

Appendix (9.5)

Statutory Consultation

Written Responses to the period of statutory consultation from s47 consultees: Members of the public and other individuals

Stakeholder Groups	Type of Consultee
Statutory Bodies	S42(1)(a)
Marine Management Organisation (not relevant)	S42(1)(aa)
Local Authorities	S42(1)(b)
Greater London Authority (not relevant)	S42(1)(c)
People with an interest in land (PIL) Reported in appendix 10.6	S42(1)(d)
Non-Statutory Bodies	S47
Local Community	S47

Comments recorded between 04/07/13 – 05/08/13

** All comments which were received through social media and direct email contact (Info@) were responded to at point of receipt. For all other comments recorded the TLSB response was provided after the fact in compliance with section 49 of the statutory consultation process.

Benefits to the Community

Individual name	Consultee type	Type of engagement	Comment	TLSB Response
n/a	n/a	Social media	I did read somewhere that you can qualify for discounted electricity if you have a share. What is the discount? Will this only come into effect when the project is finished?	TLSB propose a discounted electricity tariff for those living locally to the lagoon, which wouldn't be dependent on having a share. This is also dependant on the operation of the Lagoon.
Suzy Davies (Assembly Member)	S.47	Public Consultation	Interested in promotion of local contracting & Community Fund	TLSB has commissioned local suppliers wherever possible during the development phase and will agree a strategy with the Local Authorities for continuing this during the construction phase. With regards provision of community benefits, TLSB has considered the appropriateness of establishing a fund for the purposes of securing community benefits. It has taken account of the support for such funding and has concluded that by direct provision of infrastructure of benefit to the community it is better able to ensure that such benefits are delivered, and that there is a direct nexus between the Project and the benefits that are delivered. As such, TLSB proposes to invest in the provision of facilities such as the proposed visitor and sporting facilities, which TLSB views as an intrinsic community benefit.
Simon Williams		Social Media	Will there be a public slip to allow access to the lagoon for individuals to use or will it only be for paying groups?	There are no plans to charge for access onto the wall and we want as many people to enjoy it as possible - there will be specific places for the public to swim and enter the lagoon. The slipways will be for the launch of boats into the lagoon and these will be controlled by the watersports centre for health and safety reasons.

Construction & Engineering

Individual Name	Consultee Type	Type of Engagement	Comment	TLSB Response
------------------------	-----------------------	---------------------------	----------------	----------------------

Barry Walton	s47 Non Statutory Consultee	Info@	"Underwater noise is known to be very harmful to the hearing dependant species, how loud will the pile driving be at source? Underwater noise is known to travel for great distances, how will the cetaceans be safeguarded?"	Thank you for your response. It will be recorded as part of our formal consultation process and passed on to the most appropriate member of the Tidal lagoon team. We would be more than happy to meet with Suzy again in September to discuss the Environmental Impact Assessment (EIA) which is underway and the concerns that she has raised" Mitigation methods include 'soft start piling'. See Chapter 19 of the ES for full detail.
Barry Walton	s47 Non Statutory Consultee	Info@	"Many years ago, while working with Balfour Beatty's EPDC design group, I did some work on a highly speculative tidal power scheme for the Bay of Fundy. One of the things that has remained with me ever since is that we missed a trick in thinking ships and having a vertical turbine drive (horizontal primary shaft). Fixing and stabilising the pod, access, bearings and seals all presented problems as the whole machine would be under water. Have you looked at using a horizontal turbine with a vertical shaft perhaps even with no bottom bearing and all of the electrics above sea level?"	We have explored using horizontal turbines with a vertical shaft. We looked at bevel gear bulb turbines, however they had high mechanical losses and were not suitable for the size of machine we need, and vertical Kaplan machines which were not suitable for such a low head i.e.<5m
Dennis Harrett	s47 Non Statutory Consultee	Info@	"Where do you plan to source the infill for the wall of the lagoon and how do you propose to deliver it to the site?"	TLSB intends to use geo-textile tubes filled with sand dredged from the footprint of the lagoon to form the bases of the wall. This will be protected by rock armour which we hope to source from the UK. Please see our website and project film here for more details. See also EIA Chapter 4 for dredging plan.
Richard Crichton-Brauen	s47 Non Statutory Consultee	Info@	"given that the tide comes in and goes out naturally, why a lagoon? Wouldn't the water run through the turbines anyhow? "	The way in which we are proposing to generate energy relies on our ability to hold back the tide for a couple of hours thus creating the necessary water level difference (head) between the inside and outside of the lagoon. It is this 'head' which turns the turbines, this is known as tidal range technology. The mode of generation which you have described is called tidal stream technology; turbines are placed in areas where there is very fast moving water (for example of the coast of Scotland and Pembrokeshire) and they turn when the water velocity is great enough. Here in

				Swansea Bay, we do not have the benefit of very fast moving water in which we could place turbines, however the very large tidal range mean that with a suitable structure we are able to harness the way the tide rises and falls by isolating a body of water within a lagoon structure and delaying the ebb and flood of the tides.
Alan Greenhalgh		Info@	"The 2 hour delay in tides and operational period of 14 hours indicates a minimum head of 1.2m producing 40 MW per turbine. Can you confirm this."	We are currently testing a number of turbine designs to assess the finer detail of energy output. Current estimates suggest that the minimum head for turbining is 1.45m, the max head the turbines would see is 5.5m though they would spend most of the time around 4m. Rated power for each turbine at 5.5m head will be ~20MW.
Nigel Craddock		Info@	"Seeing the design appears relatively well advanced in outline who is responsible for H&S and in particular:- 1. seeing compliance with the Construction (Design & Management) Regulations 2007, 2. seeing the appointment of the CDM Coordinator duties under said above regulations, who is this? Which designers have been commissioned?"	The CDM Coordinator is Sam Fisher from Atkins. She is working as part of the team, informing all parties of their duties and ensuring they are carried out. The designers appointed to FEED (Front End Engineering Design) level are Atkins, LDA Design, Alstom and Voith.
Len Moran (member of Aberavon Kayaking Club)		Info@	"1. What volume of stone will be required to line the inside and outside of the sand bag wall? 2. What type of stone will be used (i.e limestone, sandstone, concrete cast blocks etc) 3. Where do you propose to obtain this stone? 4. Are you going to use an existing quarry, create a new one or re-open using the long term rights of a closed quarry? 5. Will there be planning issues relating to obtaining the stone and if so, have you started that process of application? 6. If you have started that process of application, would it be possible for me to see details of that?"	The stone needed for the rock armour of the lagoon wall is limestone, and we are in the process of completing an agreement with a quarry in North Wales to source the rock, although potentially we will only source rock for there during part of the year because of the environmental impact on certain species. We also hope to source rock form another quarry in Cornwall the remainder of the year.

John Cherry		Social Media	I personally think it's a great idea, however I have not yet been able to find any answers to some of my concerns within your current literature. How often the lagoon require dredging? How will the silt/sedimentation deposits affect the capacity/performance of the turbines. Swansea bay area is affected by very high sediment levels, will the lagoon not become a salt marsh overtime? What other schemes of this type have been/are successful worldwide?	These issues have been fully assessed as part of the Environmental Impact Assessment. Full results will appear in chapter 6 (Coastal Processes, Sediment Transport and Contamination) of the ES.
Simon Williams		Social Media	"Thanks for the reply [...] whilst I understand and believe in the need for control it hasn't answered if as an individual will I be able to launch and use the lagoon to sail in	Members of the sailing/watersports club will certainly have free access to slipways. Outside of that membership, access issues have not yet been determined, pending detailed agreements for management of the club.
Hugh Jones	s47	Public Consultation	Half the day the water is flowing in, not out.	That is correct. The turbines are bi-directional, so that they can generate electricity when water is flowing into the lagoon and also when water is flowing out of the lagoon.
Hugh Jones	s47	Public Consultation	At half tide the water is neither flowing in nor out	That is correct. We need a water level difference between the lagoon and the sea, and this level difference drives the turbines which then generate the electricity. At half tide there is no water level difference and you can then not generate any electricity. From our calculations, we can on average generate electricity for a period of about 16 hours per day.
Hugh Jones	s47	Public Consultation	We do not use much electricity in the middle of the day so no power required at these times.	Electrical consumption is not a constant throughout the day, and there are times with higher and lower peaks in demand. People still use power in the middle of the night for the fridge or for heaters, aircon etc. We have the ability with tidal turbines to simply switch some of them off and close the gates, and produce less electricity if that is required.
Hugh Jones	s47	Public Consultation	There is already a large enclosed area which could be used, thus no sea wall required — Portland Harbour in Dorset.	Yes, but it is a working port, vessels need to be able to go in and out, which means that you need a lock structure. But most importantly, Swansea has a spring tide of about 10m. Portland has a spring tide of only

				about 2.5m. A tidal lagoon with that sort of tidal range will not work.
Hugh Jones	s47	Public Consultation	The generators of electricity come from British discoveries and engineering developments but now we must buy German, leaving no career opportunities for young British engineers. Why?	The main turbine manufacturers in the world are either French, German or Swiss. There are no large British turbine manufacturers. We have asked all manufacturers to optimize the use of local resources/ products/labour. British engineering jobs will be required for some of the manufacturing of components, for the installation, the commissioning and operation and maintenance work for the turbines. The turbines are also only one part of the overall project. In addition, we need to build the bund walls, the turbine housing structure and the associated other infrastructure (and do the design for all of that), all of which will require British engineering input.

Consultation

Individual Name	Consultee Type	Type of Engagement	Comment	TLSB Response
Nigel Hill		Info@	We would like you to consider giving a presentation to the committee at next year's AGM that has been scheduled to be April 2014. The committee is supported by an administration team employed by the Chartered Institute of Building and if you wish to take up the offer then I will pass that team the necessary details. I and others would also personally like to come down to the office so that I can meet the team that is involved in these stages of promotion.	It's fantastic to hear that your Committee would like to find out more about the project and I'm sure that a member of our team will be able to come and speak at your AGM. Please do keep us informed. You are also more than welcome to come and visit our office although it is presently very quiet. If possible, I would urge you to come along to one of our consultation events this month, please see the attached document for details.
Joshua Caulton	s47 Non Statutory Consultee	Info@	As part of my third year I have to complete a dissertation, which I was hoping to base upon the proposed lagoon. My aim is to use the lagoon as a case study and to use a questionnaire to identify differences in the concern of individual stakeholder groups within the	I'm sorry to hear that you are unable to attend any of our events this month, however we will almost certainly be holding events in the coming months so I would recommend that you sign up for updates on our website. You are also welcome to get in touch when you return to Swansea and to drop into our office to discuss our stakeholder mapping methods. It

			<p>area.</p> <p>However during non-term time I live in the West Midlands so have been unable to make the consultation meetings that you have organised. I wondered if you had minutes for those meetings or associated information that you have collected that would be available to me, I also wondered if it would be possible for you to tell me what methods you as a company have used and plan to use to communicate with local stakeholders within the community.</p>	<p>will be reported on in detail in our Consultation Report which is a key part of our application. Other consultation reports are available on the Planning Inspectorate's website (for more information about planning please see our website).</p>
Mathew Llewelyn		Social Media	<p>Do you ever attend local businesses who are interested in sharing what's going on with their staff?Jul 06, 5:51pm</p>	<p>Hi Matthew, yes we are reaching out to local businesses. Please can you send me your contact details and I can arrange for one of the team to get in touch.Jul 08, 9:43am</p>

Education

Individual Name	Consultee Type	Type of Engagement	Comment	TLSB Response
Chris Jones (Neath-Port Talbot Council)	s42 Local Authority	Info@	<p>"Currently formulating a schools energy/carbon management guide for all of the schools within the Authority and intend to provide a section on all of the key renewable installations within NPTCBC and surrounding Authorities a key project within this section being the Tidal Lagoon, therefore any information will be gratefully received."</p>	<p>"Thank you for your interest in this proposal. I would be more than happy to provide you with information for this resource. Many of the documents which we have on file are communications material introducing the proposal. We also have a large range of Powerpoint slides with information about the different aspects of the project, for example; energy output, engineering design; the Environmental Impact Assessment (EIA) which we are undertaking, the planning process, masterplanning and community benefits. If you are more interested in figures such as the carbon footprint and carbon saving of the project then they are available as part of our recently published Preliminary Environmental Report on our website here, specifically in Chapter 3 – Site Selection and Option Appraisal. I'm afraid the document is too large to send my email but I can provide you with a DVD if it is more convenient."</p>

Kate Treacy (Llangatwg Community School)	s47 Local Community Consultee	Info@	Thank you for your response regarding GCSE geography, i understand how busy you must be. The Autumn term would be ideal for us, as this is when we will be on the climate change unit. If you could please send me a contact number then I will ring you as soon as we return to school in September. We can then discuss an outline of the key ideas we cover in this unit. I am really looking forward to the presentation/workshop you could show the pupils, as your knowledge and expertise will be invaluable.	TLSB welcomes this engagement as part of its commitment to ongoing local education.
Elena Segalini-Bower (Hereford Cathedral School)	s47 Local Community Consultee	Info@	We are celebrating Biology Week between Monday 14th and Friday 18th of October 2013. If you could join us for an afternoon lecture during that week it would be even better.	Biology week would be a fantastic time for me to come and do a presentation. I am happy to focus on the project as a whole or enquire whether a member of our Environmental Impact Assessment team could come along and give a more biodiversity focused presentation. I will put the event in my diary and I would be very grateful if you could let me know the details nearer to the time.

Energy & Renewables

Individual Name	Consultee Type	Type of Engagement	Comment	TLSB Response
David Mann	s47 Non Statutory Consultee	Info@	"I have a suggestion. Your tidal barrier, particularly the length facing South West, will have waves dissipating on the outer face. Why not make use of this. By the addition of a short length of platform on the outer face of the barrier you could set up an experimental area for researching wave energy devices and possibly creating some extra power. Food for thought?"	"Thank you for your interest in this proposal. Your suggestion will be recorded as part of our formal consultation and passed on to the most appropriate member of our team. We certainly think that our visitor's centre has the potential to become a hub for renewable energy knowledge and innovation, and we are hoping to work closely with the University of Swansea and other academic institutions."
Brian Jones	s47 Non Statutory Consultee	Info@	Solar pv panels on the building roofs – both the buildings on the shore, and on the Visitor Centre and other shelters along the length of the sea wall (although I accept the point made by your representative that you'd have to carefully consider the effect of sea water spray on the panels).	Solar pv panels on the building roofs – both the buildings on the shore, and on the Visitor Centre and other shelters along the length of the sea wall (although I accept the point made by your representative that you'd have to carefully consider the effect of sea water spray on the panels).

Brian Jones	s47 Non Statutory Consultee	Info@	Wind turbines – on the strongest section of the sea wall (between the Boating Centre and the Visitor Centre), the wall could be designed so that wind turbines could be fitted at a future date. Not huge ones, but ones of a scale suitable for the location. I can appreciate that the inclusion of wind turbines in the planning application now would only make getting planning permission harder to get, due to the current level of opposition to wind turbines; however, in the longer term, I believe that wind turbines will become more accepted, so an application 10 years into the lagoon to add turbines would, I believe, be approved.	Wind turbines – on the strongest section of the sea wall (between the Boating Centre and the Visitor Centre), the wall could be designed so that wind turbines could be fitted at a future date. Not huge ones, but ones of a scale suitable for the location. I can appreciate that the inclusion of wind turbines in the planning application now would only make getting planning permission harder to get, due to the current level of opposition to wind turbines; however, in the longer term, I believe that wind turbines will become more accepted, so an application 10 years into the lagoon to add turbines would, I believe, be approved.
Pete Thomas		Social Media	just out of interest, could you confirm that you have nothing to do with the proposed fracking on swansea bay?	Aug 08 6.40am Hi Pete. We are not involved in fracking, our focus is developing the Tidal Range industry in the UK.
Hugh Jones	s47	Public Consultation	Half the day the water is flowing in, not out.	Yes that is correct. That is why the turbines are bi-directional, so that they can generate electricity when water is flowing into the lagoon and also when water is flowing out of the lagoon.
Hugh Jones	s47	Public Consultation	Hugh Jones primary concern is “ why would you have government to sponsor this project for say 16 p per kWh, if you can buy gas or nuclear for 7 or 8 p per Kwh. We informed Mr Jones that the latter has environmental concerns and not the former, but a more specific response was requested.	DECC has published its consultations on the draft Electricity Market Reform Delivery Plan, to which we will be responding. The draft Plan provides detail on the support mechanism (long-term Contracts for Difference) and draft strike prices for renewables. ‘Tidal range’ projects, which include both ‘tidal lagoon’ and ‘tidal barrage’ technologies, do not have a published strike price. Instead, given the lack of cost data available, DECC will consider how best to price CfDs and the appropriate length of contracts for these projects on a case by case basis. This is the outcome for which we have been lobbying DECC and allows us to negotiate with them separately
Suzy Davies (National Assembly for Wales)	s47	Public consultation	Why move in to tidal at this time?	The United Kingdom has huge potential for tidal power. Wave and tidal energy offers a predictable and consistent source of renewable energy. Developing the potential of marine energy resources

				<p>will help the UK:</p> <p>save around 61 metric tonnes (Mt) of carbon dioxide (CO2) by 2025 (valued at an estimated £1.1 billion to the UK economy)</p> <p>help meet the UK's renewable energy objectives</p>
Environmental Impact				
Individual Name	Consultee Type	Type of Engagement	Comment	TLSB Response
Martin Slucutt	S47	Info@	<p>Following on from the informal consultation in April 2013, I continue to be impressed by the whole range of positive aspects this project could potentially deliver to the local community and not just the positive environmental benefits of being able to generate predictable, clean energy close to the shore.</p> <p>There is clearly an opportunity to make this a showcase project for future tidal lagoons in the Severn Estuary and the rest of the UK. I would welcome the opportunity to use the tidal lagoon as somewhere novel and interesting to walk, cycle and run, and as member of the Mumbles Amateur Rowing Club (MARC) to use the potential facilities to be provided for local access to the sea for sea rowing, and other water sports.</p> <p>I was especially interested this time in the more detailed proposals presented involving the proposed buildings, parks, and those facilities forming the public realm and Marine Park. The development of the lagoon presents an excellent opportunity to regenerate and open up public access to the coast in front of Swansea Docks to the east of the River Tawe and make a pleasant and accessible coastal connection to Swansea University's new SAIC.</p> <p>In terms of public access to the lagoon walls, it would be important and good if they could be open</p>	<p>The contamination of sediments is assessed in Chapter 6 of the ES which determines that the sediment within the footprint of the lagoon is within CEFAS appropriate levels.</p> <p>The use of materials has been considered throughout the design process of the Lagoon and chosen on the basis of their environmental impact, viability and ease of use.</p> <p>Geotubes® have been used for over 50 years and the longevity of the material is integrated into the design.</p>

		<p>all year around without access being restricted due to the light of day or the season. Otherwise, it would not be possible to enjoy the benefit of walking, cycling or running around the lagoon during an evening after work in the winter because it was too dark. It would be reasonable though to expect that they may only be open to the public between the hours of 6am and 10pm, for example. This would, of-course, be dependent on the weather, weather forecasts, and the temperature. Would the lagoon walkways become dangerous due to ice during sub-zero temperatures?</p> <p>Whatever the restrictions in place, there would, of-course, need to be shelters placed regularly along the lagoon walls for pedestrians and cyclists (i.e. not just fishermen) in case the weather unexpectedly turned poor very quickly and people found themselves caught out in bad conditions. In such conditions, there would also need to be provision to ensure people could be evacuated off of the lagoon walls. This might also be needed for those who had started their journey (in good weather conditions) with plenty of time but had been delayed and were unable to make it to one of the walkway entrances in time before they officially closed. This could either be done using an electric land train, if they are to be used, or sweeper O&M vehicles.</p> <p>I like the idea of having curving walkways that take pedestrians and cyclists away from the lagoon walls and out over the water of the lagoon. This and all the other features along the lagoon walls such as the spectator area will add to the interest and utility of the lagoon to tourists, local people and those able to make use of the provided sports facilities. It is clearly important that changes to the Swansea Waste Water Treatment Works outfall go ahead in order to protect the water quality within the lagoon, especially for those wishing to participate in contact</p>	
--	--	--	--

			<p>water sports. Has it been considered to have frequent, regular monitoring of the water quality in the lagoon during its (at least initial several years of) operation to ensure that it conforms to the quality predicted by the models and to ensure it is always as predicted and safe for use?</p> <p>I believe it is important that all, if not most, of these and all the other potential social, regeneration and environmental benefits are included if the lagoon is built and is to be completely successful and take pride of place in Swansea Bay. If for some reason there should be a shortfall in funding the construction of the lagoon, or costs were to dramatically increase, would the lagoon that is built end up being more functional (in terms of being a lagoon for energy production) and less beneficial in general to the people of Swansea, should the building of a lagoon still able to proceed in some form? Whilst this may be a possible concern, hopefully the project will be able deliver fully on most, if not all, of the ideas presented.</p> <p>When the design has been more finalised, and as part of the Environmental Statement, will the expected carbon footprints of the three main phases (construction, operation & maintenance, and decommissioning) over the lifetime of the lagoon be calculated, and included or published? It would be interesting to compare these to that of the North Atlantic Array (assuming they have made such a calculation) and how much this would be per GW/h of electricity generated, and how this compares with other forms of power generation. A good result here would clearly be able to help promote the benefits of tidal lagoons over other forms of energy generation and make a good case for tidal lagoons at other places around the UK.</p> <p>I found the 3D interactive model of the tidal lagoon</p>	
--	--	--	--	--

		<p>presented during the consultation to be very good and very detailed (even down to ships going into and out of the River Tawe, and the cyclists on the lagoon walls ☒) and it was good to be able to see and interact with it on a larger screen. It was quick and smooth to operate although quite sensitive to the placing of a finger on the screen such that if your finger was not perpendicular to the screen, it was difficult not to move the position of the model before your finger even touched the screen. This made it difficult to move the view accurately to a given position around the bay, so the model could have benefited from markers (or a menu) for fixed viewpoints that could be selected and took the viewer directly (and therefore accurately) to them. It was great to be able to adjust the tide level and change daytime to night-time too.</p> <p>Using the model has raised one consideration. I like the idea of a series of pearls lighting up the walkway and lagoon walls at night, however most modern lighting is required not to contribute to light pollution in the night sky and is therefore required to be pointing downwards towards the ground or have a reflective cover above. How could this requirement be incorporated into the design of the pearl lights? Would it be a case of placing a disk (much larger in diameter and at an angle) a few metres above them to reflect any light going upwards back onto the lagoon walls?</p> <p>Unfortunately I have not had the time I would have liked to have read more of the PEIR and investigated whether answers to my previous questions raised during the informal consultancy have been addressed. I have therefore repeated some of these questions below for consideration (if they have not been considered so far):</p> <p>a. How much of the seabed of the bay around the</p>	
--	--	---	--

			<p>mouth of the River Tawe is polluted with / has trapped minerals and chemicals, washed down from Swansea's former copper smelting industry? And if disturbed during the construction of the tidal lagoon, could the water in the bay be polluted until they perhaps resettle?</p> <p>b. Has it been considered which other materials could be used instead of concrete for the main walkway on top of the lagoon walls, that would have a lower-environmental impact?</p> <p>c. Whilst it is accepted that use of the Geotubes forming part of a standard breakwater must have already passed certain environmental standards / credentials, the woven fabric/plastic of the Geotubes must still gradually degrade over time, where does the fabric/plastic go? Does it gradually break up in the water? Is it ingested by microbes or small creatures so that it enters the food chain? Are the Geotubes covered with or soaked in a chemical during manufacture to protect them, which might gradually leak into the salty water?</p>	
Geraint Davies MP	S47		<p>I wish to submit my concerns to your consultation on the Tidal Lagoon.</p> <p>I am concerned that the Lagoon will affect the iconic view of Swansea Bay and our ambition to become a quality tourist destination and UK City of Culture. It could impact on future cruise access and open seas for water sports.</p> <p>From an environmental perspective, digging up the sea bed could result in contaminating the Bay by dredging up toxic waste. This could affect the environment for years to come. The Lagoon could also affect the sewerage system, particularly in the</p>	<p>TLSB accepts that the lagoon will have a visual impact on the views of Swansea Bay, but considers that mitigation through design and the provision of facilities for tourists will outweigh any impacts on tourism.</p> <p>Results from the contamination assessment are discussed in paragraph [6.4.4.4] of the ES and indicate that the contamination levels in the footprint of the lagoon do not exceed Cefas Action Level 2, and are therefore not considered to be contaminated in relation to their use or disposal.</p> <p>The electricity produced will be sold to the National</p>

		<p>event of flash flooding.</p> <p>I am also concerned that the scheme will not directly benefit Swansea as it will generate the electricity for 120,000 homes somewhere on the UK Grid, even though the biggest investment risk for the Lagoon will be with early local investors.</p> <p>Swansea Tidal Lagoon Briefing Note on Key Issues</p> <p>Prepared by Professor Dominic Reeve and slightly amended by Professor Ian Cluckie In relation to the proposal there are three areas of concern:</p> <ol style="list-style-type: none"> 1) What happens inside the lagoon; 2) What happens at the embankment; 3) Impacts external to the development. <p>Dealing with these in turn:</p> <p><i>Inside the Lagoon</i></p> <p>The construction of the embankment will shelter the enclosed area from the existing wave climate. The significance of this from a coastal engineering perspective relates to sediment transport. Wave breaking agitates the seabed sediments into suspension. The larger heavier particles settle rapidly but the finer particles can be moved a long way by currents. On a natural coast, sediments move from one area to another without interruption. With the lagoon in place fine sediments in suspension will settle more freely in the absence of wave action. Over time these sediments will accumulate without additional measures to remove them. The sediment in Swansea Bay is classified, on Admiralty Charts, as sand/mud. Without doubt, over time, mud particles suspended in the water will enter the lagoon, settle, and accumulate in areas where the currents are</p>	<p>Grid for use nationally. However, TLSB is committed to passing on a portion of revenue to subsidise a local electricity tariff. This will be in the form of producing a Swansea Bay electricity tariff offered by Good Energy and subsidised out of lagoon revenues.</p> <p>Local investors have made investments with the full knowledge of risk.</p> <p>Impacts on sediment settlement within the lagoon will be managed through regular maintenance dredging.</p> <p>The seawall is designed to be of such an angle as to minimise wave impact; it is due to this angle that smaller armour is used at the top of the wall. TLSB intends to source the rock from a quarry owned by a sister company and transport it to site by barge.</p> <p>The geotube® material has been extensively tested and used for over 50 years and is suitable for use in marine environments. The rock armour will provide suitable protection for the geotubes. As explained above, the level of contamination in the lagoon footprint and therefore within the geotubes is within Cefas appropriate levels.</p> <p>Baseline studies against which to predict and assess impacts have been carried out as a basis for the extensive Environmental Impact Assessment process. Monitoring and mitigation of impacts will be provided for within the CEMP and OEMPs.</p> <p>Impacts on the navigation channels have been assessed as minor adverse; any impact on navigation through sedimentation will be monitored and mitigated by maintenance dredging. [Paragraph 6.5.2.35] of the ES assesses the potential significance of impact on the Bay as neutral.</p>
--	--	--	--

		<p>lowest; in the centre of the lagoon and at the shallow edges. Various possible mitigation measures are available, such as: a sediment curtain installed at or near the entrance; artificial agitation of the water body with pumps; an on-going programme of dredging and re-nourishment of the sandy beach frontage. The lagoon itself over time could present with a muddy foreshore rather than the “Floridian” landscape presented by the promoters marketing team. No technical analysis carried out to date addresses this problem sufficiently.</p> <p>At the Embankment</p> <p>The structure will be ~8m high at mean tide level – the height of a 2 to 3 storey building!</p> <p>The proposed rock armour on the Atkins’ cross-section of 4-8 tonne seems a little on the small side given the protection at Neath/Port Talbot where 12 tonne units are in place. However, their bermed construction may address this to some degree, although this can only be determined from detailed analysis of the wave conditions – that has not yet been made available. I also note a reduction in rock size on the upper part of the structure that is unusual as the greatest wave impact forces are often near the crest of the structure. It is also worth noting that rocks above ~8 tonnes are difficult and expensive to source so designers and contractors tend to use concrete units in these cases – with consequent impact on carbon footprint and amenity. Atkins partners, TenCate, are manufacturers of geotextile – hence the proposed construction approach. The geotubes are to be filled with the material dredged as part of the lagoon creation. Dredged material is automatically classified as contaminated unless proven otherwise. Hence the geotubes have a dual purpose of contaminant containment as an integral part of the structure. Geofabric is porous to some degree so it needs to be</p>	<p>The visual impact of the project is assessed as significant on areas immediately adjacent to the project, and moderate on surrounding areas. However, it is considered that the development delivers a benefit to Swansea Bay through the provision of public realm. The design of the lagoon has been considered in the context of the Bay and mitigation, such as the choice of rock armour, has been provided through design of the scheme.</p> <p>TLSB are continuing consultation with Dwr Cymru Welsh Water (DCWW) to establish the best option that will be taken forward to manage the waste water treatment works (WwTW) outfall. A full investigation of FIO indicator concentrations in the bay and within the impoundment is undertaken in the EIA, as per a typical study for a bathing water investigation. This includes modelling dry and wet weather conditions with all significant sources considered.</p> <p>To ensure that compliance with the rBWD is achieved in light of TLSBs aspirations for water contacts sports and events, the modelling results are analysed against the revised BWD standards to determine potential Class in the lagoon under current and future conditions. The effects of the lagoon on mixing and dispersion are discussed in section 7.8.1 which has identified that the presence of the lagoon will have a generalised positive effect on water quality.</p>
--	--	---	---

		<p>checked whether the dredged material will leach from the geotubes. I was involved in some lab tests of geotubes filled with sediment in the recent past, and significant leakage of fines was observed once the material had wetted thoroughly. For a tube of drainpipe dimensions this took about a week. For larger tubes this might take months or even years, depending on the nature of the sediment. Use of geotube fabric has been tried and tested in fluvial environments but I am not aware of any scheme using them in the more challenging marine environment. I would recommend extensive and careful testing of the performance of the intended design, as well as the potential for material to leach from the tubes under the repeated wave loading they will be expected to endure. It is well to be reminded that the lower Swansea Valley has contributed significant heavy metals and other contaminants since the early 1700's. These will largely remain in the Bay and may produce problems if disturbed.</p> <p>External Impacts</p> <p>If DEFRA were funding this they would stipulate the owners implement a long term monitoring programme (post-project monitoring). This would typically include: measuring the nearby beach/marsh on a quarterly basis; measurements of tides, waves, winds, bird and fish counts, etc etc ... plus some analysis of the data to inform on-going maintenance and mitigation works. Critically, monitoring should start before construction to develop a 'benchmark' against which to compare measurements during and after construction. The university would be ideally placed to undertake this and NRW could advise on the coastal management policy issues.</p> <p>The lagoon will provide some defence to the existing shoreline but will strongly alter the wave climate on the shore in the NE part of the bay. Wave reflections</p>	
--	--	---	--

		<p>from the lagoon wall are likely to adversely affect the port navigation channels on each side. In the longer term, the lagoon will alter the existing balance of wave and tide driven sediment movements in the bay. The exact nature of the changes will require modelling. For a scheme of this magnitude, some realignment of the shoreline can be anticipated as well as the possibility for additional works to stabilise the beaches and protect existing infrastructure and valuable environmental habitats from flooding and/or erosion. The existing beach environment of Swansea Bay could be radically changed?</p> <p>Other</p> <p>Visual impact of the construction is going to be obvious. With a contained area of over 13 Km² the impact on Swansea Bay will be very considerable. Noise and dust will also be major considerations during construction and could be a major environmental impact. If the embankment were to fail due to the impact of a severe South West Gale then the consequences of repair need to be identified.</p> <p>A major sewage outfall (over 250k people) discharges into the area enclosed by the lagoon. This is the result of the extensive reconfiguration of the trunk sewers some years ago that closed the outfall at Mumbles Head and re-directed all the sewage of the city via large interceptor sewers under the River Tawe to the Welsh Water Treatment plant at St Thomas. The outfall with diffusers was carefully designed at the time by Delft Hydraulics to ensure that no sewage would end up on the beaches of the Bay. The effluent is usually treated but in the case of severe storms (which naturally occur several times a year) the raw sewage bypasses the treatment works and will be released inside the proposed Lagoon. This will present a potentially severe health hazard</p>	
--	--	---	--

			<p>and may impact upon any proposed water use of the Lagoon by the promoters. This will be an additional source of fine material as well as nutrients. The ability of the lagoon to be efficiently flushed by the tides is not yet established, or mitigating measures implemented to prevent eutrophication and siltation. This could have a severe impact on the environment of the new university campus. None of this analysis is currently available.</p> <p>The Ports of Neath and Swansea could be adversely affected by the new sediment regime and additional dredging could at the minimum be the result with the possibility of severe impact on the main shipping channels. None of this analysis is currently available.</p> <p>The impact of the Tidal Lagoon on the SSSI's next to the new campus at Crumlyn Burrows and at the mouth of the River Neath on the Baglan side is currently unavailable.</p> <p>Professor Dominic Reeve, PhD, CMath, FICE, FIMA Professor Ian Cluckie, PhD, CEng, FEng, FICE, FICWEM, FRMetSoc.</p>	
Anthony Nelson Smith			<p>I am a retired professional marine biologist with a PhD in that subject; I have participated in several investigations of the impact on the marine environment of oil industry structures and operations around the Middle East for the maritime agency of the United Nations as well as for various UK installations, in addition to my own studies on the shores of Milford Haven and Gower. Now living in North Gower, I was not aware of the consultation arrangements regarding the lagoon until a past student called my attention to your informative website.</p> <p>My concern is about the possibility of injury to large fish, marine mammals and maybe the occasional turtle passing through the turbines. I appreciate that these only have three blades, rotating very slowly,</p>	<p>Fitting mesh screens in front on the turbines proposed for this development (bulb turbines) is not possible. Screens would significantly impinge operating capacity and functionality. However, TLSB have taken into</p>

			<p>which might possibly allow small fish to pass without injury. There appears to be no mention of preventing the incursion of large animals by fitting a mesh screen to the turbine intakes.</p> <p>Such a mesh could be quite coarse – gaps of 10-12cm should exclude the larger fish and, obviously, turtles and mammals – to reduce the possibility of their becoming blocked by suspended rubbish etc. the regular reversal of flow should help clear much of this and surely occasional clearing, if necessary, should be much less trouble than the proposed capture and release of introducing animals. I assume that, under normal circumstances, the rim of the retaining wall is not covered by a depth of water sufficient to allow the animals in question to swim over it. I'm not clear when the sluices are opened but perhaps these, too, require such screening, at least on their outside.</p> <p>I appreciate that there may be unavoidable problems during the construction phase, although I imagine that the consequent disturbance would probably keep these animals away from the site.</p> <p>My main personal interest has been in sedentary invertebrates and, of course, these should benefit from the introduction of large solid structures into an environment predominantly sandy.</p>	<p>account the possibility of larger animals coming into contact with the turbines. As part of our EIA TLSB have investigated the likelihood of large fish and marine mammals encountering the turbines and have assessed potential mitigation strategies focused on minimising impact. The results of the assessment and associated mitigations strategies will be presented in the relevant chapters of the ES.</p> <p>The Lagoon wall will sit above the sea level and animals will not be able to pass readily.</p> <p>Construction of the Lagoon wall will promote biodiversity by creating several kilometres of artificial reef habitat as well as provision for mariculture.</p>
Phil Coates		Letter	<p>My attached response is provided as a <u>private individual</u> who resides in Mumbles and does not reflect any professional or employment affiliation.</p> <p>However, professionally I Head up the Welsh Government Fisheries Science & Evidence team and I am responsible for overseeing Fishery Habitat Regulation Assessments.</p>	;;

		<p>I am a Marine Biologist by training, with an MSc in Environmental Technology and a specialism in water management. My recreational interests (past or present) include windsurfing, dinghy sailing (instructor), sea angling (Welsh International and occasional author), surfing and diving.</p> <p>I consider that my practical experience, academic training and other experiences provides something of a unique outlook that might be of interest to the TLSB team.</p> <p>I am personally in favour of the project. I take the view that there is no such thing as an energy project that has no environmental impact at all. It is a question of what might be an acceptable impact having considered various mitigating factors that might be applied, and whether any project is still commercially viable having applied them.</p> <p>In respect of the outline proposals I make the following diverse observations:</p> <p>- <u>Tidal currents</u> The proposal will impact upon the tidal currents within the bay and disrupt the anticlockwise tidal gyre. It will also shelter the northern end of Swansea beach from wave actions from some wave directions. This will impact upon fine sediment settlement especially at the Observatory end of Swansea beach and at Mumbles, the extent of which will no doubt be subject to modelling. The tidal gyre is especially noticeable 100 – 150m off the sea front at Knab Rock, Mumbles which on most days is seen as a line between clearer offshore water and more turbid inshore waters. It would seem to me that this “front” will cease to exist if the Lagoon is built – significance unknown.</p>	<p>Possible effects on the tidal regime, currents and tidal gyres have been taken into account as part of the physical modelling undertaken as part of the EIA. The full results of the modelling and mitigation strategies are detailed in Chapter 6 of the ES (Coastal Processes Sediment Transport and Contamination).</p>
--	--	---	---

		<p>- <u>Crymlyn Burrows</u> The construction trajectory of the north eastern lagoon wall as it intercepts the shore at Crymlyn Burrows may have interesting consequences and again will require modelling to consider the most acceptable outcome. These include impacts on the supply of sand to Crymlyn dunes and the extent to which a muddy slack area may develop / be developed in its lee. This <i>could</i> have benefits to cockle settlement (ie commercial fishery) and waders & wild fowl. I am suggesting that there will be wave & tidal implications for sediment transport in that leeward area but these could (on some counts) be beneficial.</p> <p>- <u>Biodiversity</u> <i>Sabellaria</i>, a species of biodiversity interest is present on the outer arm of the eastern breakwater. On a personal basis I wonder what the fuss is about concerning their importance, especially those non erect individuals living in more exposed conditions (such as is the case locally). I wonder, however, if in time the species may colonise the new structure – possibly in greater numbers than is currently the case, owing to the greater surface area offered by the new rock face. But there may also be options in helping the species recolonise.</p> <p>- <u>Water quality</u> The discharge of treated effluent from the Swansea STW into the new embayment has been noted. It is difficult to reconcile the use of the area for recreational or even aquaculture use if that is to be maintained. Even without such uses, the inside area is a far less dispersive environment than would be the case if the discharged is extended outside.</p>	<p>The concerns in relation to sediment transport have also been addressed through the modelling undertaken to assess coastal processes as detailed in Chapter 6 of the ES. Furthermore, potential ecological impacts upon Crymlyn Burrows have also been assessed as detailed in Chapter 12 (Terrestrial Ecology) of the ES.</p> <p>Relocation of existing <i>Sabellaria</i> is proposed as a mitigation strategy. Creation of the Lagoon wall will also create several kilometres of new artificial reef habitat which should increase biodiversity.</p> <p>Several options for addressing the Water Quality with the Lagoon have been assessed and are detailed in Chapter 7 (Water Quality) of the ES.</p>
--	--	--	--

		<p>- <u>Dredged material</u> The use of local sources as dredged infill material as opposed to finite sources of offshore virgin sand may be seen as a positive. However, there are legacy industrial materials which have entered the bay from the River Tawe and at very least these will be suspended as fines and become oxidised, releasing cadmium, iron, copper, zinc tin and lead which is currently trapped and immobile into the water. The extent of this will have to be assessed and the risks evaluated.</p> <p>- <u>Herring spawning area</u> The proposed location is directly located on a winter herring spawning ground. It may be that the population will be displaced. Alternatively it may be necessary to assess the likely interaction with turbine blades. I presume that such an assessment will be routinely undertaken even without the herring spawning?</p> <p>- <u>Aquaculture</u> Again, the promotional literature has identified opportunities. These need to be fully considered alongside local experts such as Swansea University Aquaculture centre. Some species may be a good fit, others less so. But there are also opportunities to link aquaculture with wild stock management in novel ways for instance regeneration of native oysters and even ranching of other species (like lobster, sole & bass) which I would be happy to discuss. Mussel culture on suspended ropes is another obvious opportunity. However, each has the potential to conflict with other proposed activities within the new enclosed basin. The outside rock bund construction has the potential to house lobsters and crab, thus enhancing local</p>	<p>Appropriate assessments of the sediment have been undertaken through geotechnical and geophysical surveys. The results of which are detailed in Chapter 6 of the ES.</p> <p>An assessment of the potential impacts upon fish and fisheries has been undertaken. This assessment has incorporated detailed fish modelling looking at possibility of encounters with the turbines and mortality rates. TLSB have also investigated possible mitigation strategies to reduce impacts. The full results of this are detailed in Chapter 9 (Fish, Including Recreational and Commercial Fisheries) of the ES.</p> <p>Consultation has been ongoing with key stakeholders including Swansea University. Proposals for the mariculture facilities include regeneration of the native oyster stocks.</p> <p>It is expected that the creation of the Lagoon wall will create suitable habitat for many crustaceans and increase the biodiversity of the Bay.</p>
--	--	---	--

		<p>populations, depending upon the grading of material used (size of orifices offered).</p> <p>- <u>Sea Angling:</u> The structure could provide a very favourable promontory to support this economically and socially important recreational activity. Issues will arise in access, safety & litter. However, big commercial and promotional opportunity exists, in my opinion, to lever the benefits of competitive sea angling through having a sponsored annual sea angling competition fishing from both the outside and inside walls and I have some further views on this.</p> <p>- <u>Dinghy sailing & other water sports (rowing, triathlon etc) .</u> Promotional opportunity exists, as has been identified. But the full extent will depend upon how each water sport activity can co-exist with the location of the turbine housing and other activities (like sea angling & aquaculture).</p> <p>- <u>Surfing.</u> By setting the angle of the eastern lagoon wall to run parallel with the prevailing (refracted) south westerly swell and possibly by adding an underwater obstruction (reef), then a surf-break might be created. This could create a substantial community asset but would obviously have to be subject to further modelling and cost appraisal as well as impact assessment on navigation up the River Neath channel and landward coastal defences.</p> <p>- Wind turbines – Obviously not without visual impact, but the environmental benefits of the hard structure created could be maximised by turning a tidal project into a full renewable energy project.</p>	<p>The Lagoon will be accesable to the public during daylight and TLSB actively support angling from the Lagoon wall.</p> <p>Noted.</p> <p>Noted.</p> <p>There are no provisions for a multi renewable project at present. However several other ‘renewable’ features are being incorporated into the design and</p>
--	--	--	--

			<p>I would be happy to discuss any of the above aspects.</p> <p>Meanwhile I wish the project a fair wind and, assuming that the environmental appraisals do not throw up any significant adverse impacts, every commercial success.</p>	<p>masterplanning, such as solar panels on the visitor centre.</p>
Mr B.M. & Mrs J.E Burgess	S47	Letter	<p>The construction of the embankment will shelter the enclosed area from the existing wave climate. The significance of this from a coastal engineering perspective relates to sediment transport. Wave breaking agitates the seabed sediments into suspension. The larger heavier particles settle rapidly but the finer particles can be moved a long way by currents.</p> <p>On a natural coast, sediments move from one area to another without interruption. With the lagoon in place fine sediments in suspension will settle more freely in the absence of wave action. Over time these sediments will accumulate without additional measures to remove them. The sediment in Swansea Bay is classified, on Admiralty Charts, as sand/mud. Without doubt, over time, mud particles suspended in the water will enter the lagoon, settle, and accumulate in areas where the currents are lowest; in the centre of the lagoon and at the shallow edges.</p> <p>Various possible mitigation measures are available, such as:</p> <ul style="list-style-type: none"> (i) a sediment curtain installed at or near the entrance; (ii) artificial agitation of the water body with pumps; (iii) an on-going programme of dredging and re-nourishment of the sandy beach frontage. 	<p>Possible impacts upon coastal processes including sediment transport and suspensions have been fully assessed as detailed in Chapter 6 of the ES. Possible mitigations measures including beach nourishment are also discussed within Chapter 6. TLSB are aware the sediment will be deposited within the Lagoon and will undertake dredging where required to maintain the water depth.</p>

			<p>The lagoon itself over time could present with a muddy foreshore rather than the “Floridian” landscape presented by the TLSB in its marketing material. No technical analysis carried out to date addresses this problem sufficiently.</p> <p>The proposed rock armour on the Atkins’ cross-section of 4-8 tonne seems a little on the small side given the protection at Neath/Port Talbot where 12 tonne units are in place. However, their bermed construction may address this to some degree, although this can only be determined from detailed analysis of the wave conditions – that has not yet been made available.</p> <p>Geofabric is porous to some degree so it needs to be checked whether the dredged material will leach from the geotubes. I was involved in some lab tests of geotubes filled with sediment in the recent past, and significant leakage of fines was observed once the material had wetted thoroughly. For a tube of drainpipe dimensions this took about a week. For larger tubes this might take months or even years, depending on the nature of the sediment. Use of geotube fabric has been tried and tested in fluvial environments but I am not aware of any scheme using them in the more challenging marine environment. I would recommend extensive and careful testing of the performance of the intended design, as well as the potential for material to leach from the tubes under the repeated wave loading they will be expected to endure.</p>	<p>Several different grades of rock will be used to construct the Lagoon wall which is detailed in Chapter 4 (Project description) of the ES. The Lagoon has been engineered to be both physically robust and economically viable. The gradient of the Lagoon has also been optimised to reflect waves and disperse and minimise wave impact; it is due to this angle that smaller armour is used at the top of the wall. The wave climate within the bay has been fully investigated and modelled as part of our assessment on coastal processes.</p> <p>The geotube® material has been extensively tested and used for over 50 years and is suitable for use in marine environments. The rock armour will provide suitable protection for the geotubes.</p>
--	--	--	---	---

		<p>It is well to be reminded that the lower Swansea Valley has contributed significant heavy metals and other contaminants since the early 1700's. These will largely remain in the Bay and may produce problems if disturbed.</p> <p>If DEFRA were funding this they would stipulate the owners implement a long term monitoring programme (post-project monitoring). This would typically include: measuring the nearby beach/marsh on a quarterly basis; measurements of tides, waves, winds, bird and fish counts, etc etc ... plus some analysis of the data to inform on-going maintenance and mitigation works. Critically, monitoring should start before construction to develop a 'benchmark' against which to compare measurements during and after construction.</p> <p>In the longer term, the lagoon will alter the existing balance of wave and tide driven sediment movements in the bay. The exact nature of the changes will require modelling. For a scheme of this magnitude, some realignment of the shoreline can be anticipated as well as the possibility for additional works to stabilise the beaches and protect existing infrastructure and valuable environmental habitats from flooding and/or erosion. The existing beach environment of Swansea Bay could be radically changed?</p> <p>We shall look forward to receiving the results of the extensive modelling undertaken, as stated by Mr Mark Shorrocks CEO (Swansea Evening Post 22 July 2013), on his briefing to potential</p>	<p>Results from the contamination assessment are discussed in paragraph [6.4.4.4] of the ES and indicate that the contamination levels in the footprint of the lagoon do not exceed Cefas Action Level 2, and are therefore not considered to be contaminated in relation to their use or disposal.</p>
--	--	---	---

		<p>stakeholders. He stated “There will be no effect on Gower beaches whatsoever, all the modelling that we have done does not effect any sand movement beyond Mumbles Head”. Furthermore on modelling, Joanna Lane states (Swansea Evening Post 24 June 2013) in response to concerns of tidal flow and sand erosion by Briton Ferry Town Council, “ A huge amount of work has gone into early modelling, we don’t know what the impact will be in terms of coastal processes. Its a highly active area so we will have to look at that carefully”.</p> <p>Other</p> <p>Visual impact of the construction is going to be obvious but, perhaps not so to the public in general. With a contained area of over 13 Km² the impact on Swansea Bay will be very considerable indeed, to date no glossy marketing visuals have been presented to the public as to its visual impact from the shore line and higher ground around the Bay and, by its production establishing that the iconic shape of Swansea Bay will be lost, perhaps forever. In this regard we can relate to the visuals presented by the Developers of the Atlantic Array, as part of the public consultation stage, portraying the visual impact of the turbines on the sky line, viewed from various points along the Swansea and Gower coast line, which has not been demonstrated in this proposal. Noise and dust will also be major considerations during construction and could be a major environmental impact. If the embankment were</p>	<p>TLSB accepts that the lagoon will have a visual impact on the views of Swansea Bay, but considers that mitigation through design and the provision of facilities for tourists will outweigh any impacts on tourism.</p> <p>The visual impact of the project is assessed as significant on areas immediately adjacent to the project, and moderate on surrounding areas. However, it is considered that the development delivers a benefit to Swansea Bay through the provision of public realm. The design of the lagoon has been considered in the context of the Bay and mitigation, such as the choice of rock armour, has been provided through design of the scheme.</p>
--	--	---	--

			<p>to fail due to the impact of a severe South West Gales which naturally occur several times a year, then the consequences of repair need to be identified.</p> <p>A major sewage outfall outfall (over 250k people) discharges into the area enclosed by the lagoon. This is the result of the extensive reconfiguration of the trunk sewers some years ago that closed the outfall at Mumbles Head and re-directed all the sewage of the city via large interceptor sewers under the River Tawe to the Welsh Water Treatment plant at St Thomas. The outfall with diffusers was carefully designed at the time by Delft Hydraulics to ensure that no sewage would end up on the beaches of the Bay. The effluent is usually treated but in the case of severe storms (which naturally occur several times a year), the raw sewage bypasses the treatment works and will be released inside the proposed Lagoon. This will present a potentially severe health hazard and may impact upon any proposed water use of the Lagoon by the promoters. This will be an additional source of fine material as well as nutrients. The ability of the lagoon to be efficiently flushed by the tides is not yet established, or mitigating measures implemented to prevent eutrophication and siltation. This could have a severe impact on the environment of the new university campus. It would be mindfull also to take account of the revised Bathing Water Directive coming into force in 2015. None of this analysis is currently available.</p>	<p>Results from the contamination assessment are discussed in paragraph [6.4.4.4] of the ES and indicate that the contamination levels in the footprint of the lagoon do not exceed Cefas Action Level 2, and are therefore not considered to be contaminated in relation to their use or disposal.</p> <p>.</p> <p>Baseline studies against which to predict and assess impacts have been carried out as a basis for the extensive Environmental Impact Assessment process. Water quality and all potential strategies to address waste water outfalls are detailed in Chapter 7 of the ES. Monitoring and mitigation of impacts will be provided for within the CEMP and OEMPs.</p>
--	--	--	--	---

			<p>The Ports of Neath and Swansea could be adversely affected by the new sediment regime and additional dredging could at the minimum be the result with the possibility of severe impact on the main shipping channels. None of this analysis is currently available.</p> <p>The impact of the Tidal Lagoon on the SSSI's next to the new campus at Crumlyn Burrows and at the mouth of the River Neath on the Baglan side is currently unavailable.</p>	<p>Impacts on the navigation channels have been assessed as minor adverse; any impact on navigation through sedimentation will be monitored and mitigated by maintenance dredging. [Paragraph 6.5.2.35] of the ES assesses the potential significance of impact on the Bay as neutral.</p>
Julie James (National Assembly for Wales)	s47	Public consultation	Welsh Water – Sewage works further details	<p>Consultation is ongoing with Welsh Water to determine the preferred option that will be taken forward to address the sewage works and existing sewage outfall. The full results of which will be published within the Environmental Statement.</p>
Julie James (National Assembly for Wales)	s47	Public consultation	Further discussion on contamination, coastal processes, tidal difference etc	<p>A full assessment on contamination and coastal processes was conducted as part of our detailed Environmental Impact Assessment. The full results of which will be presented in chapter 6 (Coastal Processes, Sediment Transport and Contamination) of the ES.</p>
Suzy Davies (National Assembly for Wales)	s47 Non Statutory Consultee	Info@	"Underwater noise is known to be very harmful to the hearing dependant species, how loud will the pile driving be at source? Underwater noise is known to travel for great distances, how will the cetaceans be safeguarded?"	<p>"Thank you for your response. It will be recorded as part of our formal consultation process and passed on to the most appropriate member of the Tidal lagoon team. We would be more than happy to meet with Suzy again in September to discuss the Environmental Impact Assessment (EIA) which is underway and the concerns that she has raised"</p>
Barry Walton	s47 Non Statutory Consultee	Info@	"Given the turbines could be 7m in diameter how will you ensure that cetaceans cannot enter them and be killed/harmed?"	<p>As part of our EIA potential impacts to cetaceans and other marine mammals has been investigated. TLSB will endeavour to minimise impacts through appropriate mitigation strategies. Further information is provided in Chapter 10 (marine mammals) of the ES.</p>

<p>Len Moran Aberavon Kayaking Club</p>		<p>Info@</p>	<p>"Can you provide a model that will show the effect the very long eastern arm of the lagoon will have on the surf at aberavon beach. Will it for example act as a breakwater and reduce the surf in the bay and thus reduce the sporting activity we currently enjoy?"</p> <p>1. You should provide a summary in lay person's language of what the model predicts will happen to the surf parameters within our surfing area when the lagoon is finished. This summary should be a descriptive and quantitative account of anything that could conceivably affect the surf and referenced to the formal mathematical model that underlies those descriptions. This wouldn't only concern the effect of the lagoon's walls but also any shifting of sand from our surfing area due to the construction phase. The integrity of this descriptive account would have to be backed up by an independent consultant organized and paid for by yourselves. This descriptive account (along with the independent consultant's descriptive account) should be forwarded to the Aberavon Kayaking Club, care of Mr Harry Worth. The club can then collectively determine their position on this matter.</p> <p>The reason I ask for this type of summary concerns the difficulty lay people will have in trying to interpret the model in terms of these concerns. I do think the onus should definitely be on yourselves to provide a lay person's interpretation as part of this consultation procedure.</p> <p>2. There should be a program of monitoring of current sea state conditions using an automated buoy so as to compare "before and after" sea conditions. If you are not likely to start building for two years (say) then if you could get this implemented now then you would have two years' worth of data in which to compare the "before and</p>	<p>"The stone which we need for the rock armour of the lagoon wall is limestone, and we are in the process of completing an agreement with a quarry in North Wales to source the rock, although potentially we will only source rock for there during part of the year because of the environmental impact on certain species. We also hope to source rock from another quarry in Cornwall the remainder of the year." In summary and Plain English, this means that the construction and operation of the Lagoon is not predicted to have an adverse impact on surfing at Aberavon Sands with respect to changes in the wave climate, nor due to removal of sediment for filling of Geotubes. With respect to the wider sediment regime, changes are expected in the vicinity of the Neath, predominantly along the Crymlyn Burrows frontage where increased sand accretion is expected to occur, and within the Port Talbot Channel, where a small potential increase in mud deposition is expected. Elsewhere in the eastern part of the Bay, i.e. along the Aberavon Beach frontage, the assessment found no evidence to suggest any considerable changes as a result of the scheme.</p> <p>To inform the EIA, as part of the metocean surveys, an Acoustic Wave and Current Profiler (AWAC) was</p>
---	--	------------------------------	---	--

			<p>after".</p> <p>This may be considered to be too expensive, but I think it a legitimate request and one that needs a "yes or no" written answer from you at this stage so that if the predictions of the model turn out to be at variance with the real world it can at least be shown that a request for comparison data to confirm or deny subjective arguments was made at the consultation stage but rejected.</p> <p>I would ask that this e-mail be classed as part of the formal pre application public consultation and community engagement you are now embarking on so that if I do decide to submit objections to the Inspectorate based on an unsatisfactory response to the points raised (or unsatisfactory outcomes to promised assurances), those objections can be referenced to this e-mail (along with your answers and comments) as being a proper submission to this pre application process.</p>	<p>deployed within Swansea Bay for a period of 3 months between 16 February and 16 May 2012, at two locations [(Appendix 6.1)]. Deployment of the AWAC provided wave height, wave period and wave direction data crucial for validation of the numerical model and to gain greater understanding of the sea state within Swansea Bay. Furthermore, numerous measured datasets were used to test and validate the tidal model including current speed and direction data from the British Oceanographic Data Centre (BODC), whose current moorings provide a historic record of current flow in the Bristol Channel. This level of assessment, including use of historical datasets, has been deemed suitable by specialist consultants ABPmer.</p>
--	--	--	--	--

John Cherry		Social Media	I personally think it's a great idea, however I have not yet been able to find any answers to some of my concerns within your current literature. How often the lagoon require dredging? How will the silt/sedimentation deposits affect the capacity/performance of the turbines. Swansea bay area is affected by very high sediment levels, will the lagoon not become a salt marsh overtime? What other schemes of this type have been/are successful worldwide?	Thank you very much for your feedback. This response will be recorded as part of formal consultation and will be taken into account. Information will be presented within our Environmental Statement that will provide further information relating to dredging requirements, turbine performance and various results associated with our detailed Environmental Impact Assessment.
Hugh Jones	s47	Public Consultation	Tide height varies considerably.	Yes, of course, that is the nature of the tides. It means we can produce more electricity during spring tides then during neap tides. The advantage of the tides is that these are predictable, and we know that we will be producing electricity no matter what happens.
Suzy Davies National Assembly for Wales	s47	Public consultation	local environmentalists in Swansea?	TLSB has engaged with a full range of bodies including environmental groups in Swansea Bay.
Suzy Davies National Assembly for Wales	s47	Public consultation	extent of environmental impact	To understand the extent of the possible environmental effects that may result as part of the tidal lagoon development a detailed Environmental Impact Assessment (EIA) has been conducted. This will take into account potential impacts individually and cumulatively. The full results of the EIA will be presented within the Environmental Statement.
Geraint Davies House of Commons	s47	Public consultation	The sand for our Gower beaches would also be under threat. The beach sand is currently replenished by sand swirling down from Porthcawl into Swansea Bay	Thank you for your feedback. It will be recorded as part of our formal consultation process and shared with the rest of the tidal lagoon team.

Finance & Investment

Individual Name	Consultee Type	Type of Engagement	Comment	TLSB Response
Tim Campbell	s47 Non Statutory Consultee	Info@	"Also please let me know of any investors/sponsors that are interested in doing business with me, and can help in creating this great experience for the	"Thank you very much for your interest in this project. Your proposal will be recorded as part of our consultation process and passed on to the most

			Welsh economy."	relevant member of our team. Please sign up on our website here, to fill in our questionnaire and for updates as the plans as develop. Best of luck with your business plans."
John Phipps	s47	Public Consultation	As an expat and current renter of apartment (450k gbp to buy) on the World Famous Palm Jumeriah I must say I'm am rather surprised that 11km of brand new coastline isn't being commercially exploited.	TLSB has considered this comment.
Suzy Davies National Assembly for Wales	s47	Public consultation	asked about ownership, Crown Estate etc, size of the lagoon	Once construction is complete the tidal lagoon (Tidal Lagoon Swansea Bay) will be owned and maintained by Tidal Lagoon Power Plc. The Crown Estate (TCE) – TCE owns virtually the entire seabed out to the 12nm territorial limit, including the rights to explore and utilise the natural resources of the UK Continental Shelf (excluding oil, gas and coal). Therefore it is necessary to obtain a licence from TCE prior to placing any offshore structures on, or passing cables over, the seabed and its foreshore. We are maintaining ongoing consultation with The Crown Estate to obtain a licence to lease the seabed for the development. The impounded area will be approximately 11.5km ² with a total breakwater length of c9.5km.
Suzy Davies National Assembly for Wales	s47	Public consultation	fall-back position if the plc falls over? Moneys held for decommissioning.	TLSB intend to own and operate the Lagoon throughout its working life. Should any other body gain the benefit of the DCO, the consent will ensure that this body would assume the responsibility the TLSB is committed to undertaking.
Russell George National Assembly for Wales	S47	Public Consultation	asked about funding	There are two aspects to the funding requirements: £10m equity required for the pre planning development phase with a further c£750m for the lagoon build. The Company's £10m capital raise is three quarters allocated with any shortfall underwritten by Tidal Lagoon Power. It had been anticipated that our £750m capital raise would commence in earnest post planning submission

				however the company has received significant interest from specialist infrastructure funding parties interested in funding a series of tidal lagoons
Russell George National Assembly for Wales	S47	Public Consultati on	cheaper electricity tariff – requires legislative change	A cheaper tariff can be offered through commercial mechanisms related to specific tariffs with energy companies.

Jobs & Economic Development

Individual Name	Consultee Type	Type of Engagem ent	Comment	TLSB Response
Barry Jefferys Barry Jefferys Agencies	s47 Non Statutory Consultee	Info@	"This could be the potentially the largest artificial angling venue in the UK surely this is worth considering. My business is selling angling equipment to local fishing tackle retailers and this could be the best thing to happen to our area probably ever."	"Our project film is an introduction to the proposal, however we have certainly considered angling in our plans and design. Please do come along to one of our remaining consultation events this month where we are exhibiting our most up to date masterplanning design and where you can speak with a member of the team, see the attached flier for details. "
Mark Wade	Other	Public Consultati on	Using tax payers money to finance the lagoon	TLSB is financing the lagoon from private sources.
Hugh Jones	s47	Public Consultati on	The generators of electricity come from British discoveries and engineering developments but now we must buy German, leaving no career opportunities for young British engineers. Why?	The main turbine manufacturers in the world are either French, German or Swiss. There are no large British turbine manufacturers. We have asked all manufacturers to optimize the use of local resources/ products/labour. British engineering jobs will be required for some of the manufacturing of components, for the installation, the commissioning and operation and maintenance work for the turbines. The turbines are also only one part of the overall project. In addition, we need to built the bundwalls, the turbine housing structure and the associated other infrastructure (and do the design for all of that), all of which will required British engineering input.
Suzy Davies National Assembly for Wales	s47	public Consultati on	local contracting	TLSB is committed to ensuring local employment and establishing a local supply chain

Masterplanning

Individual Name	Consultee Type	Type of Engagement	Comment	TLSB Response
Julie James National Assembly for Wales	s47	Public consultation	Welsh Water – Sewage works further details Welsh fisheries – value added and opportunities for processing / synergy Welsh Government	In order to provide an appropriate standard of water quality all-year-round for water contract sports within the Lagoon in the case of heavy rainfall, additional treatment of the storm water is required. Three options are currently being considered to address this requirement in ongoing consultation with key stakeholders. The full outcome of this continuous engagement and full assessment into water quality will presented within chapter 7 (Marine Water Quality Assessment) of the ES.
Dennis Harrett	s47 Non Statutory Consultee	Info@	"Where do you plan to source the infill for the wall of the lagoon and how do you propose to deliver it to the site?"	"I realise I only answered one of your questions in my last email. We plan to bring the rock armour to the site by sea or potentially by rail."
Brian Jones	s47 Non Statutory Consultee	Info@	Solar pv panels on the building roofs – both the buildings on the shore, and on the Visitor Centre and other shelters along the length of the sea wall (although I accept the point made by your representative that you'd have to carefully consider the effect of sea water spray on the panels).	Thank you for your feedback, it will be recorded as part of our consultation and passed on to the rest of the team. I'm glad that you felt we were able to answer your questions at the consultation event.
Brian Jones	s47 Non Statutory Consultee	Info@	Wind turbines – on the strongest section of the sea wall (between the Boating Centre and the Visitor Centre), the wall could be designed so that wind turbines could be fitted at a future date. Not huge ones, but ones of a scale suitable for the location. I can appreciate that the inclusion of wind turbines in the planning application now would only make getting planning permission harder to get, due to the current level of opposition to wind turbines; however, in the longer term, I believe that wind turbines will become more accepted, so an application 10 years into the lagoon to add turbines would, I believe, be approved.	Thank you for your feedback, it will be recorded as part of our consultation and passed on to the rest of the team. I'm glad that you felt we were able to answer your questions at the consultation event.

John Phipps	s47 Non Statutory Consultee	Info@	<p>Your wall is certainly the width to support buildings and with the massive potential for marinas, hotels and apartments it would seem odd that Swansea Council and yourselves would use this prime real estate to turn the beautiful Swansea bay into the prime tourist location in South Wales and South West. Easily accessible from the North Devon Coast and Bristol airport.</p> <p>Along the inner wall a beach can be created rather like the Palm (incredible to see them spraying it from a huge boat)</p>	The potential for developing a unique tourist attraction is one that we are very interested in. At present the only building we are planning to have offshore is the visitor's centre, due to costs and O & M requirements, however thank you for writing to us with your ideas.
Hugh Jones	s47	Public Consultation	There is already a large enclosed area which could be used, thus no sea wall required — Portland Harbour in Dorset.	Yes, but it is a working port, vessels need to be able to go in and out, which means that you need a lock structure . But most importantly, Swansea has a spring tide of about 10 m. Portland has a spring tide of only about 2.5 m. A tidal lagoon with that sort of tidal range will not work.
Suzy Davies National Assembly for Wales	s47	Public consultation	gravel extraction has been a problem, localized extraction	Thank you for your feedback. It will be recorded as part of our formal consultation process and passed on to the most appropriate members of the Tidal Lagoon Team.

Sports leisure & amenities

Individual Name	Consultee Type	Type of Engagement	Comment	TLSB Response
Martin Blackwell Monkstone Cruising and Sailing Club	s47	Public Consultation	At present it takes at least 30 mins for me to get out into sailing water, were this development to be built it would take significantly longer to get out and around the massive wall along the dredged channel to the river into the bay, our window of opportunity to sail for one week in two is only 3 to 4 hrs depending on yacht draught	Thank you for your feedback. It will be recorded as part of our formal consultation process and passed on to the most appropriate members of the Tidal Lagoon Team.
Martin Blackwell Monkstone Cruising and Sailing Club	s47 Local Community Consultee	Info@	"this will seriously curtail any sailing that i am able to do"	Thank you for your feedback. It will be recorded as part of our formal consultation process and passed on to the most appropriate members of the Tidal Lagoon Team.

Barry Jefferys Barry Jefferys Agencies	s47 Non Statutory Consultee	Info@	" no mention of any angling benefits. "	"Our project film is an introduction to the proposal, however we have certainly considered angling in our plans and design. Please do come along to one of our remaining consultation events this month where we are exhibiting our most up to date masterplanning design and where you can speak with a member of the team, see the attached flier for details. "
Steve Aston		Social Media	I know there are plans for sailing etc, but will the lagoon be able to be used by swimmers at all? I'm guessing it wouldn't be too hard to section off a small length of it? It could be like the Summerleaze pool in Bude. 'Wild swimming' is becoming increasingly popular - I know A LOT of people in Swansea who'd want to use that.	It is the intention of TLSB to provide water quality that is up to the standards required for bathing waters under European legislation.
Simon Williams Simon Williams		Social Media Social Media	Have asked before Will there be a public slip to allow access to the lagoon for individuals to use or will it only be for paying groups Aug 01, 4:15pm, Thanks for the reply but no it doesn't whilst I understand and believe in the need for control it hasn't answered if as an individual will I be able to launch and use the lagoon to sail in	There are no plans to charge for access onto the wall and we want as many people to enjoy it as possible - there will be specific places for the public to swim and enter the lagoon. The slipways will be for the launch of boats into the lagoon and these will be controlled by the watersports centre for health and safety reasons. The boating facilities are likely to be part of a member based boating club to which individuals may have to subscribe.
Suzy Davies National Assembly for Wales	s47	Public consultati on	impact on sailing and the marina	Noted. This concern will be taken into account as part of our detailed consultation process. Furthermore, a Navigation and Marine Transport Assessment has been conducted as part of our EIA and will be presented in chapter 14 of the ES.

Visual Impacts

Individual Name	Consultee Type	Type of Engagem ent	Comment	TLSB Response
David Wilkinson	s47 Local Community Consultee	Info@	"I might also have mentioned - in answer to remarks from Geraint Davies MP - that far from spoiling the view for tourists, the seawall might serve to screen	"Thank you for your support, it is always fantastic to get positive feedback during consultation and it is very important that the planning inspectorate receives

			the Port Talbot works from Swansea beach."	letters of support once we submit our application."
Phil Atkins		Info@	<p>It appears that the rig has now moved even further into the views from my apartment</p> <p>On 19 July 2013 21:43, P Atkins <atkinspd@gmail.com> wrote: Hi,</p> <p>I note that there is a rig in the bay today - in the general location of your planned development.</p> <p>You will note from the three attached photos that it is in the very middle of the 3 x views from my apartment (balcony, picture window and kitchen porthole window) - which I paid a lot of money for - JUST FOR THE VIEWS !!</p> <p>I assume that you have built in costing for the relevant compensation for my loss if this development proceeds ?</p> <p>Phil Atkins</p>	"I apologise for any inconvenience caused by the rig, it will be operating in the area of the proposed lagoon for approximately 3 weeks (depending on weather), and will relocate periodically. With regards your concerns about views if the lagoon is built, our interactive 3D model will give you a good idea of the view of the lagoon from your area. A Seascape and Landscape Visual Assessment is also a key part of our Environmental Impact Assessment (with work-to-date summarised in the Preliminary Environmental Information Report, for which the relevant chapter is here). We acknowledge that the lagoon will have a visual impact on the Bay, but the scheme is low-lying so that impact is much reduced compared to other energy infrastructure. We believe the benefits the scheme brings outweigh this visual impact, and other impacts, but the Examining Authority will consider all such issues during the determination process, and I would encourage you to respond formally to our consultation if you have not done so already. I should advise that changes to a view (or perceived impact on property value) are not "material considerations" justifying compensation in UK planning law."
Tim Hughes	s47 Local Community Consultee	Info@	<p>I think the tidal lagoon is a good idea at first glance. It's difficult to support the idea without an artist's impression of the lagoon from all angles. I'd be more supportive if a view from Mumbles head was presented.</p>	<p>Our Visual Impact Assessment will include computer generated images from over 20 viewpoint from around the bay including Mumbles head. These images are being undertaken by an independent consultant and have been agreed on by the statutory consultees and reviewed by a number of landscape architecture and design specialist. These will be made available to the public as soon as possible and we hope that they give people a realistic idea of what the development would look like so that they can make an informed decision about the proposal.</p>

Geraint Davies MP	s47	Public consultation	Unightly concrete units that have a high carbon footprint will probably be used as rocks bigger than 8 tonnes are rare and expensive	TLSB will not use concrete blocks in the building of the Lagoon.
Other				
Individual Name	Type of Consultee	Type of engagement	Other	Response
Tim Campbell	s47 Non Statutory Consultee	Info@	"I'm expressing the idea of having an Afro-Caribbean Restuarant/Cafe with a difference to reflect the great outdoors and the sea, by introducing healthy and affordable Caribbean food to the public as they visit this amazing project. This is creating the creatures of the sea with the Caribbean themed Cafe."	Thank you very much for your interest in this project. Your proposal will be recorded as part of our consultation process and passed on to the most relevant member of our team. Please sign up on our website here, to fill in our questionnaire and for updates as the plans as develop. Best of luck with your business plans.
Huw Roberts		Info@	I have today attempted to complete your Welsh language version of the online Consultation Questionnaire. Please be advised that there are several errors and omissions in this document.	Thank you for your interest in this proposal and I am very sorry for the inconvenience caused by these mistakes. Prysgr Translation Services have now reviewed all materials on the website including the questionnaire, and changes will be made by Monday. We have worked with Prysgr in the past and their services have been commended by The Welsh Language Commissioner, I will notify you once the corrections are made and I hope that it is of a standard which you would approve of. Thank you for bringing this to our attention, all feedback is very much appreciated. Please do not hesitate to contact me again if you come across any other errors.
Emma Pugh The Welsh Language Commisisoner	s42 Statutory Consultee	Info@	I am currently exploring ideas for stories and have been reading about the Tidal Lagoon Project in Swansea Bay. I would like to speak with you to see what the possibilities are and if it could fit with our brief for the series.	Thank you very much for your interest in our proposal, your programme sounds like a fantastic opportunity for us to reach people. I have forwarded you message to Lisa who will contact you.

Steve Kern Swansea Marina	S47	Public Consultati on	Marina logs boats in and out.	The arrangements for the use of boating facilities will be decided by the boating club that assumes responsibility.
Richard Darlington		Info@	I am going to be in Swansea on Friday 12th July. Is there an information board where I might learn more?	<p>I hope that you were able to attend our event on the 12th in Sketty, Swansea, or one of our unmanned exhibitions? If not please see the attached flier for the details of our consultation events throughout July.</p> <p>We will be exhibiting information about the Preliminary Environmental Information report which we have recently published, and made available on our website here. Members of our team will also be available to answer any question that you have at this time.</p>