial Archaeology and Historic Landscape
Chapter 22	Economy, Tourism and Recreation
Chapter 23	Mitigation and Monitoring
Chapter 24	Interrelationships

1.8 The applicant and project team

- 1.8.0.1 The proposed Project is being developed by Tidal Lagoon (Swansea Bay) plc, a special purpose vehicle ("SPV") established by Tidal Lagoon Power Ltd (TLP) specifically for the development of the Project. The SPV will own and operate the Project upon completion.
- 1.8.0.2 TLP was established in 2012 with a vision of using the UK's sustainable and abundant tidal resource to help move towards greater energy security, a low carbon future and lower electricity costs. It aims to help this transition while providing regeneration, economic and recreational benefits to local communities.
- 1.8.0.3 TLP's renewable energy and infrastructure development team has both UK and international experience, supported by multiple leading consultancy firms with specialist experience in onshore and marine surveys, design, engineering and construction.
- 1.8.0.4 The specialist consultancy firms supporting this project are listed in Table 1.3, below.

Table 1.3 Consultant team supporting the project (in alphabetical order)

Engineering team	
Alstom	Turbine design and testing
Atkins Global	Design, engineering and project management
Costain	Engineering and project management
KGAL	Specialist in control and design of water gates
Sgurr Energy	Engineering consultancy specialising in renewables
TenCate	Textiles technology, Geotubes®
Van Oord	Dredging, marine engineering & offshore projects
Voith	Turbine design and testing
EIA team	
APB Marine Environmental Research	Coastal, sediment transport and contamination (Chapter 6); intertidal and subtidal benthic ecology (Chapter 8); marine mammals (Chapter 10)
Clarke Saunders Associates	Noise and Vibration (Chapter 19)
Anatec Ltd	Navigation and marine transport assessment (Chapter 14) and Navigation Risk Assessment
Cotswold Archaeology	Marine archaeology (Chapter 20)
Intertek Energy & Water	Marine water quality (Chapter 7)
MP Ecology	Terrestrial ecology (Chapter 12)
Soltys Brewster Consulting Ltd	Coastal birds (Chapter 11); breeding bird surveys; seascape and landscape visual amenity assessment (Chapter 13)
Turnpenny Horsfield Associates	Fish (including recreational and commercial fisheries) (Chapter 9)
URS Infrastructure and Environment Ltd	Onshore transport assessment (Chapter 15), air quality (Chapter 16); hydrology and flood risk assessment (Chapter 17); land quality and hydrogeology (Chapter 18), terrestrial archaeology and historic landscape (Chapter 21) and economy, tourism and recreation (Chapter 22)
Additional environmental input	
Hyder Consulting Ltd	Habitat Regulation Assessment (HRA) and Water Framework Directive (WFD) assessments (separate documents)
SEACAMS	Research into seawall colonisation, mariculture opportunities, marine mammals and monitoring strategies

1.9

References

Department for Communities and Local Government (January 2013) Planning Act 2008: guidance on the pre-application process.

(https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/49468/Planning_Act_2008_pre-applications.pdf)

Department of Energy and Climate Change, National Policy Statement for Renewable Energy Infrastructure (EN-3) (July 2011)

Department of Energy and Climate Change, Overarching National Policy Statement for Energy (EN-1) (July 2011)

Ofgem (2011) Typical domestic energy consumption figures, Fact sheet 96. (www.ofgem.gov.uk)

Tidal Lagoon Swansea Bay, Scoping Report (October 2012)
<http://infrastructure.planningportal.gov.uk/wp-content/ipc/uploads/projects/EN010049/1.%20Pre->



Tidal Lagoon Swansea Bay plc

Submission/EIA/Scoping/Scoping%20Request/EN010049_Tidal%20Power%20Swansea%20Bay%20Scoping%20Document%20Final%20reduced%20size.pdf

The Planning Inspectorate (April 2012) Advice Note Nine: Use of the 'Rochdale Envelope'

The Planning Inspectorate (November 2012) Scoping Opinion Proposed Tidal Lagoon Swansea Bay. http://infrastructure.planningportal.gov.uk/wp-content/uploads/projects/EN010049/1.%20Pre-Submission/EIA/Scoping/Scoping%20Opinion/121121_EN010049_Scoping%20Opinion_Tidal%20Lagoon%20Swansea%20Bay.doc.pdf

Legislation

Electricity Act (1989)

2009 No. 2263, Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (http://infrastructure.independent.gov.uk/wp-content/uploads/2009/08/uksi_20092263_en.pdf)

Marine Coastal Access Act 2009.

2007 No. 1518, The Marine Works (Environmental Impact Assessment) Regulations 2007 (www.legislation.gov.uk/uksi/2007/1518/contents/made)

Planning Act (2008)

Town and Country Planning Act (1990)