

Vattenfall Wind Power Ltd

Thanet Extension Offshore Wind Farm

Appendix 3 to Deadline 4C Submission: Thanet
Offshore Wind Farm: A Post-Construction
Monitoring Survey of Benthic Resources

Relevant Examination Deadline: 4C

Submitted by Vattenfall Wind Power Ltd

Date: April 2019

Revision A

Drafted By:	Vattenfall Wind Power Ltd
Approved By:	Daniel Bates
Date of Approval:	April 2019
Revision:	A

Revision A	Original document submitted to the Examining Authority

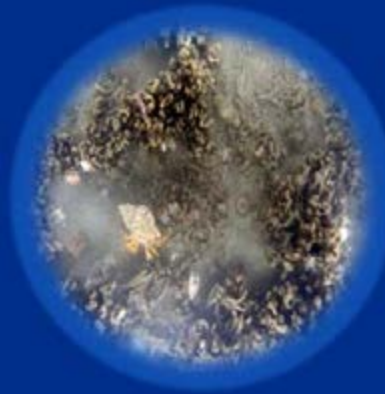
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Thanet Offshore Wind Farm

A Post-Construction Monitoring Survey of Benthic Resources

Prepared for Thanet Offshore Wind Ltd.



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Thanet Offshore Wind Farm: A Post-Construction Monitoring Survey of Benthic Resources

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Report Proofing:	Lindsay Jane Seiderer		15/01/2013
Report Authorisation:	Lindsay Jane Seiderer		17/01/2013
Report Status:	FINAL Draft		
Issue Date:	18/01/2013		

STATEMENT

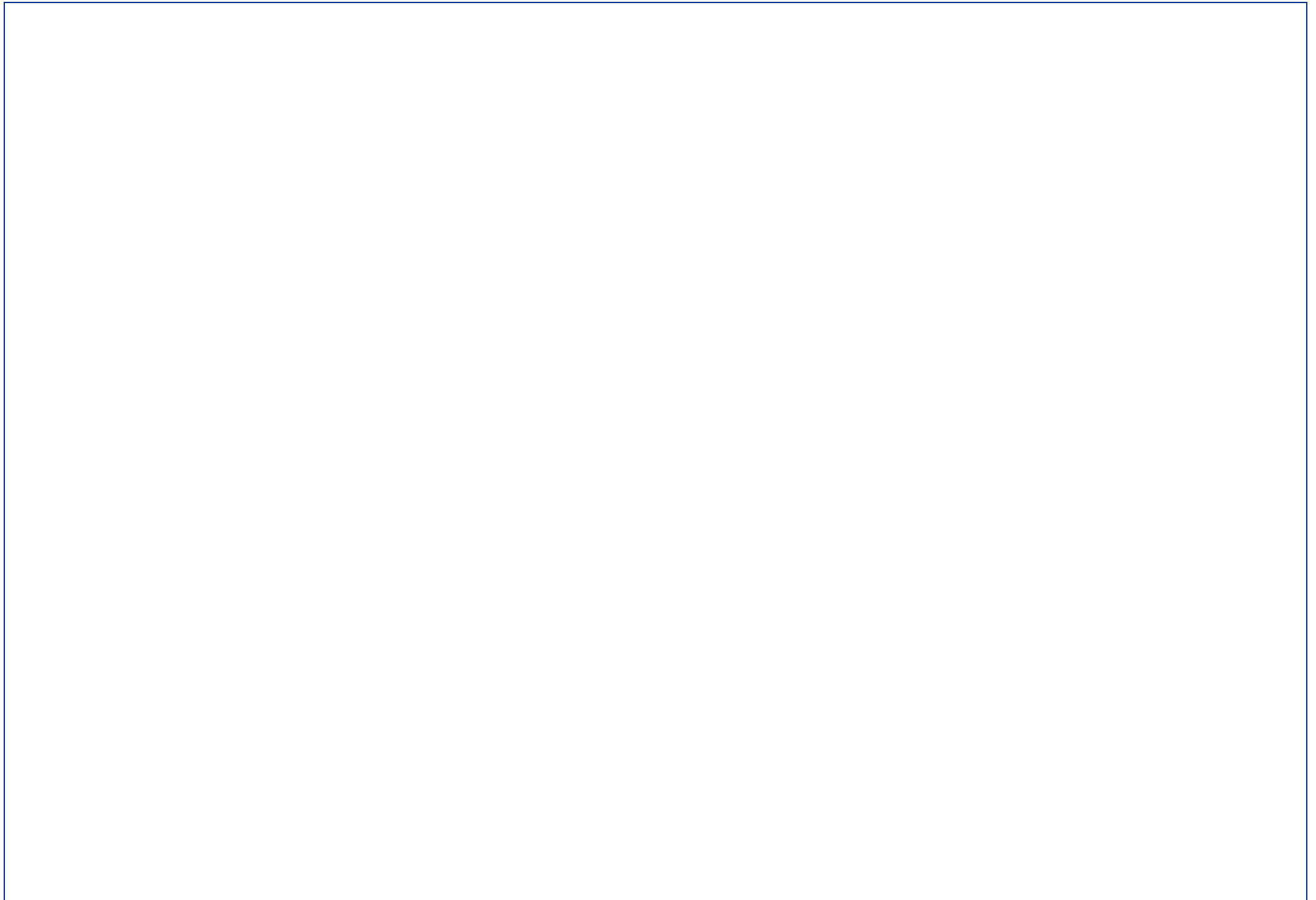
Marine Ecological Surveys Limited (MESL) was commissioned by Vattenfall and Haskoning UK Ltd on behalf of Thanet Offshore Wind Ltd (TOWL) to undertake a post-construction monitoring survey of benthic resources at Thanet Offshore Wind Farm (TOWF).

This report presents the findings of the post-construction monitoring survey that was undertaken across the TOWF area during two sampling events in August & November 2012. The primary objective of this study was to investigate any potential impacts that have occurred to the natural benthic environment in the TOWF area following construction and operational activities, providing TOWL with evidence of temporal changes and enabling them to fulfil regulatory monitoring commitments.

Marine Ecological Surveys Limited is a member of the Institute of Environmental Management and Assessment (IEMA) and is a leading participant in the National Marine Biological Analytical Quality Control (NMBAQC) scheme.

Marine Ecological Surveys Limited
18th January 2013





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NON – TECHNICAL SUMMARY

A post-construction monitoring survey of benthic resources was undertaken at Thanet Offshore Wind Farm (TOWF) by MESL during two sampling events in August and November 2012. The study comprised the following elements:

- A **subtidal benthic survey** to assess any long term changes to the subtidal benthic ecology as a result of the construction and operation of TOWF against natural variability.
- A **scour pit assessment** to ground-truth the geophysical survey data of scour pits and assess any potential impact on benthic biological resources.
- A ***Sabellaria spinulosa* assessment** to assess any changes that may have occurred in the distribution and/or density of *Sabellaria spinulosa* aggregations across the TOWF site

The **monopile colonisation study** which will determine the colonisation on four monopile foundations in terms of dominant species and diversity and assess the rate of colonisation will be undertaken during the first appropriate weather window in spring 2013, as approved by the MMO and their advisors.

The survey followed the specification set out in the TOWF Terms of Reference which were agreed with industry regulators prior to commencement of the survey. A total of 53 faunal grabs, 42 sediment samples for particle size analysis, 21 sediment samples for organic content analysis and 230 seabed images were acquired during the course of the investigation.

A summary of the key results of this report are presented below:

Nature of the Seabed Sediments

- Sediments throughout the region were found to be comprised of a mixture of coarse sands, fine sands and cobbles. Where sediment sample data could not be obtained within the central-southern portion of the site, seabed images revealed that these sites were characterised by coarse sediments with evidence of bedrock outcrop in places.
- The organic matter content of these sediments varied between <0.20% and 1.50%, representing low to moderate levels.

Nature of the Benthic Fauna

- A wide range of benthic invertebrate species were recorded across the TOWF survey area; a total of 264 taxa were identified. The mean number of taxa recorded per sample was 27, and the mean number of organisms per sample was 172. Average biomass per sample was 1.71g AFDW (Ash Free Dry Weight).
- Taxa belonging to the Phylum Annelida dominated the benthic communities in terms of abundance and species diversity. Taxa belonging to the Phylum Echinodermata made a considerable contribution to total biomass, which was ascribed to the presence of large taxa that included the common heart urchin *Echinocardium cordatum* and the serpent's table brittle star *Ophiura albida*.
- There was considerable variation in abundance and diversity was recorded across the site. High abundances of macrofauna recorded at stations 09 and 10 were attributed to high abundances of the Ross worm *Sabellaria spinulosa* and the long clawed porcelain crab *Pisidia longicornis*, which is typically found associated with *S. spinulosa* aggregations.

- The most abundant species was the long clawed porcelain crab *Pisidia longicornis*, and the bristle worm *Spiophanes bombyx* was the most commonly occurring taxon.
- A total of 4 infaunal groups were identified through multivariate analysis. The similarity between infauna recorded from each of the sampling sites was relatively low, which is a likely result of the sediments sampled being broadly similar.
- Statistical techniques revealed a significant relationship between patterns observed in the particle size distribution data to those seen in the faunal communities.

Temporal Variability

- Comparisons of data recorded pre- (2005 & 2007) and post-construction (2012) indicated that seabed sediment composition has remained broadly similar following the construction and operation of TOWF.
- Temporal comparisons of faunal data recorded pre- and post-construction, revealed that there has been an increase in mean infaunal abundance, diversity and biomass across the TOWF site.
- Statistical testing revealed that benthic assemblages at TOWF showed significant overall differences between pre- and post-construction accounted for by an increase in the number of taxa that made up 90% of the population in 2012, in addition to a variation in the highest contributing taxa within the benthic communities.
- Although significant, the differences between the pre- and post-construction faunal data were not large and differences can be attributed to a level of natural variation corroborated by the variability recorded within reference conditions.

Key Findings from the Scour Pit Assessment

- Seabed sediment within the scour pits assessed comprised a mixture of coarse sediments which, on average, were coarser than those sampled throughout the TOWF site.
- Analysis of infaunal samples from scour pit locations E01 and E02 revealed that the most abundant and commonly occurring taxa were similar to those found across the TOWF site and surrounding region.
- Epifaunal communities within the scour pits were characterised by species able to colonise coarse sediments and unstable cobbles, which included an abundance of hydroids and bryozoans. The common starfish *Asterias rubens* and shell of the blue mussel *Mytilus edulis* was recorded in a majority of the seabed images collected at these scour pit locations, suggesting that *M. edulis* are likely to colonise the monopile foundations, therefore attracting predators such as *A. rubens*.
- No *Sabellaria spinulosa* reef aggregations were identified in seabed images collected from the assessed scour pits. Any impacts on *Sabellaria spinulosa* aggregations and benthic resources are likely to be restricted to the base of the monopile plus an approximate 5 metre circumference, as extrapolated from Titan 2012 data.

Key Findings from the *Sabellaria spinulosa* Assessment

- The 2012 *Sabellaria spinulosa* assessment revealed that *S. spinulosa* reef is present over a large portion of the TOWF site.
- A direct comparison of the 2007 and 2012 *Sabellaria spinulosa* distribution data illustrated that in 2012 there was a wider distribution of *S. spinulosa* aggregation categorised as 'moderate *Sabellaria* growth' and 'dense *Sabellaria* growth'.

- There was a reduction in the recorded amount of *S. spinulosa* rubble and damage in post-construction (2012), when compared with pre-construction (2005 and 2007) data. It can therefore be assumed that the positive growth and stable *S. spinulosa* aggregations across the site may be partially attributed to the refuge provided by TOWF from destructive bottom fishing activities that hampered growth in the past.

A. INTRODUCTION

Marine Ecological Surveys Limited (MESL) was commissioned by Vattenfall and Haskoning UK Ltd, on behalf of Thanet Offshore Wind Ltd (TOWL), to undertake a post-construction monitoring survey of benthic resources at Thanet Offshore Wind Farm (TOWF).

TOWF is located approximately 11.3km off Foreness Point on the Kent coast, and is within the Thames Estuary Strategic Environmental Assessment (SEA) area. The location of the wind farm array is shown in Figure 1. TOWF covers an area of around 35km² and consists of 100 wind turbine generators (WTGs) installed on monopile foundations approximately 500m apart along rows and 800m between rows. Water depths vary between 15 to 25m below chart datum (CD). TOWF has the potential to generate 300MW of electricity providing 200,000 homes with clean energy.

MESL has extensive knowledge of the TOWF project due to our central involvement in the TOWF biological baseline survey which assessed the benthic and intertidal fauna of the area, including the distribution of *Sabellaria spinulosa*^{1,2}. This was followed by a pre-construction investigation into the biological resources of the site by MESL in 2007³. Licensing for the development was granted by Natural England and the JNCC under conditional licensing conditions set out by FEPA (Food and Environmental Protection Act 33119/10/0/S36/TCPA).

¹ Marine Ecological Surveys Ltd. 2005. Thanet Offshore Windfarm Benthic & Intertidal Resource Survey. September 2005. Technical Report to Thanet Offshore Wind Ltd. 127pp.

² Marine Ecological Surveys Ltd 2005. Preliminary Report on the presence of *Sabellaria spinulosa* in the Survey Area. Technical Report for the Thanet Offshore Windfarm. 11pp.

³ Marine Ecological Surveys Ltd 2008. Benthic & Conservation Resources Survey. Technical Report POSTHA1007 prepared for Haskoning UK Ltd. 166pp.

The Terms of Reference⁴ (ToR) for the TOWF post-construction monitoring survey of benthic resources were prepared by MESL and approved by the MMO and their advisors on June 14th 2012, prior to the commencement of field operations.

In order to adequately monitor TOWF, MESL completed a comprehensive benthic survey of the area using both grab sampling and acquisition of seabed imagery. A total of 53 faunal grabs, 42 sediment samples for particle size analysis, 21 sediment samples for organic content analysis and 230 seabed images were acquired during the course of the investigation. The majority of the survey was undertaken in August 2012 and the second portion of the survey, which required seabed images to be collected where grab sampling was not possible, was undertaken on the 15th November 2012. The gap between these sampling events was a result of very poor weather conditions experienced at TOWF throughout this period. The monopile colonisation survey was not completed on account the weather experienced at site. This will be undertaken during the first appropriate weather window in spring 2013, as approved by the MMO and their advisors.

⁴ Marine Ecological Surveys Ltd. 2012. Terms of Reference: Benthic Ecological Survey of the Thanet Offshore Windfarm. 33pp

The TOWF post-construction monitoring study consisted of 4 distinct components each with specific objectives:

1. Subtidal Benthic Sampling

To assess any long term changes to the subtidal benthic ecology as a result of the construction and operation of TOWF against natural variability.

2. Scour Pit Assessment

To ground-truth the geophysical survey data of scour pits and assess any potential impact on benthic biological resources.

3. *Sabellaria spinulosa* Assessment

To assess any changes that may have occurred in the distribution and/or density of *Sabellaria spinulosa* aggregations across the TOWF site, through ground-truthing of geophysical data.

4. Monopile Colonisation

To determine the colonisation on four monopile foundations in terms of dominant species and diversity and to assess the rate of colonisation (as previously discussed, this will be undertaken during the first appropriate weather window in spring 2013, as approved by the MMO and their advisors).

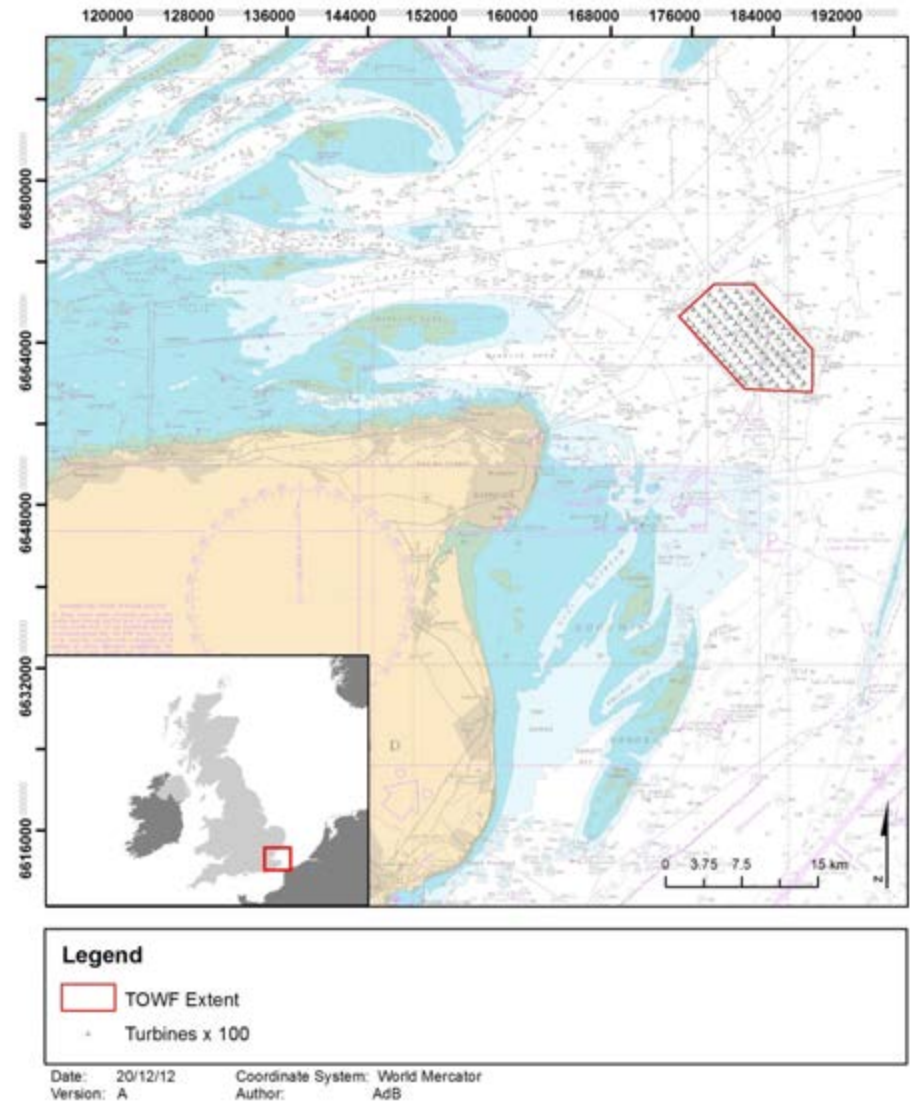


Figure 1. A chart section showing TOWF in geographic context. ARCS chart 1183-0 used under licence from the UK Hydrographic office.

B. METHODS

B.1 Subtidal Benthic Sampling

B1.1 Survey Rationale and Positioning of the Benthic Sampling Stations

The Thanet Offshore Wind Farm (TOWF) benthic survey sampling array was produced using a strategic and iterative approach whereby historic stations sampled during the 2005⁵ benthic resource survey and the 2008⁶ pre-construction survey of TOWF were revisited to enable a statistical comparison of data. Table 1 presented within the Terms of Reference (ToR)⁷ demonstrates the process that was undertaken in the selection of a representative sampling strategy. Stations were selected according to which faunal group and sediment type they were classified under historically. This process ensured that the 2012 post-construction sampling array was representative of key habitats across the region. The stations in the following survey methodology are in accordance with the survey ToR, approved by the MMO and their advisors on June 14th 2012.

Figure 2 demonstrates the position of sampling stations across the TOWF site and surrounding region. A total of 25 stations were targeted for subtidal infaunal sampling, in triplicate, with a 0.1m² mini-Hamon grab. At stations where sampling failed after 3 attempts, sites were targeted by seabed imagery.

⁵ Marine Ecological Surveys Ltd, 2005. Thanet Offshore Windfarm Benthic & Intertidal Resource Survey, September 2005. Technical Report to the Thanet Offshore Wind Ltd. 127pp.

⁶ Marine Ecological Survey Ltd, 2008. Benthic & Conservation Resources Survey. Technical Report POSTHA1007 prepared for Haskoning UK Ltd. 166pp.

⁷ Marine Ecological Surveys Ltd, 2011. Terms of Reference: Benthic Ecological Survey of the Thanet Offshore Wind Farm. 33pp.

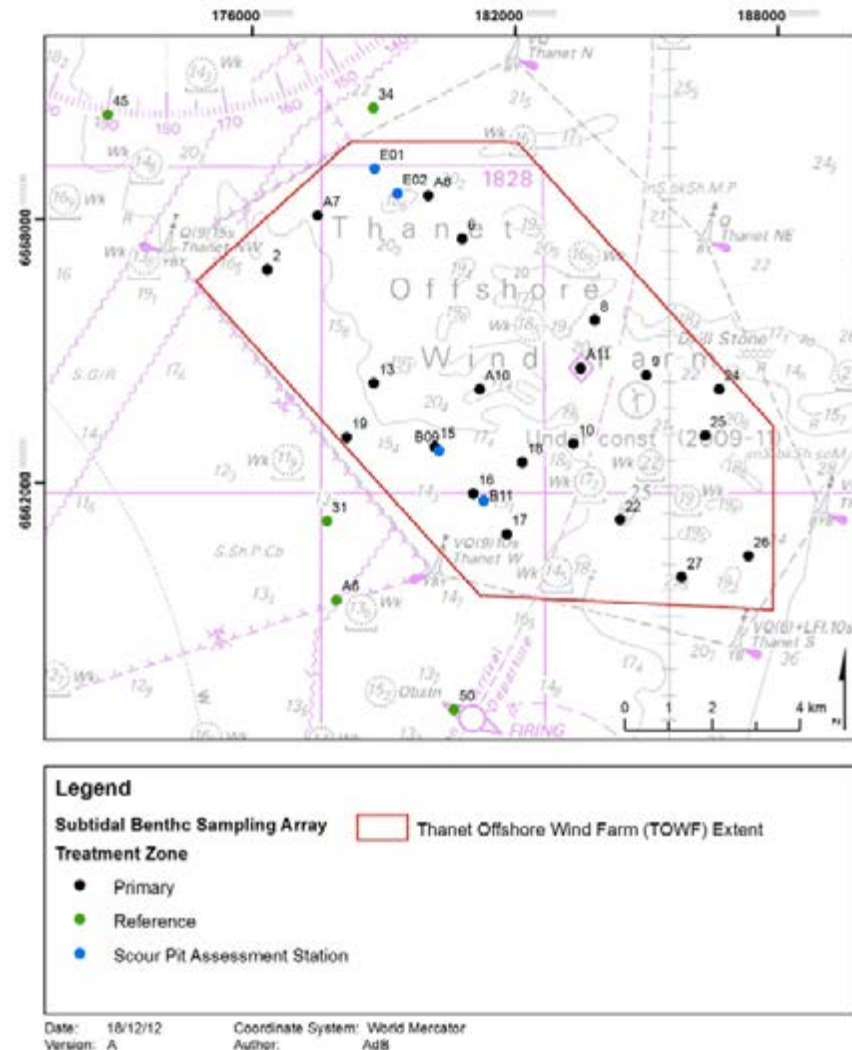


Figure 2. The location of benthic grab stations sampled during August & November 2012 from across TOWF and the surrounding region. Numbered stations correspond to those first sampled in the 2005 baseline benthic resource survey, while stations with the prefix 'A' correspond to those first sampled during the 2007 pre-construction survey. ARCS chart 1183-0 used under licence from the UK Hydrographic office.

All current survey data were collected between the 14/08/12 and 21/08/12, a further sampling event took place on the 15/11/12 whereby seabed images were collected where grab sampling was not possible due to substrate type.

Information regarding the navigational positions of sampling stations, the date and time at which the samples were obtained, the depth of water at the sampling site, the weather conditions which prevailed during sampling and notes on the fauna and sediments observed during sampling are presented in Appendix Table 2 (for benthic biological sampling) and Appendix Table 3 (for seabed imagery).

A summary of MESL's standard survey protocol and quality assurance procedures is presented in Appendix Table 1.

B1.2 Benthic Sample Collection and Assessment

B1.2.1 Benthic Sample Collection

All samples were obtained using a standard 0.1m² mini-Hamon grab deployed from the survey vessel '*Aquadynamic*'. Following deployment, the grab was brought aboard the survey vessel and the sample discharged into a plastic box. A photograph of each sample was taken (Appendix Plate 1).

A note was made of the volume of sample obtained, along with supplementary information about the sediment (Appendix Table 2). Where possible, three small sub-samples were taken from the sediment in the box and a pooled sample of between 0.5 and 1.0 litre was placed in a labelled plastic bag for subsequent particle size distribution (PSD) analysis.

The remainder of the sample was placed on a 1mm mesh stainless steel sieve and gently washed using seawater to remove excess substrate. The residual sample was transferred into a labelled plastic bucket, preserved in buffered formalin and sealed with a tight fitting lid. The samples were retained for subsequent faunal extraction and quantitative analysis of the benthic infauna in the MESL laboratory.

Following a request from the MMO and their advisors for an assessment of the organic matter within the sediments, a fourth grab sample from each of the 25 benthic monitoring stations was obtained. A 1kg sediment sample was collected and transferred into a labelled sediment pot and sealed with a secure lid, for subsequent organic matter content analysis.



Plate 1. Images of the acquisition and processing of benthic grab samples and seabed images from within TOWF and surrounding regions, during August 2012.

B1.2.2 Separation and Analysis of the Fauna

On arrival at the MESL analytical laboratory, samples were checked against the field notes in accordance with our standard operating procedures (Appendix Table 1) and signed against the list of samples collected. The excess formalin was poured through a 1mm mesh sieve and collected for licensed disposal. Each sample was gently eluted with tap water through a 1mm mesh sieve to extract the low-density components (crustaceans and polychaetes) and combined with the material initially separated from the formalin in the sample. The larger macrofauna were removed from the eluted material. This stage in the initial sorting process was carried out in the open air to reduce the effects of residual formalin used to preserve the sample on the survey vessel.

The sediments were sorted under a stereomicroscope with the aim of extracting the fauna. The entire sample of separated fauna was then preserved in industrial methylated spirit (IMS) for subsequent analysis. Each of the extracted samples were subsequently sorted into major faunal groups before being analysed to species level by experienced taxonomists, who sign a log sheet on completion of the analysis of each individual sample. Taxonomic identification is checked throughout the process by our senior analysts and against a reference collection held for ease of use in the analytical laboratory.

MESL is a leading participant in the National Marine Biological Analytical Quality Control (NMBAQC) scheme. Species identification was recorded in a standard format using species codes from Howson & Picton (1997)⁸. The data were entered into our UNICORN database.

⁸ Howson, C.M. & Picton B.E. 1997. *The Species Directory of the Marine Fauna and Flora of the British Isles & Surrounding Seas*. Ulster Museum & The Marine Conservation Society, Belfast & Ross-on-Wye. Ulster Museum Publication No. 276. ISBN 0 948150 06 8.

B1.2.3 Biomass Determination

The blotted wet weight of major groups recorded from the benthic grab samples was measured. These data were then used to estimate total biomass as ash-free dry weight (AFDW) in grams using conventional conversion factors for each of the faunal groups. The wet weight conversion factors are as follows in accordance with Eleftheriou & Basford (1989)⁹:

- Annelida x 0.155
- Crustacea x 0.225
- Mollusca x 0.085
- Echinodermata x 0.08
- Miscellaneous groups x 0.155

In terms of species diversity, miscellaneous groups were mostly accounted for Cnidaria and Bryozoa.

B1.2.4 Particle Size Distribution (PSD)

The sediment sub-samples were subjected to PSD analysis by Gardline Environmental Limited. The stations from which PSD samples were obtained are presented in Appendix Table 2 along with supplementary information obtained during the survey.

The sediments were sieved at ½ phi intervals over a particle size range 64mm-0.063mm, on the Wentworth scale. The results were expressed as cumulative percentage passing and were converted by MESL to absolute percentage retained on each sieve size. These values are summarised for the 2012 survey in

⁹ Eleftheriou, A & Basford, D.J. 1989. The macrofauna of the offshore northern North Sea. *Journal of the Marine Biological Association, UK*. **69**, 123-143.

Appendix Table 4 and further divided in Appendix Table 5 into higher groupings of % gravel, % sand and % silt for ease of broad scale substrate assessment.

B1.2.5 Organic Matter Content Analysis

Sediment samples from a fourth grab sample from each of the 25 benthic monitoring stations were subjected to detailed organic matter content analysis by Severn Trent Services.

Percentage organic matter of sediments was determined by use of potassium dichromate oxidation followed by a back titration with ammonium II iron sulphate solution to assess the amount of unused dichromate. The organic matter was derived from the actual amount of dichromate used, which is reduced from Cr6+ to Cr3+. The test was carried out on an air-dried sediment sample ground to pass a 212µm test sieve. A summary of the test report is described in Appendix Table 6.

B.2 Scour Pit Assessment

B2.1 Survey Rationale and Positioning of Scour Pit Assessment Stations

Four monopiles were selected for scour pit assessment. Monopiles E01, E02, F01 and F02 were initially selected for scour pit assessment, on the basis that these sites were predicted to show the greatest level of scour. MESL subsequently assessed the bathymetric data at these locations and demonstrated that these sites did not show considerable amounts of scour.

MESL selected sites E01 and E02 for scour assessment on the basis that these monopiles, from the four originally selected, showed the best representation of scour. Additionally, MESL identified two alternative monopile locations B09 and B11, where small scour pits were apparent in the bathymetric data and where highly anomalous terrain (a typical signature for *Sabellaria spinulosa* aggregation) has been documented from SSS interpretation in the vicinity of these monopiles.

Figure 15 (Section C.4) shows a chart illustrating the positions of these scour pit assessment stations in geographical context.

B2.2 Scour Pit Assessment Methods

Scour pits at the base of monopiles E01, E02, B09 and B11 were ground-truthed with five sets of seabed imagery per monopile, and, pending confirmation that *Sabellaria spinulosa* was not present, three benthic grabs were taken at each site to verify these images. Benthic sample and PSD collection and assessment follows methods detailed in Section B.1.2.

Detailed field notes documenting the surrounding sediment type, the biological communities present and features of the site were taken with corresponding fix

numbers to coordinates recorded by the vessels onboard dGPS device. These notes were entered into the survey log book and checked for consistency (see Appendix Table 2 and Appendix 3 for further details and tabulated results). Following capture, the quality of each image was checked and re-sampling was undertaken where images were deemed to be of insufficient quality.

At the end of each day the images, logs and data were saved and stored on CD whilst also being saved on the computers as a back-up.

B.3 *Sabellaria spinulosa* Reef Assessment

Survey rationale and methodologies adopted by MESL in order to conduct the *Sabellaria spinulosa* reef assessment are detailed within Section G.2 of this report.

B.4 Statistical Analysis of the Data

Various univariate and multivariate techniques were carried out by MESL, detailed descriptions of these analyses are provided in Appendix Table 10.

B.5 Thematic Maps (GIS)

All of the GIS maps used in this report were generated using ArcGIS 9.3.

C. RESULTS

C.1 Composition of the Seabed

C.1.1 Particle Size Composition of the Seabed

The Particle Size Distribution (PSD) of the deposits sampled with a 0.1m² mini-Hamon grab from stations in and adjacent to TOWF is presented in Appendix Table 4. These data have been summarised in Appendix Table 5 to show the percentage composition of silt (<0.063mm), sand (0.063 to <2mm) and gravel (≥2mm) fractions in the deposits of each sample.

Figure 3 summarises the relative proportions of silt, sand and gravel from benthic deposits collected during August 2012. For ease of presentation, at stations where triplicate samples were obtained, PSD data were averaged to inform the overall composition of sediment fractions at each site. Figure 3 reveals that benthic deposits were predominantly characterised by sand with varying proportions of silt and gravel.

Locations where no PSD data were recorded represent stations that could not be sampled due to the nature of the substrata, or where grabbing retrieved *Sabellaria spinulosa* aggregations in the first grab sample, resulting in the exclusion of that station from further sampling. At these stations, 5 seabed images were subsequently obtained. These images are presented in Appendix Plate 2. Sediment descriptions of these images are presented in Figure 4 and are discussed overleaf.

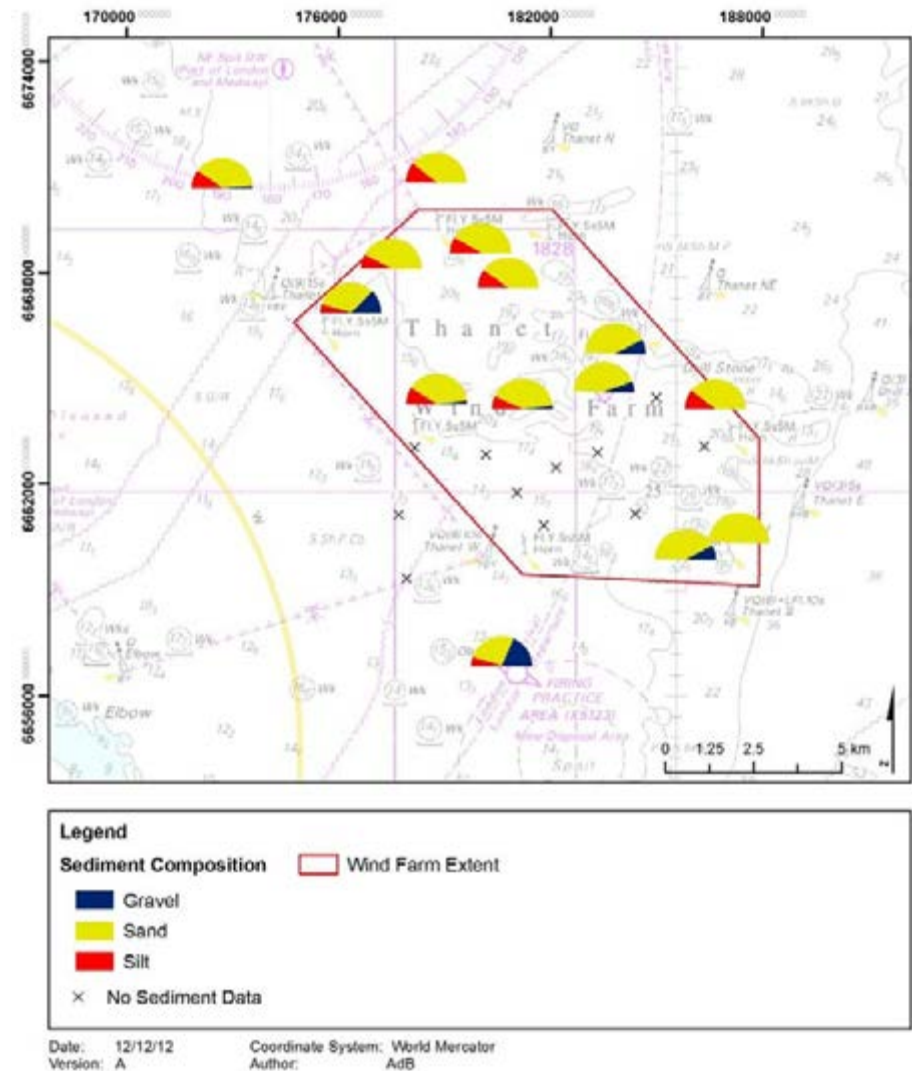


Figure 3. A thematic chart illustrating the distribution of the relative proportions of gravel, sand and silt sampled with a 0.1m² mini-Hamon grab at stations in and adjacent to TOWF during August 2012. ARCS chart 1183-0 used under licence from the UK Hydrographic office.

Figure 4 summarises the nature of the seabed from seabed images at stations where no benthic grab data could be collected. These sites were represented by a mixture of coarse sediments including gravelly Sands (gS), sandy Gravels (sG) and Cobble (C). There was also evidence of bedrock and chalk fragments within some of the images. These findings are consistent with previous assessments describing the substrates within this area, as shown by the seabed substrate layer produced in 2005¹⁰ and included in Figure 4.

The nature of the substrata described at these stations demonstrates why it was not possible to obtain grab samples from these locations. Detailed field notes documenting the sediment type, the biological communities present and features of each image collected at these stations can be found in Appendix Table 3. Any images that revealed the presence of *Sabellaria spinulosa* were incorporated into the TOWF *Sabellaria* assessment as described in Section G.

The Folk triangle depicted in Figure 5 (overleaf) was used to classify the sediment types during this assessment.

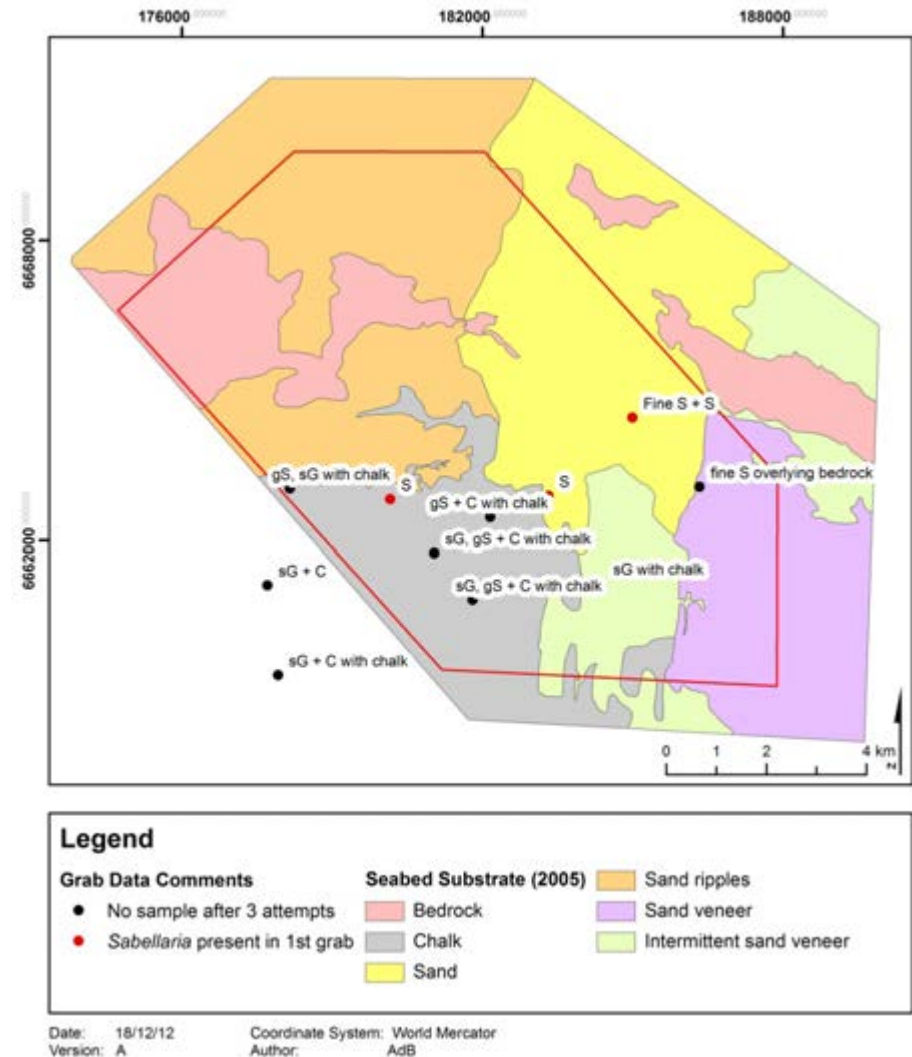


Figure 4. A thematic chart summarising the sediment descriptions allocated to the seabed images collected at stations where samples could not be obtained with a mini-Hamon grab. In addition the 2005 seabed substrate map has been presented.

¹⁰ Marine Ecological Surveys Ltd, 2005. Thanet Offshore Windfarm Benthic & Intertidal Resource Survey, September 2005. Technical Report to the Thanet Offshore Wind Ltd. 127pp.

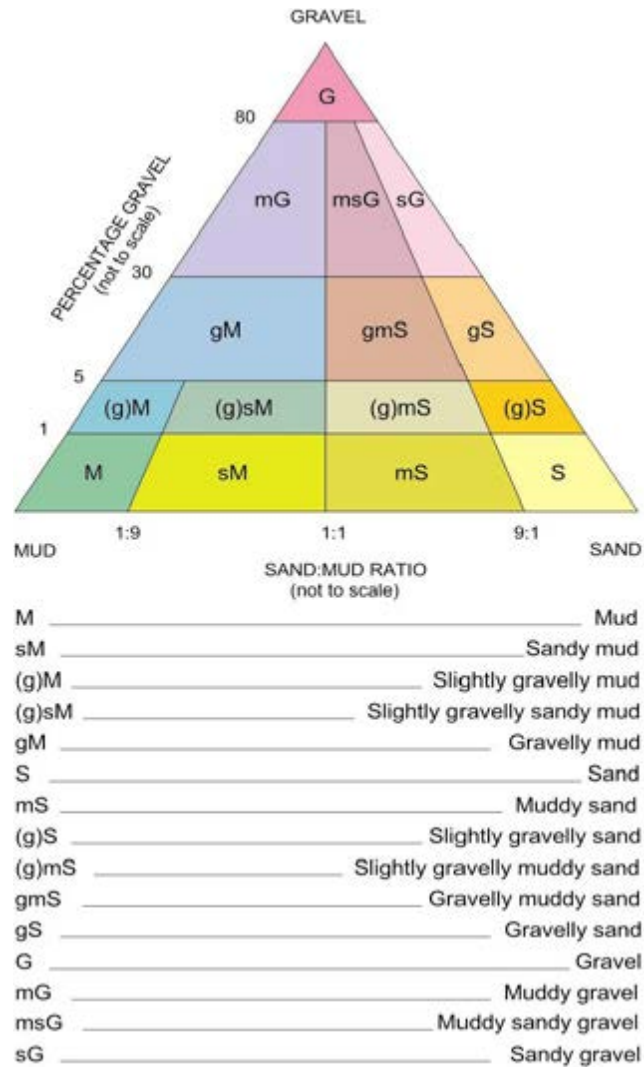


Figure 5. The modified Folk classification system used to define the sediments. After Folk (1954) J.Geol., 62 pp344-359.

C.1.2 Multivariate Statistical Analysis of TOWF Sediment Data

The results presented in Figure 3 and 4 demonstrate a good overview of sediment types in and adjacent to TOWF. A more sensitive comparison across the area however can be achieved by applying multivariate statistical techniques that utilise the complete size spectrum of particles recorded in each sample. *Note that these analyses can only be applied to stations where a sediment sample was obtained.*

A variety of analytical techniques within the PRIMER v6 software package were utilised in order to facilitate a more detailed analysis of the data and to provide a greater insight into the composition of the seafloor across TOWF and the surrounding region.

A group average sorting dendrogram (based on Euclidian Distance) and a corresponding multidimensional scaling (MDS) plot, presented in two-dimensional format was produced in PRIMER v6 using the sediment data acquired from across the survey area. Figure 6 presents the output of these analyses which demonstrates the existence of 4 sediment groups, determined at a Euclidean distance of 23. Station 45 represents a sediment composition that does not group with any other station and is therefore an Outlier. The mean proportions of gravel, sand and silt that account for the 4 multivariate sediment groups are presented in Table 2 overleaf.

Inspection of Table 2 and Figure 6 indicates that sediment samples taken from the TOWF survey area were broadly similar and represent a continuum of gravelly Sands (gS), sandy Gravels (sG) and muddy Sands (mS).

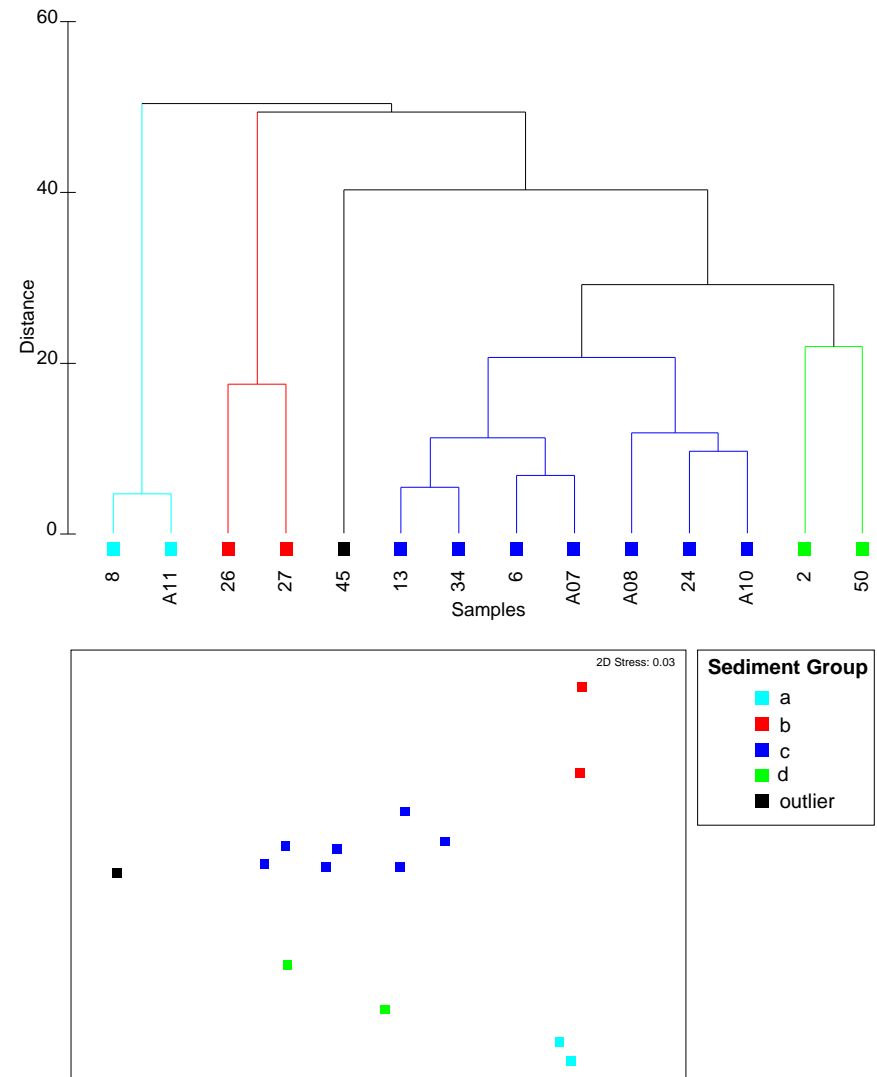


Figure 6. A group average sorting dendrogram and corresponding multidimensional scaling plot presented in two-dimensional format, based on Euclidean distance, for the particle size composition of the sediments sampled in and adjacent to TOWF during August 2012

Figure 7 shows the distribution of sediment groups identified through multivariate analysis. The most common sediment type sampled throughout the region was slightly gravelly muddy Sand ((g)mS). Note that this chart does not take into consideration stations within the southern-central portion of TOWF, where sediment samples could not be obtained due to the nature of the substrate, as demonstrated in Figure 4.

Table 2. The mean proportions of gravel, sand and silt that accounted for each of the TOWF multivariate sediment groups. Each group has been assigned a description that loosely follows the Folk scale of classification (Figure 5).

Sediment Group	% Gravel	% Sand	% Silt	Folk Sediment Class
a	13.22	85.18	1.60	gravelly Sand (gS)
b	8.35	89.94	1.72	slightly gravelly Sand(g)S
c	1.50	80.90	17.59	slightly gravelly muddy Sand ((g)mS)
d	30.81	59.62	9.56	muddy sandy Gravel (msG)

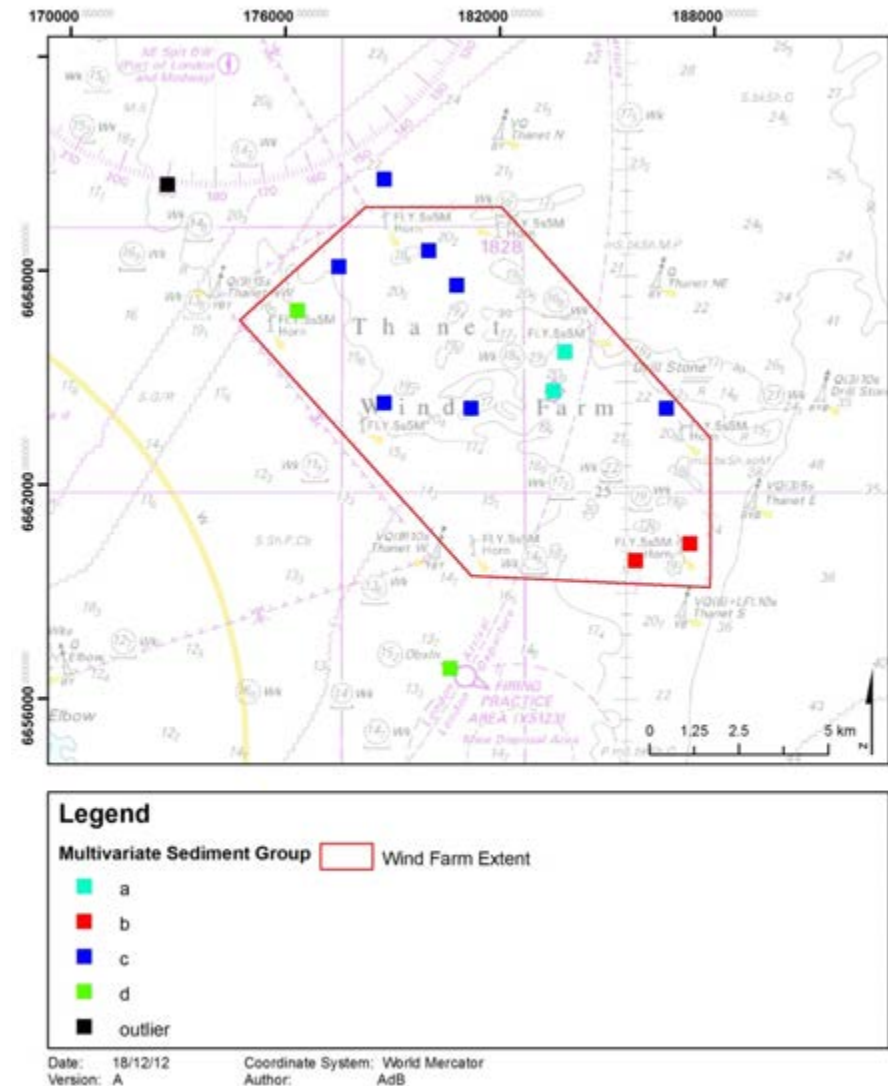


Figure 7. A thematic chart illustrating the spatial distribution of sediment groups identified from multivariate analysis of the particle size distribution data recorded in the TOWF survey area during August 2012. ARCS chart 1183-0 used under licence from the UK Hydrographic office.

C.2 Organic Content of the Sediments

The organic matter content across the TOWF study area varied between <0.20% and 1.50%, representing a range of low to moderate levels across the study area, as demonstrated by Figure 8.

Multivariate statistical techniques were applied to the data in order to assess the relationship between organic content and sediment composition across the site. It is common for organic content to be closely linked with the fine fraction of sediments, but review of results for particle size fractions revealed that there was no significant relationship between sediment particle size distribution and organic matter content.

The same statistical techniques were applied to assess potential correlations between organic matter content and benthic community composition. The results demonstrated that no relationship was apparent.

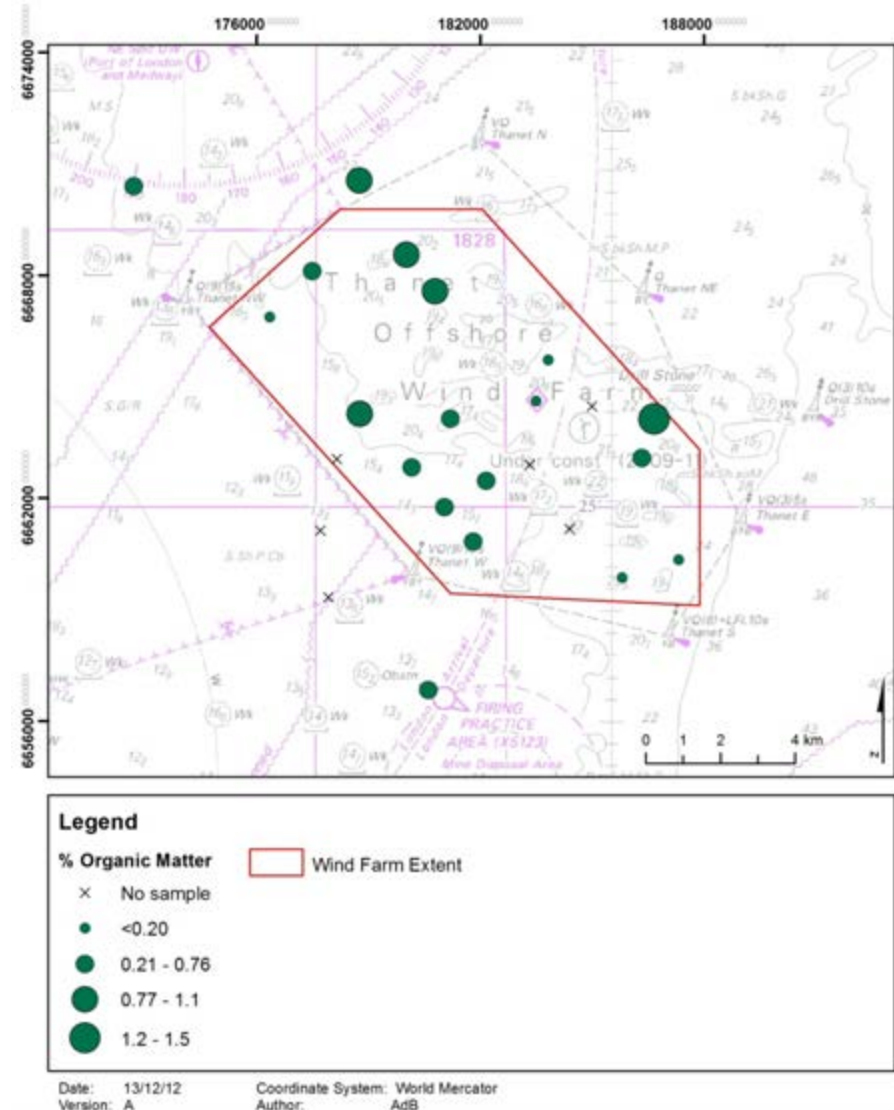


Figure 8. A thematic map illustrating the percentage of organic matter in the TOWF sediments, recorded in the TOWF survey area during August 2012. ARCS chart 1183-0 used under licence from the UK Hydrographic office.

C.3 Biological Resources

C.3.1 Description of the Benthic Fauna

A wide range of benthic invertebrate species were recorded from the TOWF area. The full taxonomic list, including the numerical abundance of each taxon by station, is provided in Appendix Table 7. The biomass (gAFDW) of each major faunal group is presented in Appendix Table 8. *Note: the following section does not include data from stations sampled as part of the scour pit assessment.*

A total number of 264 taxa were recorded during the TOWF post-construction survey with a mean of 27 taxa per sample. The mean number of organisms per sample was 172, and the mean biomass per sample was 1.71g AFDW (Ash Free Dry weight). A summary of the data is presented in Appendix Table 9. Images of some of the most abundant taxa are presented in Plate 2 opposite. The relative contribution of Annelida, Crustacea, Mollusca, Echinodermata and miscellaneous phyla to the macrofaunal assemblage are shown in Figure 9 below.

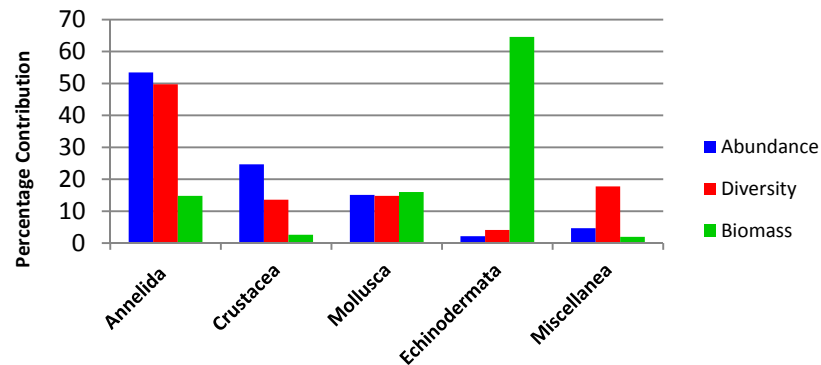


Figure 9. A histogram illustrating the relative contribution of the main faunal groups to the total abundance, diversity and biomass sampled across TOWF and adjacent areas.



Plate 2. A selection of fauna recorded from across TOWF during the 2012 monitoring survey.
© www.seasurvey.co.uk

Figure 9 shows that taxa belonging to the Phylum Annelida dominate the benthic community in terms of abundance and species variety. Crustaceans, molluscs and miscellaneous Phyla are present in lower numbers and are represented by relatively few species. Taxa belonging to the Phylum Echinodermata make a significant contribution to the community in terms of biomass and are accounted for primarily by the common heart urchin *Echinocardium cordatum* and the serpent's table brittle star *Ophiura albida*. Although these are present in relatively small numbers (maximum 13 individuals at 1 station), due to their size, they represent a significant proportion of the biomass.

The contribution of the top ten organisms to the overall abundance is illustrated in Figure 10. The highest contributor to the overall abundance was the long clawed porcelain crab *Pisidia longicornis*. This species is frequently found to be associated with *Sabellaria spinulosa* reef habitat, which was the third largest contributor to abundance. Despite high contribution to abundance, examination of the data shows that *Sabellaria spinulosa* and *Pisidia longicornis* were found in abundance at only a few stations (stations 09, 10 and 15). These stations were not sampled in triplicate on account of the presence of potential *Sabellaria* reef within the first grab sample.

The contribution to abundance of epilithic species such as *Pomatoceros lamarcki* and Mytilidae reflects the presence of coarser gravelly sediments throughout the area of interest, which provide comparatively stable surfaces for attachment.

Figure 11 illustrates the taxa that occurred in the highest proportion of samples collected during the 2012 survey. Five of these taxa belong to the Phylum Annelida and of these, the bristle worm *Spiophanes bombyx* occurred most frequently. The absence of *Sabellaria spinulosa* in this graph indicates that, whilst

this species was abundant within the area, it only occurred at a relatively limited number of stations.

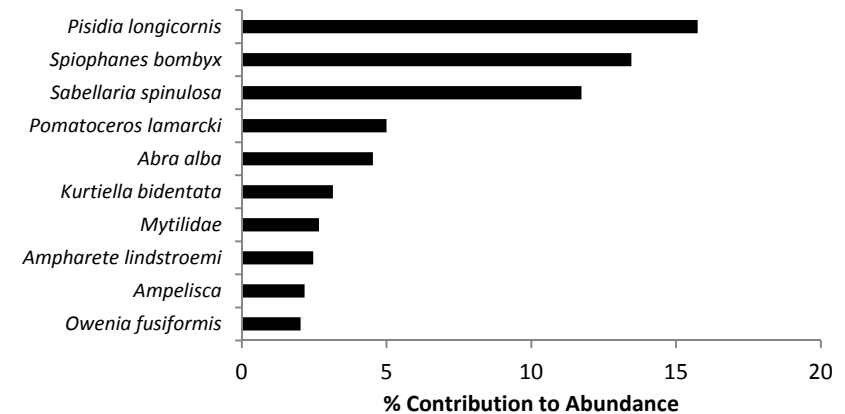


Figure 10. A histogram illustrating the 10 most abundant taxa sampled across TOWF and adjacent areas during August 2012.

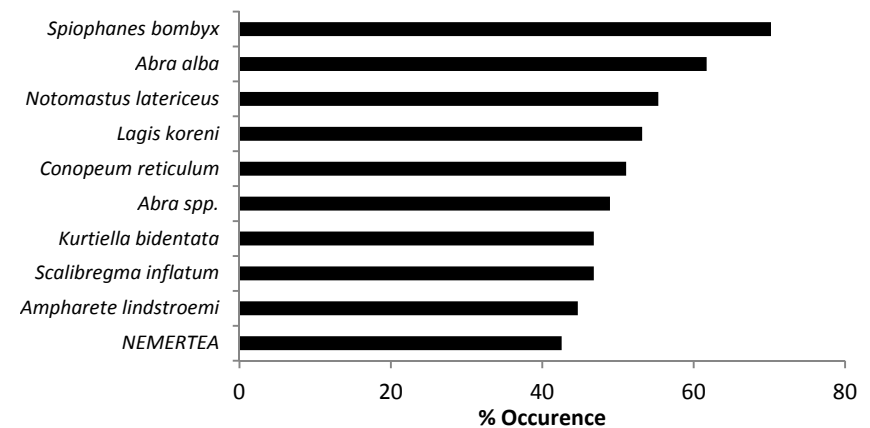


Figure 11. A histogram illustrating the 10 most commonly occurring taxa sampled across TOWF and adjacent areas during August 2012.

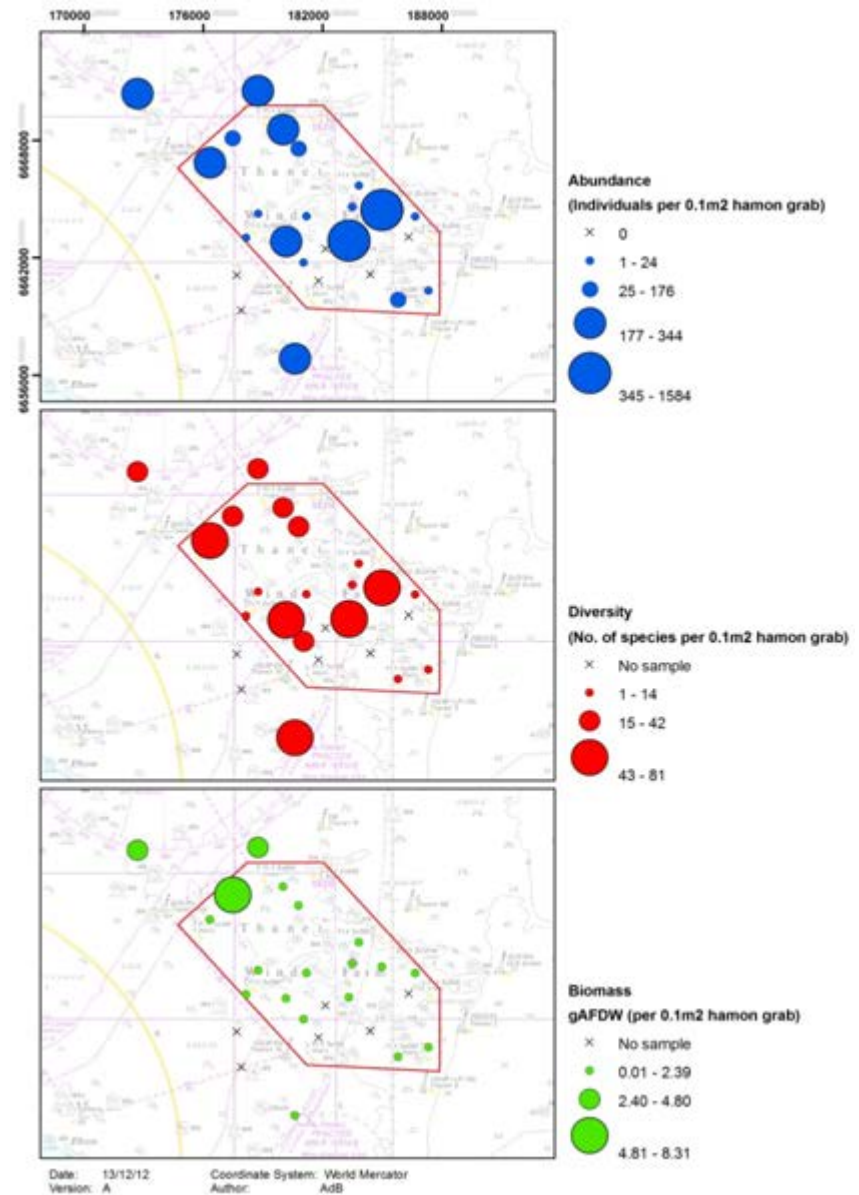
C.3.2 Description of Abundance, Taxonomic Richness and Biomass

The spatial variation in benthic macrofaunal abundance, species diversity and biomass is shown in Figure 12. Note that triplicate samples have been averaged to facilitate comparison at each station.

Figure 12 shows that there was considerable variation in abundance between sampling stations, with the number of individuals ranging from 4 to 1574 per station. There was a substantial elevation in the abundance of macrofauna recorded at two sampling stations, 09 and 10, with both stations having over 1000 individuals recorded. Stations 09 and 10 were found to have aggregations of *Sabellaria spinulosa* within the samples. High abundances recorded reflect the presence of high numbers of the long clawed porcelain crab *Pisidia longicornis*, in addition to high numbers of *S. spinulosa* itself. During sampling both stations 09 and 10 were excluded from triplicate sampling in order to avoid damaging a potential *S. spinulosa* reef habitat.

Species diversity varied from 4 to 81 species per station throughout the area. Approximately half the stations are represented by a relatively high numbers of species (30 to 81 species). The distribution of benthic infaunal biomass was relatively uniform with 86% of the stations having a biomass of 0.01 to 2.39g AFDW. As previously described, high biomass values recorded to the north of the site were ascribed to the presence of *Echinocardium cordatum* and *Ophiura albida* within those samples.

Figure 12. Charts showing the abundance (numbers of individual per 0.1m²), species diversity (number of species per 0.1m²) and biomass (g AFDW per 0.1m²) of benthic infauna recorded in August 2012. ARCS chart 1183-0 used under licence from the UK Hydrographic office.



C.3.3 Multivariate Analysis of Community Composition

The composition of the biological communities in the survey area are best analysed by multivariate methods. These take into account the species variety and the relative abundance of each taxon and allow some inferences to be made on the characterising species that comprise the major communities in the survey area.

Figure 13 shows a group average sorting dendrogram (based on Bray- Curtis similarity of square-root transformed data) and the corresponding multidimensional scaling (MDS) ordination, presented in two-dimensional format, for the benthic infauna recorded across the survey area. The 2D stress of the MDS ordination is low (0.13) indicating that the two-dimensional representation provides a useful interpretation of the interrelationships that occur between the communities sampled at the different survey stations.

The similarity between infauna recorded from each of the sampling sites was low. Figure 13 demonstrates that samples acquired from across TOWF and adjacent areas were representative of a total of 4 infaunal groups at the 25% similarity level, with 3 outlying samples. The output of the analysis used to define these groups is presented in Appendix Table 11.

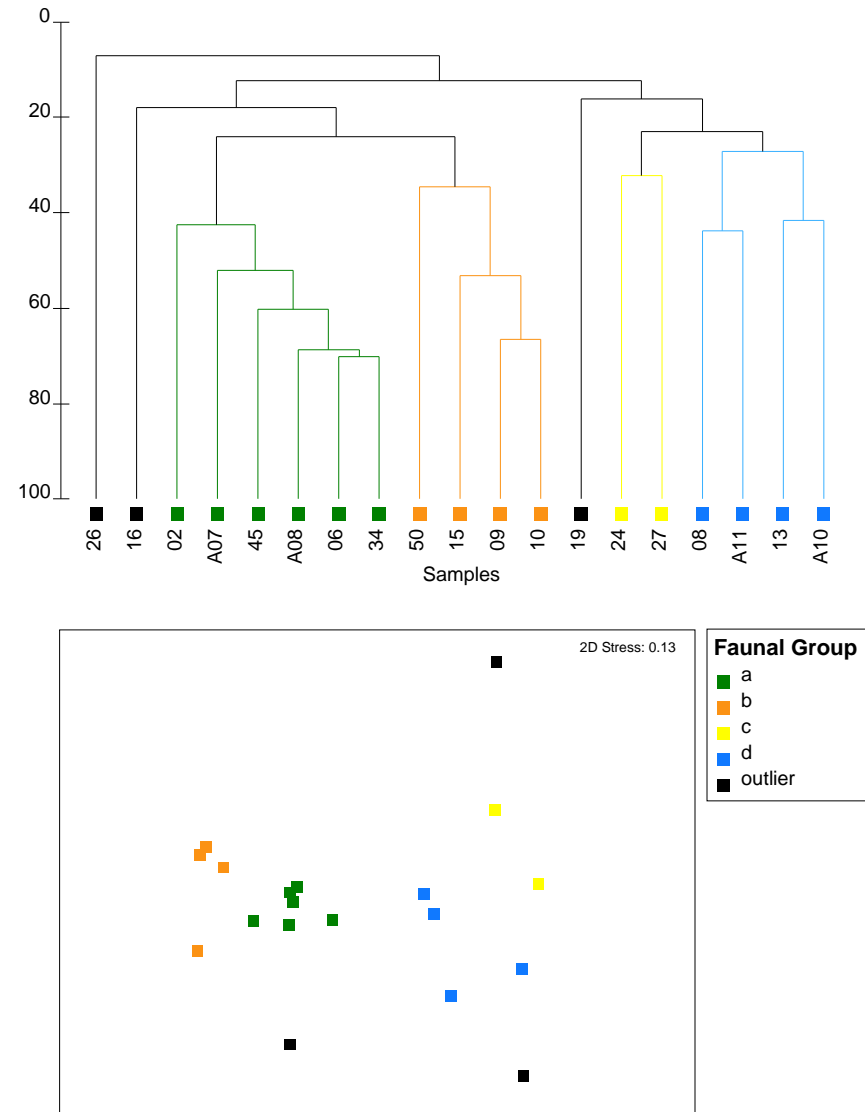


Figure 13. A group average sorting dendrogram based on the square root transformed Bray Curtis similarity infaunal abundance data and the corresponding multidimensional scaling (MDS) ordination, presented in two-dimensional format at 19 stations in and adjacent to TOWF.

Faunal Group a was the most commonly occurring group identified from benthic samples collected across the area. Faunal Group a occurred at 6 stations located towards the north of the site and was the second most diverse group recorded, consisting of 37 taxa. Characterising fauna of this group included the bristle worms *Ophelia borealis* and *Spiophanes bombyx*, the bivalve molluscs *Abra alba* and *Kurtiella bidentata*, in addition to the tube worm *Owenia fusiformis*. Appendix Table 11 reveals that the average group similarity for Faunal Group a was 54.01 %.

Faunal Group b (average group similarity of 46.12%) was the most diverse group recorded, consisting of 44 taxa (at the 90% cut-off) and occurred at 4 stations across the area. Key characterising fauna of Group b were *Pisidia longicornis* and *Sabellaria spinulosa*, which accounted for 22% of the total group similarity. Both stations 09 and 10, which fall in to this group, were characterised as potential *Sabellaria spinulosa* reef during sampling with 518 and 291 individuals recorded within samples, respectively. *Sabellaria spinulosa* and *Pisidia longicornis* individuals were recorded at stations 15 and 50, although numbers were not as high. The Ross worm, *Sabellaria spinulosa*, is tubicolous in nature and requires a hard surface for attachment. Faunal Group b is therefore likely to be found in association with coarser deposits across the site. PSD was only recorded at 1 of the sites, which comprised muddy sandy Gravel (msG).

Faunal Group c was the least diverse group, consisting of 5 taxa (at the 90% cut-off) and occurred at 2 stations, located towards the south-east of the sampling array. The amphipod *Urothoe brevicornis* and mussels belonging to the family Mytilidae were key characterising fauna of this group. Average group similarity for this group was 83.13%.

Faunal Group d (average group similarity of 32.35%) comprised 4 stations within the central portion of TOWF and consisted of 18 taxa (at the 90% cut-off). The bristle worms *Ophelia borealis* and *Spiophanes bombyx*, in addition to taxa belonging to the family Mytilidae account for 36% of this group's similarity.

The geographical distribution of these faunal groups is shown in Figure 14, overleaf. There was no obvious correlation between the faunal groups identified in Figure 14 and sediment groups identified in Figure 7; this is most likely the result of the sediments sampled across TOWF being broadly similar. The relationship between the distribution of sediments and the distribution of infauna is further explored in Section C.3.4, where more sensitive statistical techniques have been applied.

The relatively high biodiversity recorded at locations across the TOWF site is likely to reflect the mixed sediment types observed across the area (as demonstrated by Table 2). Research undertaken by MESL (2007)¹¹ found that the wide range of habitats that occur within mixed sediment types, such as mixed sands and gravels support a higher biodiversity of benthic infauna than well sorted sediments. Essentially, the more heterogeneous the sediments, the greater number of species they can support. This is because a greater mix of particle size increases the number of potential habitat types for benthic species.

¹¹ Marine Ecological Surveys Limited. (2007) Predictive Framework for Assessment of Recoverability of Marine Benthic Communities Following Cessation of Aggregate dredging. Technical Report to the Centre of Environment, Fisheries and Aquaculture Science (CEFAS) and the Department for Environment, Food and Rural Affairs (Defra). Project No MEPF 04/02. Marine Ecological Surveys Limited, 24a Monmouth Place, BATH, BA1 2AY. pp. 115.

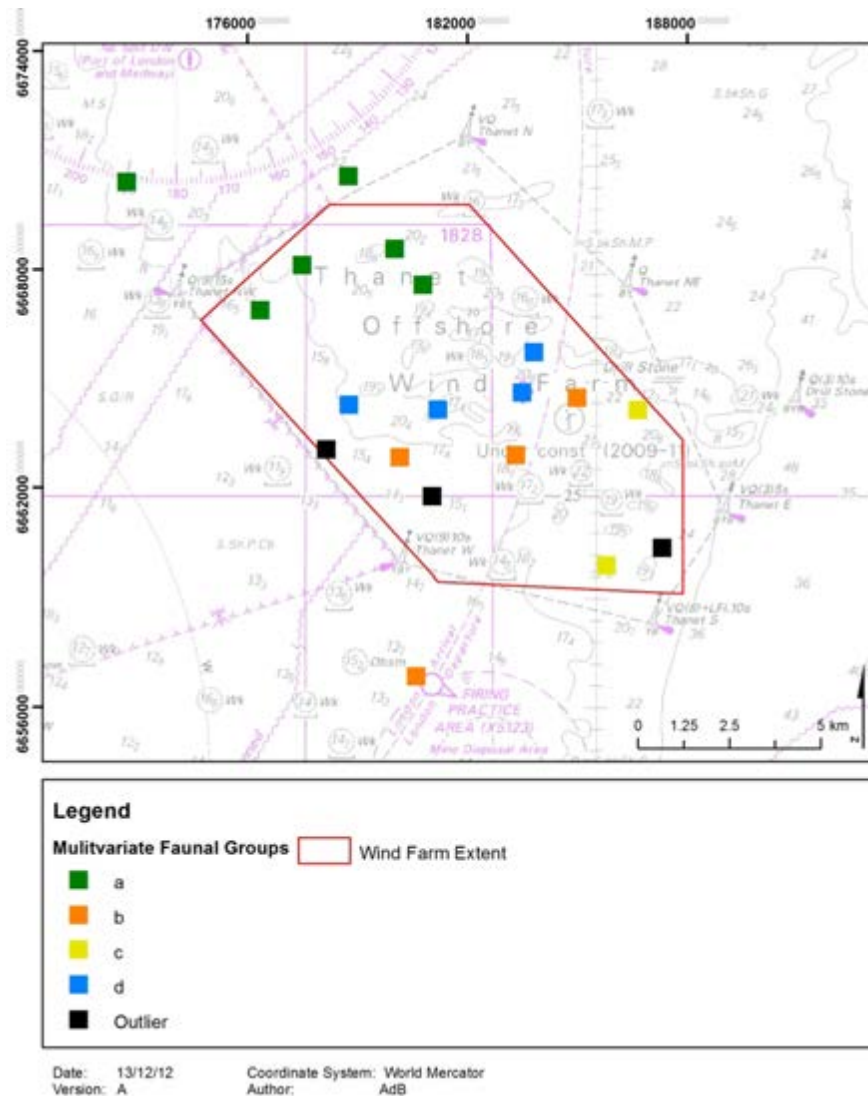


Figure 14. A thematic chart illustrating the spatial distribution of faunal groups identified from multivariate analysis of fauna recorded in the TOWF survey area during August 2012. ARCS chart 1183-0 used under licence from the UK Hydrographic office.

C.3.4 The Relationship between the Distribution of Sediments and the Distribution of Infauna

A brief review of the information presented in Sections C.1 and C.3 reveals that there were no obvious correlations between the faunal groups identified in Figure 14 and sediment groups identified in Figure 7.

A more sensitive comparison across the area can be achieved by applying statistical techniques such as the RELATE routine. The RELATE routine within PRIMER v6 provides a comprehensive means of testing for correlations between faunal data and sediment data acquired during the course of the TOWF 2012 study and establishes the robustness of this relationship.

The full results of the RELATE test are presented in Appendix Table 12 which demonstrates that there was a significant relationship (Rho 0.525, Significance Level 0.2%) between the multivariate patterns observed in the sediment data and the faunal data. *Note that the faunal samples without corresponding PSD samples were not included within these analyses.*

In order to establish which particle sizes correlate most strongly with the patterns observed within the faunal communities, the faunal and sediment data were further tested using the BIO-ENV routine. The full results of this test are presented in Appendix Table 12. The results indicate that the strongest correlation between the multivariate patterns in the sediment and faunal data corresponded most strongly from a combination of gravel of particle sizes 16 & 8mm, sand of particle sizes 0.5-0.25mm and silt of particle sizes <0.063mm.

It is well documented that sediment composition is an important factor for determining the distribution of infaunal communities^{12,13}. For example, the presence of coarse sediments provides attachment sites for a diverse assemblage of species including bryozoans and hydroids. Cooper *et al.* (2011)¹² asserted that taxa characterising gravel dominated sediments were typically only found in association with these sediment fractions.

Research undertaken by MESL (2007)¹⁴ suggested that biodiversity (relating to the number of characterising taxa in marine deposits) can be directly related to sediment type. It was found that the wide range of habitats that occur within mixed sediment types such as mixed sands and gravels support a higher biodiversity of benthic infauna than well sorted sediments. Essentially, the more heterogeneous the sediments, the greater the number of species they can support. This is because a greater mix of particle size increases the number of potential habitat types for benthic species.

Other factors that could influence the community composition include current speed, depth and influence of the tidal regime.

¹² Cooper, K.M., Curtis, M., Wan Hussin, W.M.R., Brrrio Frojan, C.R.S., Defew, E.C., Nye, V., Paterson, D.M. (2011) Implications of dredging induced changes in sediment particle size composition for the structure and function of marine benthic macrofaunal communities. *Marine Pollution Bulletin*, **62**.

¹³ Ellingsen, K.E. (2002) Soft sediment benthic biodiversity on the continental shelf in relation to environmental variability. *Marine Ecology Progress Series*, **232**, 15-27.

¹⁴ Marine Ecological Surveys Limited. (2007) Predictive Framework for Assessment of Recoverability of Marine Benthic Communities Following Cessation of Aggregate dredging. Technical Report to the Centre of Environment, Fisheries and Aquaculture Science (CEFAS) and the Department for Environment, Food and Rural Affairs (Defra). Project No MEPF 04/02. Marine Ecological Surveys Limited, 24a Monmouth Place, BATH, BA1 2AY. pp. 115.

C.3.5 Overview of Habitats and Community Composition

This study has shown that the sediments within the survey area comprise a mixture of coarse sands, fine sands and cobbles, with bedrock outcrop within the central-southern portion of the site. The organic matter content of these sediments varied between <0.20% and 1.50%, representing low to moderate levels.

A wide range of benthic invertebrate species were recorded across the TOWF survey area. Taxa belonging to the Phylum Annelida were found to dominate the benthic communities in terms of abundance and species diversity. Taxa belonging to the phylum Echinodermata made a considerable contribution to total biomass, which was ascribed to the presence of large taxa that included the common heart urchin *Echinocardium cordatum* and the serpent's table brittle star *Ophiura albida*.

There was considerable variation in abundance and diversity recorded across the site. High abundances of macrofauna recorded at stations 09 and 10 were attributed to high abundances of the ross worm *Sabellaria spinulosa* and the long clawed porcelain crab *Pisidia longicornis*, which is typically found associated with *S. spinulosa* aggregations.

A total of 4 infaunal groups were identified through multivariate analysis, the similarity between infauna recorded from each of the sampling sites was low.

Statistical techniques revealed a significant relationship between patterns observed in the particle size distribution data to those seen in the faunal communities.

C.4 Scour Pit Assessment

On August 18th 2012, seabed images were collected from scour pits at the base of monopiles E01, E02, B09 and B11 (five sets of imagery were collected per monopile). A contact sheet of the seabed images is included as Appendix Plate 3. Figure 15 illustrates the position of these stations. The rationale for sampling the scour pits is described in Section B.2.

Benthic grab data were obtained from within scour pits associated with monopiles E01 and E02 using a 0.1m² mini-Hamon grab. The numerical abundance of each taxon by station is provided in Appendix Table 7. The biomass (gAFDW) of each major faunal group (by station) is presented in Appendix Table 8. No benthic grab data could be obtained from scour pits associated with monopiles B09 and B11 due to the coarse nature of the sediments.

The following section presents examples of the seabed images and a summary of the data collected within each scour pit identified from bathymetric data obtained by Titan Environmental Surveys Ltd for Gardline Geosurvey Ltd during April and October 2012¹⁵.

The Titan 2012¹⁴ report concluded that, at turbines E01, E02, F01 and F02, scour ranged between 3.5m and 4.5m in a circular shape around the base of the monopile. The circular nature of scour suggests a non distinctive direction of tide current at the TOWF site.

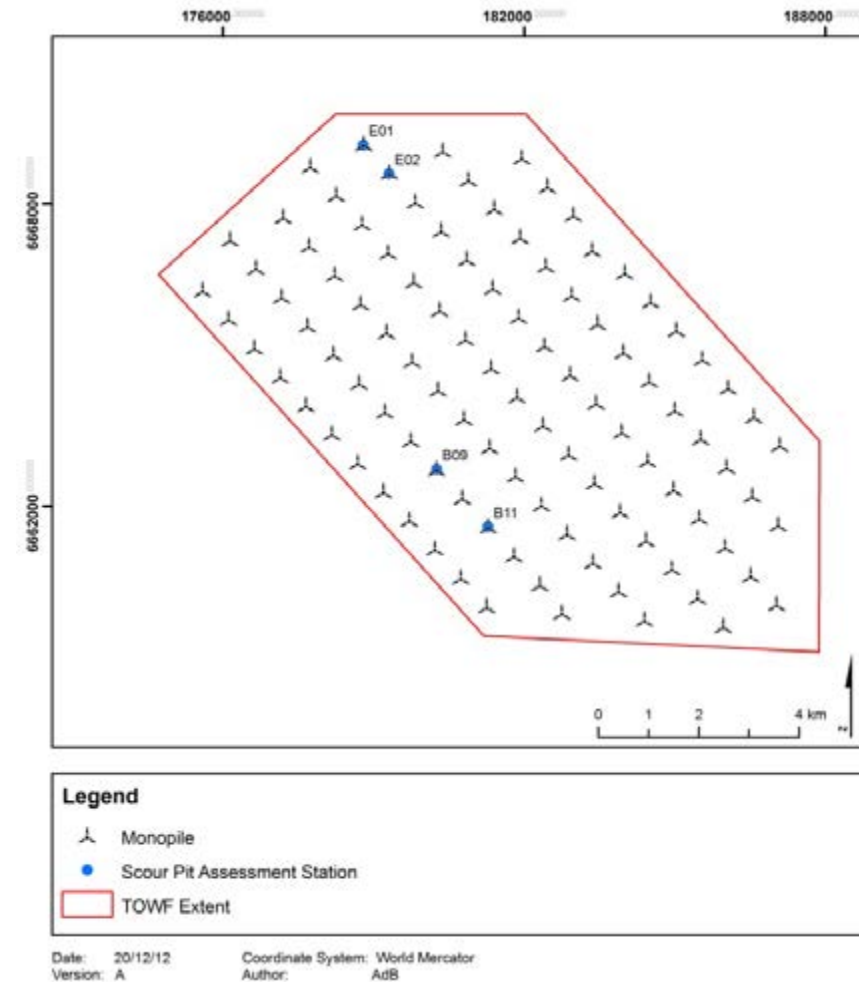


Figure 15. The location of scour pit assessment stations sampled during August 2012.

¹⁵ Titan Environmental Surveys Ltd, 2012. CS0371 –TOWF Post Construction Survey Campaign 2. 40pp.

Scour Pit B09

Plate 3 shows an example of the seabed imagery collected from within the scour pit associated with monopile B09. Examination of the seabed images collected at B09 revealed that the sediments within the scour pit consisted of a mixture of gravels and cobbles, with evidence of chalk.

Epifauna identified within these images includes the common starfish *Asterias rubens*, the common whelk *Buccinum undatum*, the bryozoan *Alcyonidium diaphanum* and the calcareous tube building worm *Pomatoceros* sp. Interestingly there was also evidence of broken *Mytilus edulis* shell.

No infaunal data were acquired at this station due to the coarse nature of the sediments.

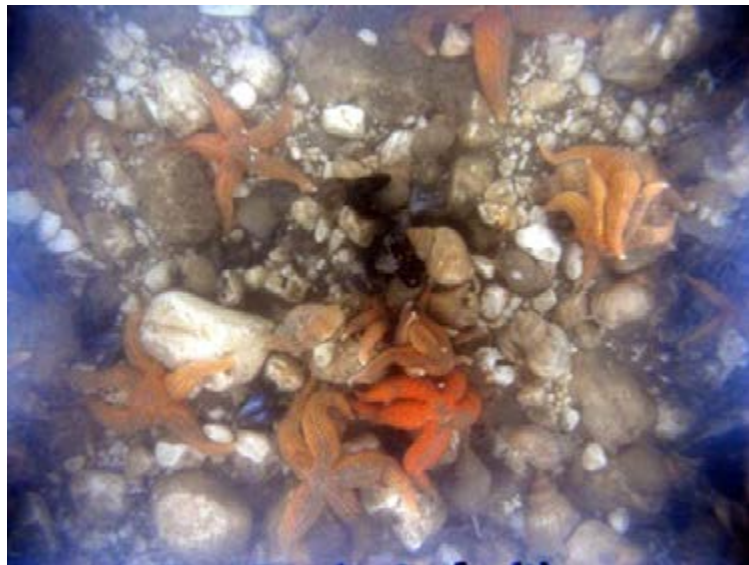


Plate 3. Seabed image taken at scour pit B09 (e)

Scour Pit B11

Plate 4 shows an example of the seabed imagery collected from within the scour pit associated with monopile B10. Examination of the seabed images revealed that the sediments within the scour pit consisted of a mixture of gravels and cobbles, with evidence of chalk, similar to that seen at B09.

The epifauna identified within these images includes the Dahlia anemone *Urticina felina*, the hermit crab *Pagurus* sp., *Asterias rubens*, *Buccinum undatum*, *Alcyonidium diaphanum*, and *Pomatoceros* sp. In common with B09, there was also evidence of broken *Mytilus edulis* shell.

No infaunal data were acquired at this station due to the coarse nature of the sediments.



Plate 4. Seabed image taken at scour pit B11 (e)

Scour Pit E01

Plate 5 shows an example of the seabed imagery collected from within the scour pit associated with monopile E01. Examination of the seabed images collected at E01 revealed that the sediments within the scour pit consisted of sandy gravels with broken shell.

The epifauna identified within these images includes *Pagurus* sp., *Asterias rubens*, *Buccinum undatum*, *Alcyonidium diaphanum* and hydroids belonging to the family Sertulariidae. There was also evidence of broken *Mytilus edulis* shell.

Particle size analysis and infaunal analysis was undertaken from sediments obtained at this site in addition to those at site E02, both of which are described overleaf.



Plate 5. Seabed image taken at scour pit E01 (a)

Scour Pit E02

Plate 6 shows an example of the seabed imagery collected from within the scour pit associated with monopile E02. Examination of the seabed images collected at E02 revealed that the sediments within the scour pit consisted of sandy gravels and cobble.

Epifauna identified within the images collected at this location includes *Pagurus* sp., *Asterias rubens*, *Alcyonidium diaphanum*, *Carcinus* sp. *Hyas* sp. and hydroids belonging to the family Sertulariidae. There was also evidence of broken *Mytilus edulis* shell.



Plate 6. Seabed image taken at scour pit E02 (a)

Particle Size Distribution (PSD) analysis was undertaken on sediment samples obtained at scour pit locations E01 and E02. Table 3 below illustrates the mean proportions of gravel, sand and silt at locations E01 and E02 in comparison with the calculated mean of all samples obtained across the TOWF site (non scour). The results from PSD analysis demonstrate that greater proportions of gravel were obtained within scour pits E01 and E02 than those obtained from the site as a whole, confirming the coarse nature of the sediments observed from seabed imagery.

Table 3. The mean proportions of gravel, sand and silt which accounted for sediments from scour pits E01 and E02 and all samples across TOWF which were obtained from non-scour stations.

	% Gravel	% Sand	% Silt	Folk Sediment Class
Scour pit E01	37.96	56.54	5.49	sandy Gravel (sG)
Scour pit E02	73.27	20.33	6.40	muddy sandy Gravel (msG)
All samples across TOWF (non scour)	7.49	79.99	12.52	gravelly muddy Sand (gms)

Infaunal analysis of benthic samples collected from scour pit locations E01 and E02 revealed that a mean number of 29 taxa were recorded per sample. The mean number of organisms per sample was 71 and the mean biomass per sample was 1.35g AFDW. Compared to the infaunal analysis of samples across the whole TOWF region (Section C.3.2), diversity and biomass values were relatively similar, although mean species abundance per sample was approximately 60% lower in scour pit samples.

The most abundant taxon from samples collected at E01 and E02 was the polychaete worm *Mediomastus fragilis*, contributing 16% to the total abundance. Other abundant taxa include the bivalve *Abra alba*, and the polychaete worms *Ampharete lindstroemi* and *Sabellaria spinulosa* all of which contributed highly to overall abundance from samples collected across TOWF.

The most commonly occurring taxa from samples collected at E01 and E02 were taxa belonging to the phylum Nemertea, the polychaete worms *Lumbrineris cingulata*, *Mediomastus fragilis* and *Sabellaria spinulosa* and the amphipod *Ampelisca spinipes*. These taxa were also high contributors to commonly occurring taxa throughout the TOWF survey site.

C.4.1 Impacts of Scouring on *Sabellaria spinulosa* Reef Structures

Sabellaria spinulosa reef structures could potentially be adversely impacted by the scouring of sediments around the base of a monopile. To prevent negative impacts on *Sabellaria* aggregations across the region, assessments undertaken by MESL in 2005¹⁶ and 2007¹⁷ informed the micro-siting of turbine foundation structures to ensure that placement of the wind turbines avoided dense patches of *Sabellaria spinulosa* reef.

Figure 16 shows the location of turbines in relation to 2012 *Sabellaria spinulosa* aggregations, as modelled in Section G. The figure reveals that there are dense patches of *Sabellaria* growth across TOWF. Furthermore, 2012 results revealed a positive growth and stabilisation of reef recorded across the site. No *Sabellaria* reef aggregations were identified in seabed imagery collected from scour pits B09, B11, E01 and E02. None of these monopiles were in modelled *Sabellaria* reef locations.

It can be assumed that impacts associated with scouring are restricted to the base of the monopile plus an approximate 5 metre circumference, as extrapolated from Titan 2012 data¹⁴.

¹⁶ Marine Ecological Surveys Ltd, 2005. Thanet Offshore Windfarm Benthic & Intertidal Resource Survey, September 2005. Technical Report to the Thanet Offshore Wind Ltd. 127pp.

¹⁷ Marine Ecological Survey Ltd, 2008. Benthic & Conservation Resources Survey. Technical Report POSTHA1007 prepared for Haskoning UK Ltd. 166pp.

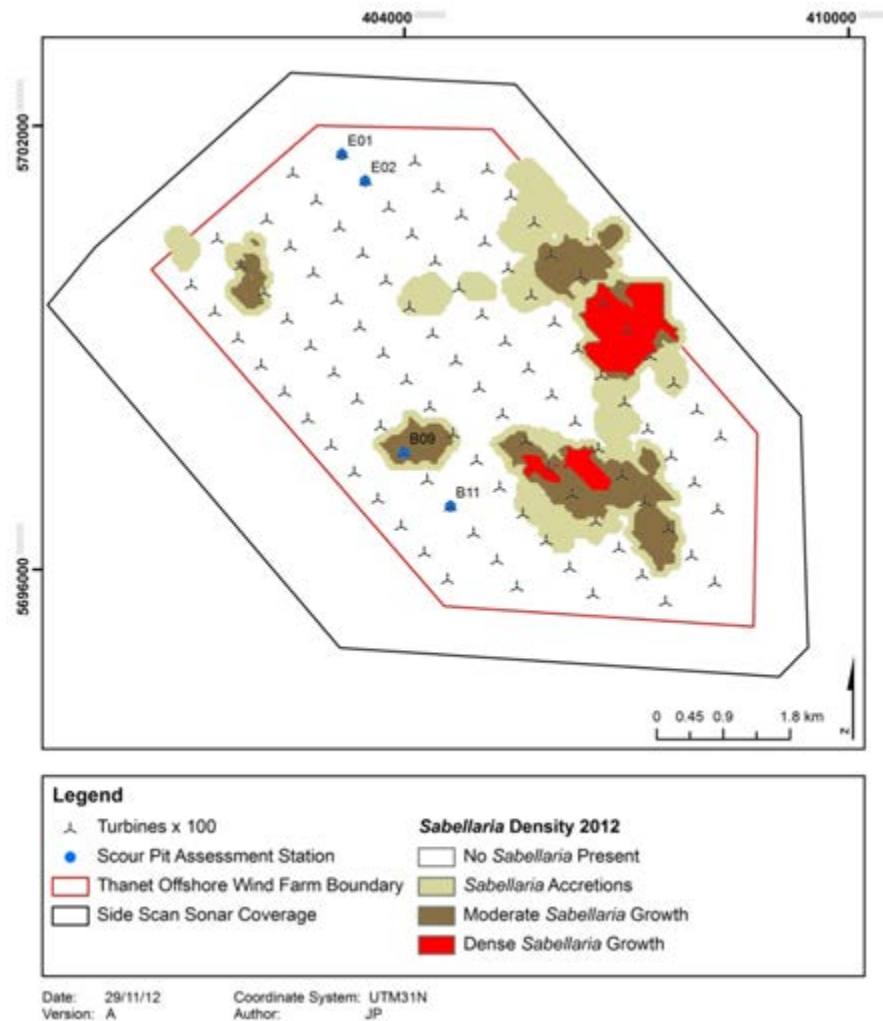


Figure 16. Monopile locations in relation to *Sabellaria spinulosa* aggregations modelled using the 2012 data.

C.4.2 Conclusions from Scour Pit Assessment

The 2012 scour pit assessment demonstrated that, within the assessed scour pits, substrates comprised a mixture of coarse sediments ranging from muddy sandy Gravels (msG) to Cobbles (C). On average these sediments were coarser than those recorded from samples throughout the TOWF site.

Analysis of infaunal samples from scour pit locations E01 and E02 revealed that the most abundant and commonly occurring taxa were similar to those found across the TOWF site and surrounding region.

Epifaunal communities within the scour pits were characterised by species able to colonise coarse sediments and unstable cobbles. These communities included the bryozoan *Alcyonidium diaphanum*, the calcareous tube building worm *Pomatoceros* sp and the Dahlia anemone *Urticina felina*, with an abundance of other hydroids and bryozoans.

Furthermore, seabed images revealed an abundance of the common starfish *Asterias rubens* which is known to prey upon a wide range of living organisms and carrion. Research has demonstrated that *A. rubens* exhibit positive rheotaxis, which is intensified by the occurrence of taxa upon which they feed¹⁸. *Mytilus edulis* shell was recorded in the seabed images at these scour pit locations, suggesting that *M. edulis* are likely to colonise the monopile foundations, therefore attracting predators such as *A. rubens*. This theory will be further examined during the monopile colonisation survey which is to be undertaken during spring 2013.

¹⁸ Dare P.J. 1982. Notes on the swarming behaviour and population density of *Asterias rubens* L.(Echinodermata: Asteroidea) feeding on the mussel, *Mytilus edulis*. *ICES Journal of Marine Science*, **40**, 112-118pp.

No *Sabellaria spinulosa* reef aggregations were identified in seabed images collected from the assessed scour pits. Any impact on *Sabellaria spinulosa* aggregations and benthic resources are likely to be restricted to the base of the monopile plus an approximate 5 metre circumference, as extrapolated from Titan 2012 data¹⁴

D. TEMPORAL VARIABILITY

D.1 Comparison of Particle Size Distribution (PSD) Data between the years 2005 & 2007, and 2012

This section draws comparisons between Particle Size Distribution (PSD) data obtained during pre-construction (2005 & 2007) and post-construction (2012) surveys. *Note that triplicate samples have been averaged to facilitate comparison at each station.*

Figure 17 presents the percentage gravel, sand and silt between pre-construction (2005 & 2007) and post-construction (2012) data within the TOWF survey area. The figure demonstrates that comparable stations remain largely unchanged in 2012 and continue to be dominated by sandy deposits with varying proportions of silts and gravels.

Multivariate statistical techniques have been applied in order to assess potential temporal changes in PSD between stations sampled during the pre-construction and post-construction surveys. Applying multivariate statistical methods allows a more sensitive comparison to be made, as these techniques utilise the complete size spectrum of particles recorded in each sample.

An ANOSIM test was carried out on the combined 2005 & 2007 and 2012 PSD dataset which indicated that there was no overall difference in the data between these years. This is further illustrated by the large overlap seen in PSD data between sampling years presented in the MDS ordination (Figure 18).

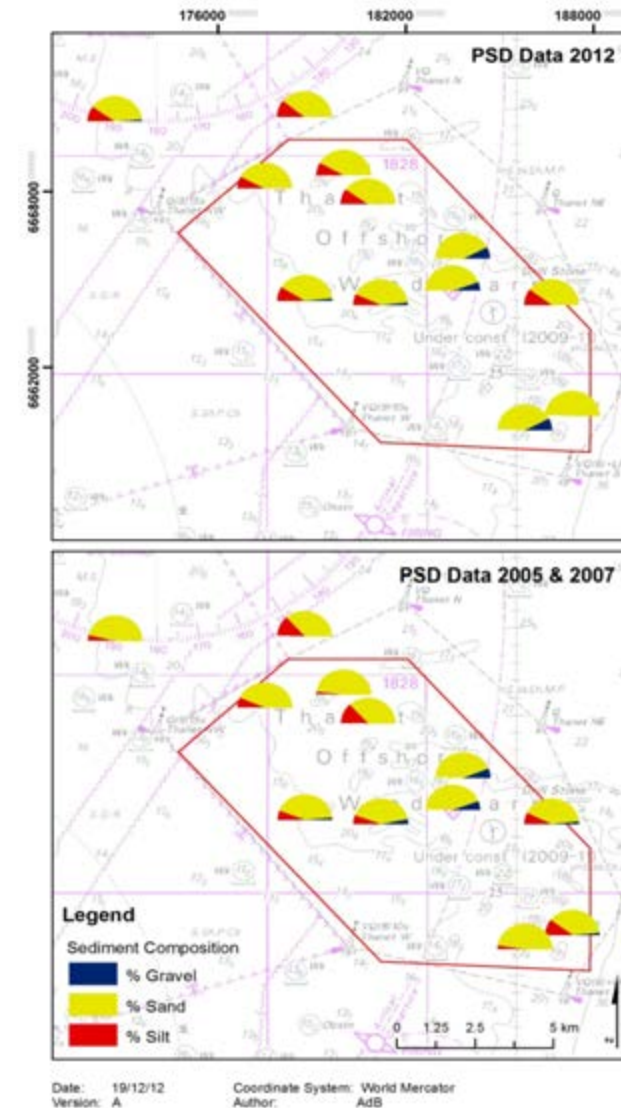


Figure 17. Thematic charts illustrating the relative proportions of gravel, sand and silt across the TOWF survey area during the pre-construction survey work carried out by MESL in 2005 & 2007 and during the post-construction survey in August 2012.

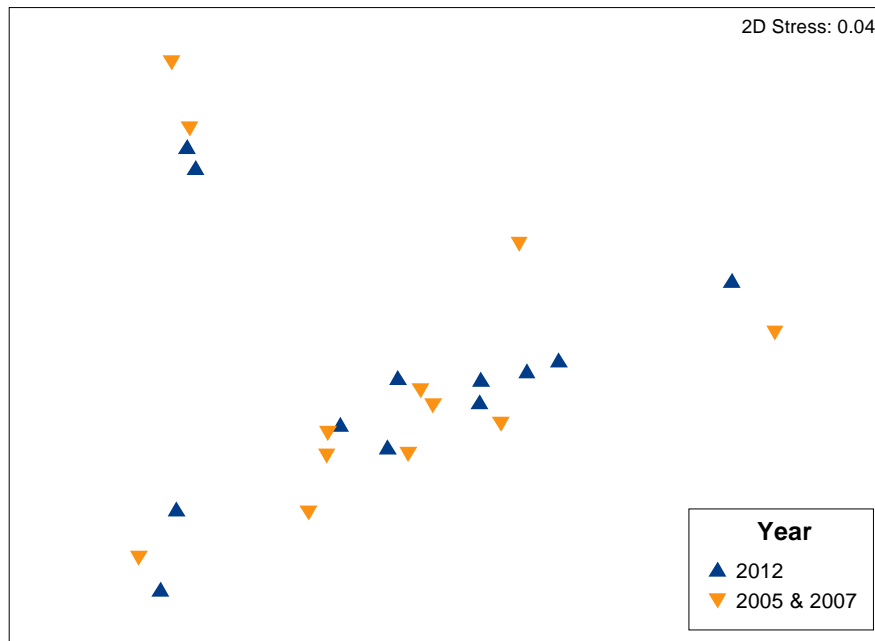


Figure 18. A multidimensional scaling plot presented in two-dimensional format, based on Euclidean distance, for PSD samples obtained across TOWF and surrounding regions during both the 2005-2007 (pre-construction) and 2012(post-construction) benthic surveys. Only the 12 comparable stations sampled in both years were used in this comparison.

Statistical temporal comparisons could only be made at stations where PSD data were obtained during pre-construction and post-construction sampling events. As discussed in Section C.1.1, it was not possible to obtain sediment data at all station locations during the 2012 survey, due to the hard nature of the substrata. The majority of stations that could not be sampled with a 0.1m² mini-Hamon grab in 2012 directly correspond with chalk bedrock, as defined in 2005 and demonstrated in Figure 4.

D.2 Comparison of Faunal Data between the years 2005 & 2007, and 2012

A full species abundance list of the fauna sampled in 2005 and 2007 are presented in Appendix Tables 13 and 14, with the total biomass for each major group presented in Appendix Tables 15 and 16. Histograms illustrating the overall contribution made by each major group to abundance, diversity and biomass during pre- (2005 & 2007) and post-construction (2012) are presented in Figure 19. All comparisons undertaken throughout this section are made using directly comparable station data, sampled during both pre- and post-construction (14 stations). *Note that triplicate samples have been averaged to facilitate appropriate faunal comparison at each station.*

Comparisons of the data obtained pre- (2005 & 2007) and post-construction (2012), reveal large variations in average infaunal abundance, species diversity and biomass, across comparable stations, as presented in Table 4.

The 2012 infaunal data demonstrate an increase in mean infaunal abundance, diversity and biomass across the TOWF site since the pre-construction surveys in 2005 & 2007. High infaunal abundance and diversity associated with dense *Sabellaria spinulosa* aggregations at stations 09 and 10 will have significantly influenced this increase.

Table 5 shows the mean infaunal abundance, diversity and biomass data, omitting data obtained from stations 09 and 10, where dense *Sabellaria spinulosa* aggregations were recorded. Although there was still a relatively considerable increase in mean abundance, diversity and biomass across the TOWF site, increases in these biological parameters were not as substantial when the influence of high abundance and diversity values, associated with *Sabellaria spinulosa* aggregations, were disregarded.

Table 4. Mean infaunal abundance, species diversity and biomass (gAFDW) sampled at comparable stations across TOWF during pre-construction (2005&2007) and post-construction (2012) surveys.

	2005 & 2007	2012
Abundance	45.71	273.33
Diversity	23.57	41.71
Biomass	0.13	1.84

Table 5. Mean infaunal abundance, species diversity and biomass (gAFDW) sampled at comparable stations across TOWF, omitting stations 09 and 10, during pre-construction (2005&2007) and post-construction (2012) surveys.

	2005 & 2007	2012
Abundance	47.56	95.64
Diversity	22.33	35.83
Biomass	0.14	1.84

Figure 19 presents the percentage contribution of each major faunal group to overall abundance, species diversity and biomass for pre- (2005 & 2007) and post-construction (2012) data. In 2012 taxa belonging to the group Annelida were still the greatest contributors to abundance and species diversity, although percentage contribution was not as high. Taxa belonging to the group Crustacea demonstrated a significant increase in the percentage contribution to 2012 abundance figures. This can be accounted for by the high abundance of *Pisidia longicornis* associated with *Sabellaria spinulosa* aggregations at stations 09 and 10.

Although the overall pattern of major group contribution to diversity shows a broadly similar pattern between pre- and post-construction data, in 2012, miscellaneous taxa contributed more to species diversity than previously recorded.

Variations in the relative proportions of biomass were accounted for by the different major groups. In terms of biomass constituents, Mollusca made up the greatest contribution to overall biomass in 2005 & 2007 and Echinodermata in 2012. This can be ascribed to the presence of the common heart urchin *Echinocardium cordatum* and the serpent's table brittle star *Ophiura albida* which, though present in relatively small numbers, represent a significant proportion of the biomass in 2012.

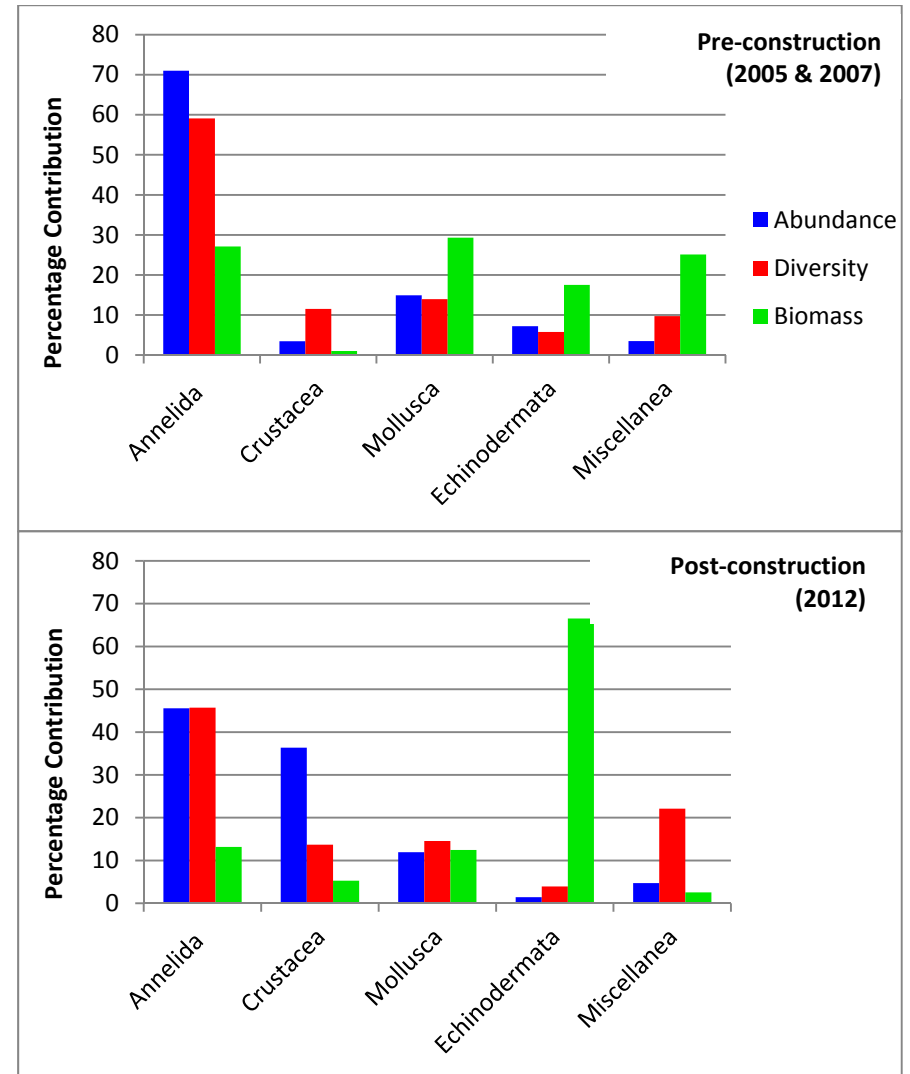


Figure 19. A histogram illustrating the relative contribution of the main faunal groups to the total abundance, diversity and biomass sampled across TOWF and adjacent areas. The data obtained during 2012 are presented above and the combined 2005 & 2007 data are presented below.

D.3 Natural Variability and the Impacts from Construction and Operation at TOWF

In order to assess the potential impacts from construction and operation at the TOWF site, infaunal data gathered pre- (2005 & 2007) and post-construction (2012) were compared and analysed using the ANOSIM statistical routine, in PRIMER.

The R values presented below reveal the extent of the change that has occurred within the faunal communities at comparable stations following construction of TOWF and allow inferences to be made regarding the driving forces behind these changes.

Note the importance of the R statistic. This value assists in the determination of whether the R statistic returned by the test is a 'real' result, which was unlikely to be achieved by chance, or whether the R statistic is in fact a coincidental result driven by the laws of probability.

- R Statistics approaching zero = very slight differences & therefore a high degree of overlap between the groups.
- R Statistics of 0.2-0.3 = some difference but still with some degree of overlap between the group
- R Statistics approaching 1 (>0.5) = large differences & therefore only slight overlap between the groups.

The ANOSIM test revealed significant overall differences between the benthic assemblages sampled in 2005 & 2007 and 2012 ($R = 0.357$, $P = 0.1\%$) although these differences were not large, as demonstrated by the R value and the spatial representation of data points presented in Figure 20.

The SIMPER routine performed on these data indicated that the highest contributing factor to this difference was the increase in the number of taxa contributing to 90% of the population in 2012. The SIMPER routine further indicated that an increase in the polychaete worm *Spiophanes bombyx*, the bivalve molluscs Mytilidae and *Abra alba*, the long clawed porcelain crab *Pisidia longicornis*, a species typically associated with *Sabellaria spinulosa*, and *Sabellaria spinulosa* itself, as well as a decline in the bristle worm *Notomastus latericeus* were the taxa most responsible for the dissimilarity between pre- and post-construction data.

These shifts in percentage contribution of key taxa, combined with the increase in faunal abundance and diversity observed in 2012, explains the overall differences in the benthic assemblages between pre- (2005 & 2007) and post-construction (2012). All ANOSIM and SIMPER results are presented in Appendix Table 17.

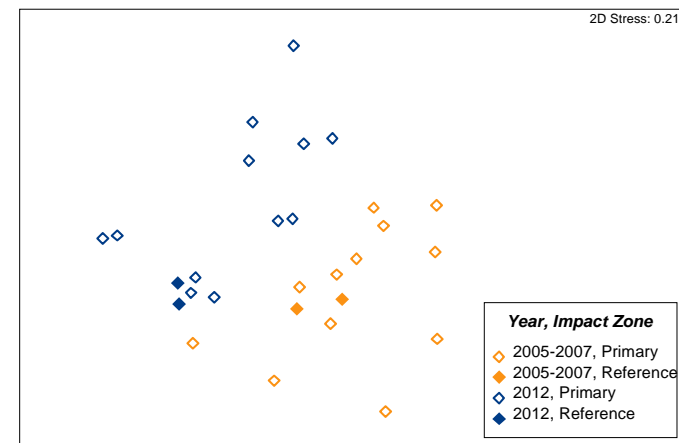


Figure 20. A multidimensional scaling plot presented in two-dimensional format, based on the square root transformed abundance of benthic infauna sampled from within (primary) and outside (reference) the TOWF site during pre- (2005&2007) and post-construction (2012) sampling events (14 comparable stations pre and post-construction were used in this comparison).

To summarise, the results presented reveal some significant differences in the faunal composition across the survey area when comparing pre- and post-construction data, although these differences were not large. It is well documented that both spatial and temporal comparisons of marine benthic assemblages are likely to reveal a high degree of variability. This was highlighted by the temporal differences recorded from within reference conditions positioned outside the TOWF boundary at sites with similar habitat characteristics to those found within TOWF. Benthic assemblages recorded from reference sites showed the same level of temporal variability to those from within the TOWF site, as seen in Figure 20.

D.4 Overview of Temporal Variability

Temporal comparisons of PSD data recorded pre- (2005 & 2007) and post-construction (2012) revealed no significant differences in sediment composition at comparable sampling stations following the construction and operation of TOWF.

Temporal comparisons of faunal data recorded pre- and post-construction, revealed that there has been an increase in mean infaunal abundance, diversity and biomass across the TOWF site.

Statistical analysis of the data revealed significant overall differences between the benthic assemblages sampled during pre-construction compared to those sampled post-construction at TOWF. These differences contributed to an increase in the number of taxa that made up 90% of the population in 2012, in addition to a variation in the highest contributing taxa within the benthic communities.

Although significant, the differences between the pre- and post-construction faunal data were not large and differences between the benthic communities can be attributed to a level of natural variation corroborated by the variability recorded within reference conditions.

E. CONSERVATION

E.1. Issues Relating to Nature Conservation

E.1.1 Sites Protected Under UK and European Nature Conservation Legislation

A number of sites in the vicinity of TOWF have been designated for protection under UK and international conservation legislation. These protected areas are illustrated in Figure 21.

The TOWF turbine array does not overlap any areas of existing marine conservation. The closest statutory designation is the Margate and Long Sands SAC which is over 10km from TOWF.

Figure 21 also illustrates the location of the Thanet Coast recommended Marine Conservation Zones (rMCZ), which is located over 14km from the turbine array. MCZs are a new category of Marine Protected Area that will be introduced over the coming years through the Marine and Coastal Access Act (2009). It is important to note that management and protection of these sites is yet to be finalised.

The Thanet Coast rMCZ has been proposed for designation for the features of conservation importance that include: **Broad scale habitats** - moderate energy infralittoral rock, moderate energy circalittoral rock, subtidal coarse sediment, subtidal sand, subtidal mixed sediments. **Habitats of conservation importance** - peat & clay exposures, blue mussel beds, Ross worm reefs (*Sabellaria spinulosa*), subtidal chalk, subtidal sands & gravels and **species of conservation importance** - St John's Jellyfish (*Lucernariopsis cruxmelitensis*) and the Kaleidoscope Jellyfish (*Haliclystus auricula*).

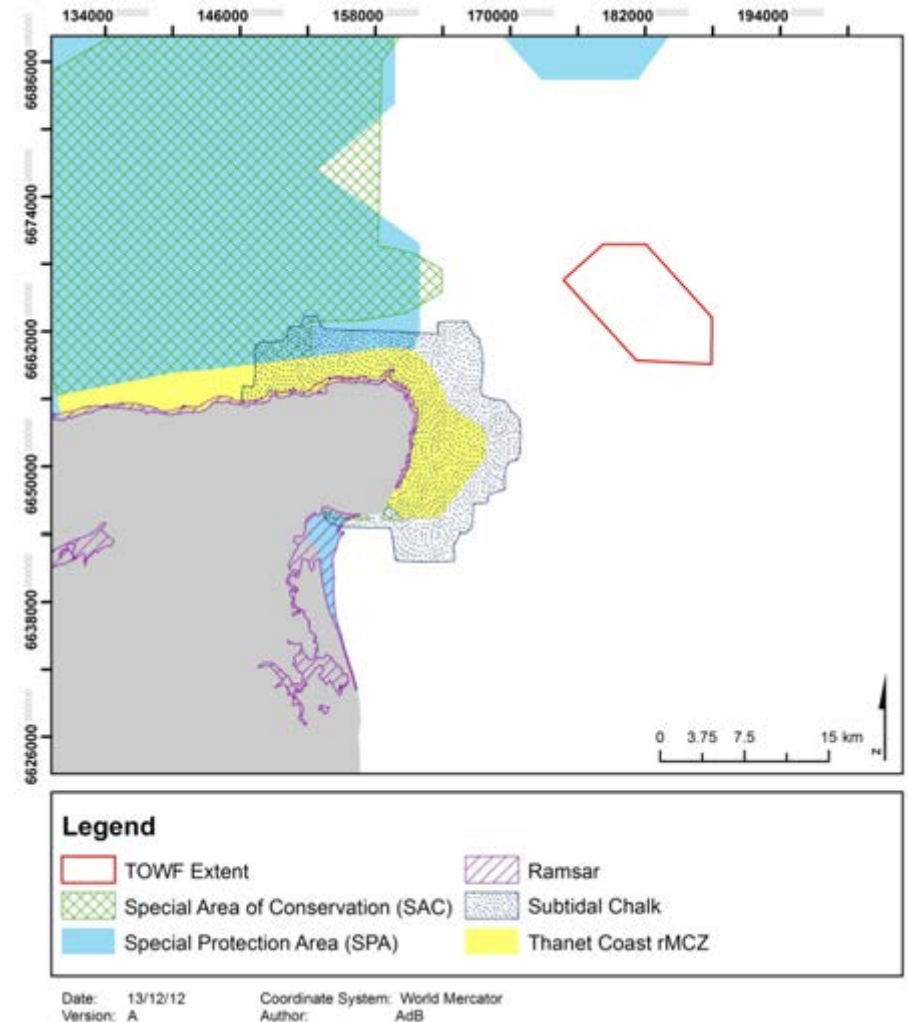


Figure 21. A thematic chart illustrating the geographical location of TOWF and nationally and internationally protected sites.

E.1 Habitats of Interest to Nature Conservation

Annex I habitats are defined under the [Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora](#); more commonly referred to as the EC Habitats Directive (1992) as amended. Under these regulations, species and habitats that fall into designated categories are eligible for legal protection from activities which have the potential to damage them.

One habitat type listed in Annex I of the Habitats Directive occurs in the TWF site, this is:-

- **Reefs** – described in the Directive as *‘Submarine or exposed at low tide, rocky substrates and biogenic concretions, which arise from the sea floor in the sublittoral zone but may extend into the littoral zone where there is an uninterrupted zonation of plant and animal communities. These reefs generally support a zonation of benthic communities of algae and animal species including concretions, encrustations and corallogenic concretions.’*

E.1.1 Sabellaria spinulosa Reefs

Pre-construction benthic surveys carried out in 2005 & 2007 revealed high densities of *Sabellaria spinulosa* across the site. To assess if any impacts have occurred in these dense aggregations found within the TWF site as a result of the construction and operation of the wind farm, a detailed *Sabellaria spinulosa* assessment was undertaken, the results of which are presented in Section G.

E.1.2 Subtidal Chalk

Underwater habitats of chalk are rare in Europe. In Britain the largest underwater chalk seascape is found off the Kent coast, as demonstrated in Figure 21. TWF turbine array does not overlap this mapped distribution of subtidal chalk that is listed in Annex 1 of the Habitats Directive.

E.1.3 Other Annex I Habitats

Evidence acquired from the underwater video and stills imagery gathered as part of the benthic characterisation survey conducted across TWF indicate that mussel beds, other geogenic reefs and submarine structures caused by leaking gases are not present across the area of interest.

F. INVASIVE / ALIEN SPECIES

Concerns have been raised regarding the potential for wind farm structures to act as 'stepping stones' permitting the spread of alien / invasive species. In addition to this, they provide significant matrices of hard substrate allowing these species to potentially become established throughout the local and wider region¹⁹.

During the course of this study no alien / invasive species were recorded in high abundance. The amphipod *Monocorophium sextonae* is an alien species and was recorded at one station in 2012 (1 individual). It was also recorded during the 2005 characterisation report and is not a matter for concern.

The monopile colonisation study will report on any alien /invasive species recorded during the survey which is expected to take place during spring 2013.

¹⁹ Cefas, 2010. Strategic Review of Offshore Wind Farm Monitoring Data Associated with FEPA Licence Conditions. CEFAS Report ME1117, 42pp.

G. *Sabellaria spinulosa* REEF ASSESSMENT

G.1 Introduction

Sabellaria spinulosa is a tubicolous worm belonging to the family Sabellariidae. *S. spinulosa* can have a huge impact on the nature of the sea floor by turning large quantities of sand into intricate tube colonies. In their most prolific form, these structures are classified as biogenic reef. The formation of these biogenic reef structures can alter and in many cases consolidate the benthic habitat and are capable of supporting a rich diversity of organisms. It is thought that these structures have a positive impact on biodiversity by providing a multifaceted habitat²⁰.

Due to the high biodiversity associated with *S. spinulosa* reefs, they have been listed in Annex I of the [Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora](#), commonly referred to as the EC Habitats Directive (1992), as amended. Under these regulations, species and habitats that fall into specific categories are eligible for legal protection from activities which have the potential to damage them.

On account of the high conservation status and subsequent protection awarded to *S. spinulosa* reef, it is important to accurately define the nature and extent of any such aggregations in order to fully assess any impacts that could be associated with construction and operational activities at TOWF.

²⁰ Pearce, B., Hill, J.M., Grubb, L. and Harper, G (2011) Impacts of marine aggregate dredging on adjacent *Sabellaria spinulosa* aggregations and other benthic fauna. Marine Aggregates Levy Sustainability Fund MEPF 08/P39 and The Crown Estate. Marine Ecological Surveys Limited, 3 Palace Yard Mews, BATH, BA1 2NH. 35pp ISBN 978-0-9506920-5-0

G.1.2 Pre-Construction *Sabellaria spinulosa* Abundance

The pre-construction benthic surveys carried out at Thanet in 2005^{21,22} and 2007²³ revealed high densities of *Sabellaria spinulosa* across the proposed TOWF site. *S. spinulosa* aggregations were mapped using high resolution Side Scan Sonar (SSS), and ground-truthed seabed imagery in addition to a limited number of targeted mini-Hamon grab samples. The detailed maps presented both the extent and nature of the aggregations which were categorised as follows:

- Dense *Sabellaria* growth that could constitute reef
- Moderate *Sabellaria* growth that could constitute patchy reef
- *Sabellaria* accretions
- No *Sabellaria*

Ground-truthing stations assessed in 2005 were re-sampled in 2007, revealing a general decline in the extent and density of *S. spinulosa* aggregations across the survey area. A comparison of mapped aggregations between the years 2005 and 2007 is shown in Figure 25, *note the survey area was increased during the 2007 survey (Figure 22)*. It was concluded that this difference may have represented a general decline across the area or a natural shift in the spatial distribution of aggregations, or may have been due to differing operating procedures by the two different contractors who undertook the work, EGS International Ltd. (2005) and Gardline Geosurvey Ltd. (2007). Interpretation of SSS data, collected in both 2005 and 2007, revealed that the area was significantly impacted by fishing

²¹ Marine Ecological Survey Ltd. (2005) Thanet Offshore Wind Farm Benthic & Intertidal Resource Survey, September 2005. Technical Report to Thanet Offshore Wind Ltd. 127pp.

²² Marine Ecological Surveys Ltd. (2005) Preliminary Report on the presence of *Sabellaria spinulosa* in the Survey Area. Technical Report for the Thanet Offshore Windfarm. 11pp.

²³ Marine Ecological Surveys Ltd. (2008) Benthic & Conservation Resources Survey. Technical Report POSTHA1007 prepared for Haskoning UK Ltd. 166pp.

activities and, as such, fishing activities cannot be ruled out as the cause of decline.

Both 2005 and 2007 data were used in combination to map the extent and quality of *S. spinulosa* aggregations existing in the area pre-construction, facilitating the micrositing of the wind turbine generators and inter-array cabling as well as 'Sabellaria exclusion zones'.

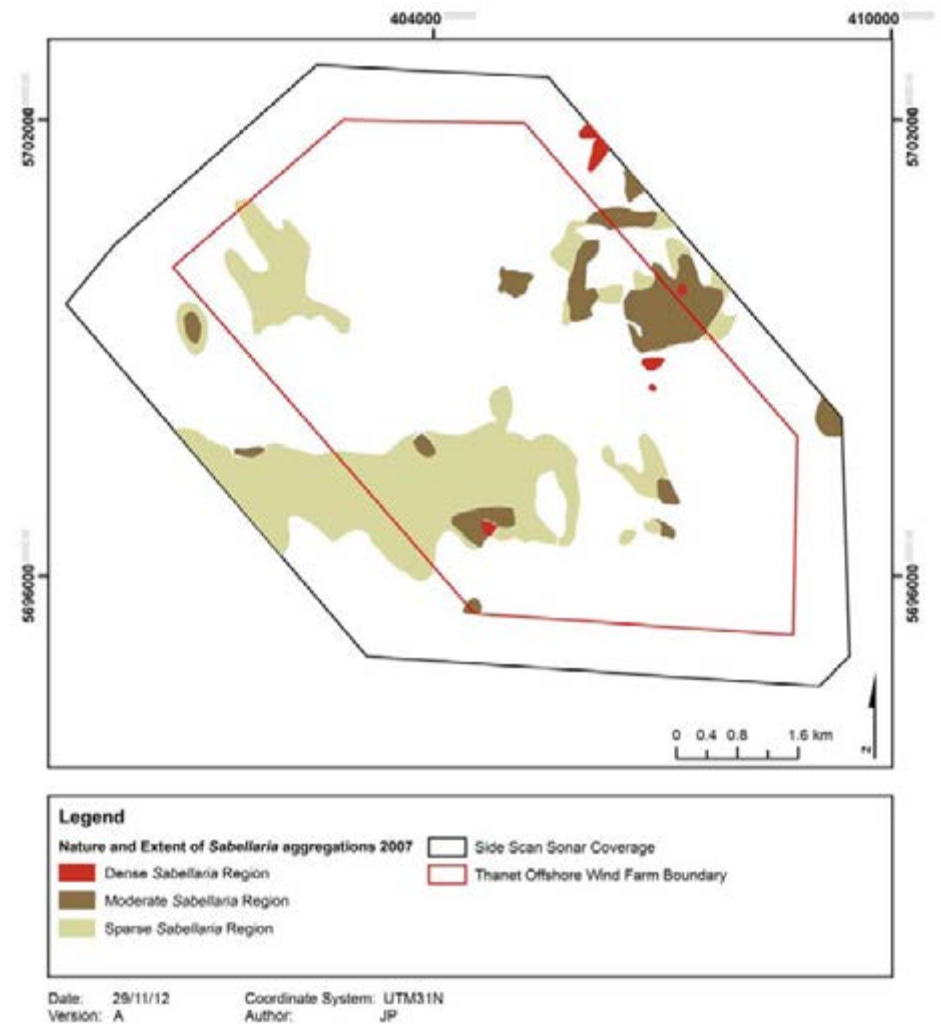


Figure 22. Interpretation of the high resolution Side Scan Sonar data as corroborated by seabed images obtained in October 2007 across TOWF survey area. Contours show the areas of relative *Sabellaria spinulosa* densities classified as dense, moderate and patchy.

G.2 Establishing the Nature and Extent of *Sabellaria spinulosa* Aggregations

During April 2012 high resolution geophysical data were collected by Gardline Hydro as part of the geophysical survey at TOWF (survey area identified in Figure 22). Subsequent high resolution Side Scan Sonar (SSS) data were assessed by MESL's senior geophysicist in order to inform the location of thirty-four *Sabellaria spinulosa* reef assessment stations which were targeted during the seabed imagery survey undertaken in August 2012. Ground-truthing stations were selected to confirm the extent and condition of texturing observed in SSS data that were consistent with the signature identified for *S. spinulosa* aggregations in 2005 and 2007. Appendix Table 18 demonstrates the rationale behind the selection of each seabed image station.

Appendix 19 shows a chart illustrating the positions of these stations across the TOWF site. The number of stations investigated (34) reflected the distribution of potential *S. spinulosa* aggregations across the area. The positions of each of the *S. spinulosa* reef assessment stations are presented in Appendix Table 3, in addition to the date and time at which the samples were obtained, the depth of water at the sampling site, the weather conditions which prevailed during sampling and notes on the fauna and sediments observed during sampling.

Each ground-truthing station was sampled with a freshwater camera system, which was developed especially for use in the turbid conditions prevalent at this

site. Five images were taken at each station in order to give an indication of the small scale variability in the nature of the aggregations.

Each seabed image was interpreted taking into consideration methods discussed in Gubbay (2007)²⁴ and Hendrick & Foster-Smith (2006)²⁵ and assigned a description based on the observed habitat features. Each site was then assigned a broad categorisation and a *S. spinulosa* categorisation score of 0-3, as described in Table 6. All images are presented in Appendix Plate 4 and the classifications are given, along with a full description in Appendix Table 20.

Score	Assessment
0	No <i>Sabellaria</i> Present
1	<i>Sabellaria</i> Accretions / Sparse <i>Sabellaria</i> region
2	Moderate <i>Sabellaria</i> Growth / Patchy Reef
3	Dense <i>Sabellaria</i> Growth / Reef

Table 6. *Sabellaria* assessment scores and justification.

²⁴ Gubbay, S. (2007) Defining and managing *Sabellaria spinulosa* reefs: Report of an inter-agency workshop 1-2May, 2007, 26pp.

²⁵ Hendrick, V.J. & Foster-Smith, R.L. (2006) *Sabellaria spinulosa* reef: a scoring system for evaluating 'reefiness' in the context of the Habitats Directive. *Journal of the Marine Biological Association of the United Kingdom*, **86**, 655-677.

The following section presents examples of the raw SSS data and associated seabed images, taken in areas classified according to the level of *S. spinulosa* growth observed. These two datasets were used in combination to map the extent and nature of the *S. spinulosa* aggregations within the survey area.

Plate 7 shows the raw SSS data and corresponding seabed image taken at station S12 during the 2012 survey. The SSS data reveals a distinctive stippled signature that is typically associated with *Sabellaria* reef / dense growth. The seabed image confirms the presence of dense *S. spinulosa* aggregations.

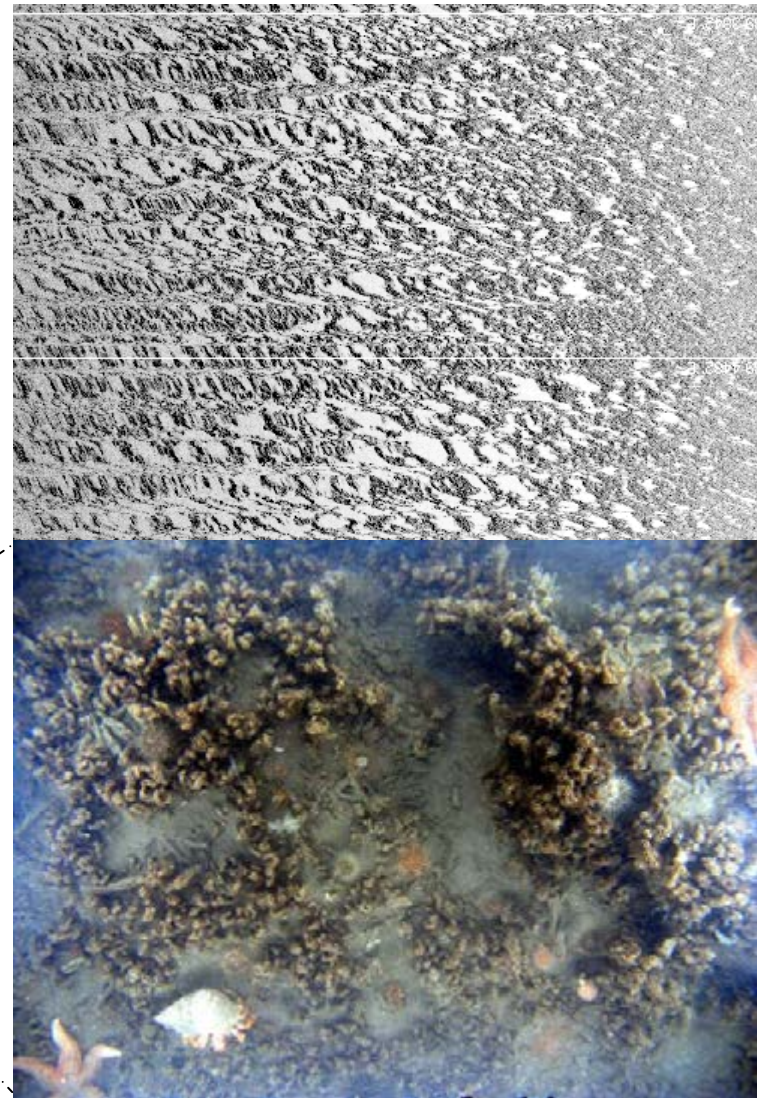
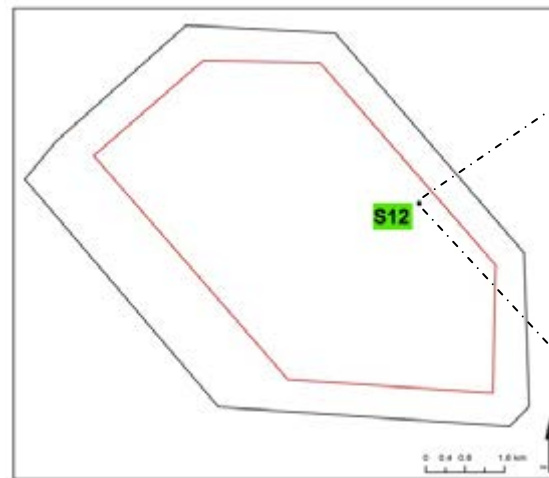


Plate 7. Example of the raw, high resolution, Side Scan Sonar (SSS) data and seabed imagery taken at ground-truth station S12(c) within TOWF during August 2012. This station was classified as dense *Sabellaria* growth / reef.

Plate 8 shows a section of SSS data that reveals a lighter stippled texture with an area of sand waves crossing the top of the plot. This less pronounced texture is typically associated with moderate *S. spinulosa* growth. The corresponding seabed image taken at ground truth station S05 confirms the presence of moderate *Sabellaria* growth.

The *S. spinulosa* aggregation identified in Plate 8 was attributed a high elevation score with low percentage coverage. The image also shows fauna that are typically associated with reef habitat. The aggregation was assigned a 'medium' reef characterisation score because it is dense but patchy in nature and was therefore characterised as moderate *Sabellaria* growth / patchy reef based on methods described in Hendrick & Foster-Smith (2006)²⁶.

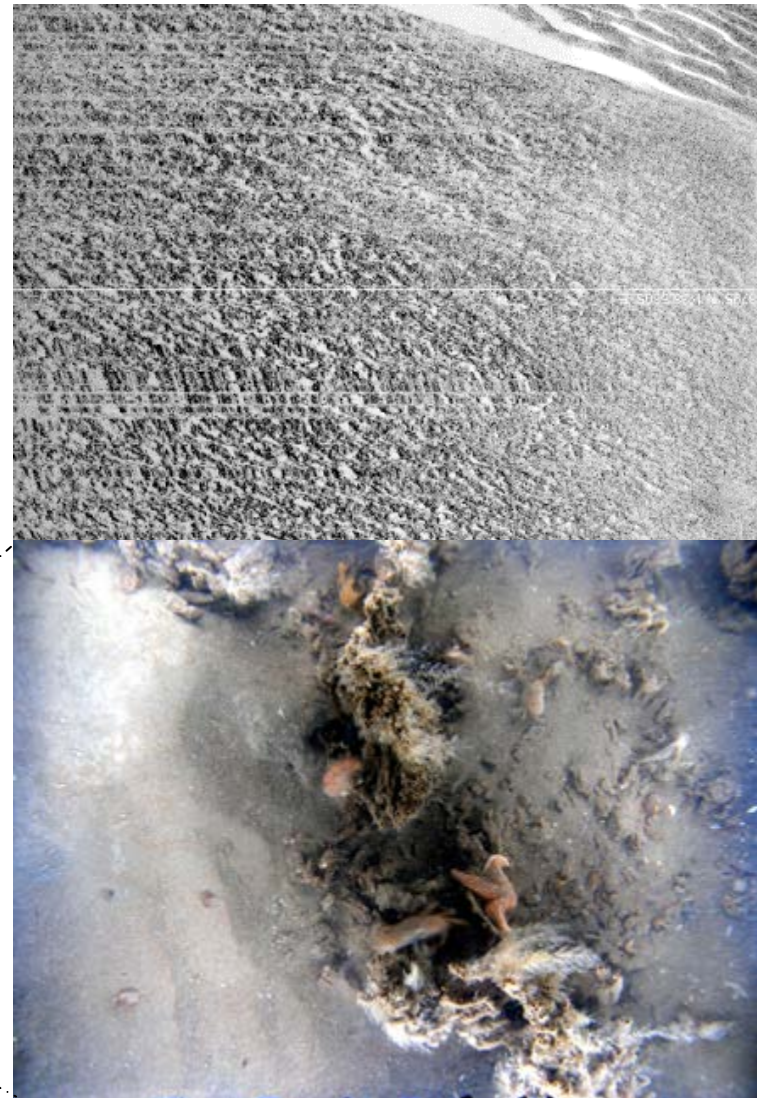
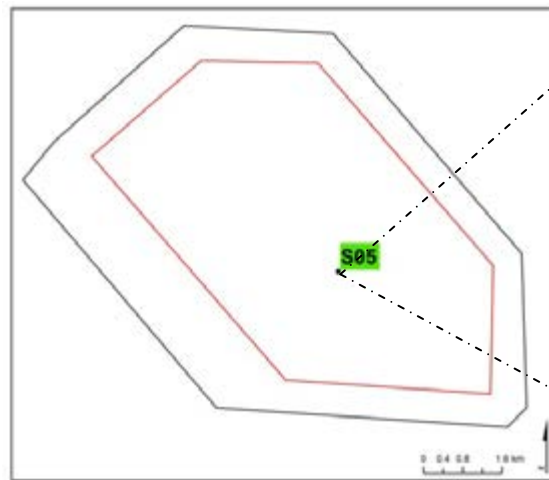


Plate 8. Example of the raw, high resolution, Side Scan Sonar (SSS) data and seabed imagery taken at ground-truth station S05(a) within TOWF during August 2012. This station was classified as moderate *Sabellaria* growth / patchy reef.

²⁶ Hendrick, V.J. & Foster-Smith, R.L. (2006) *Sabellaria spinulosa* reef: a scoring system for evaluating 'reefiness' in the context of the Habitats Directive. *Journal of the Marine Biological Association of the United Kingdom*, **86**, 655-677.

Ground-truth station S17 was chosen because the SSS data within this region exhibited low level stippling (Plate 9), which is typical of low density *S. spinulosa* aggregations. The seabed image at station S17(d) verifies the presence of patches of *S. spinulosa* aggregation. The *S. spinulosa* aggregation identified in Plate 9 was attributed a low elevation score with a very low percentage cover and was therefore assigned a 'Low' reef characterisation score and was categorised as *Sabellaria* accretions / sparse *Sabellaria* region.

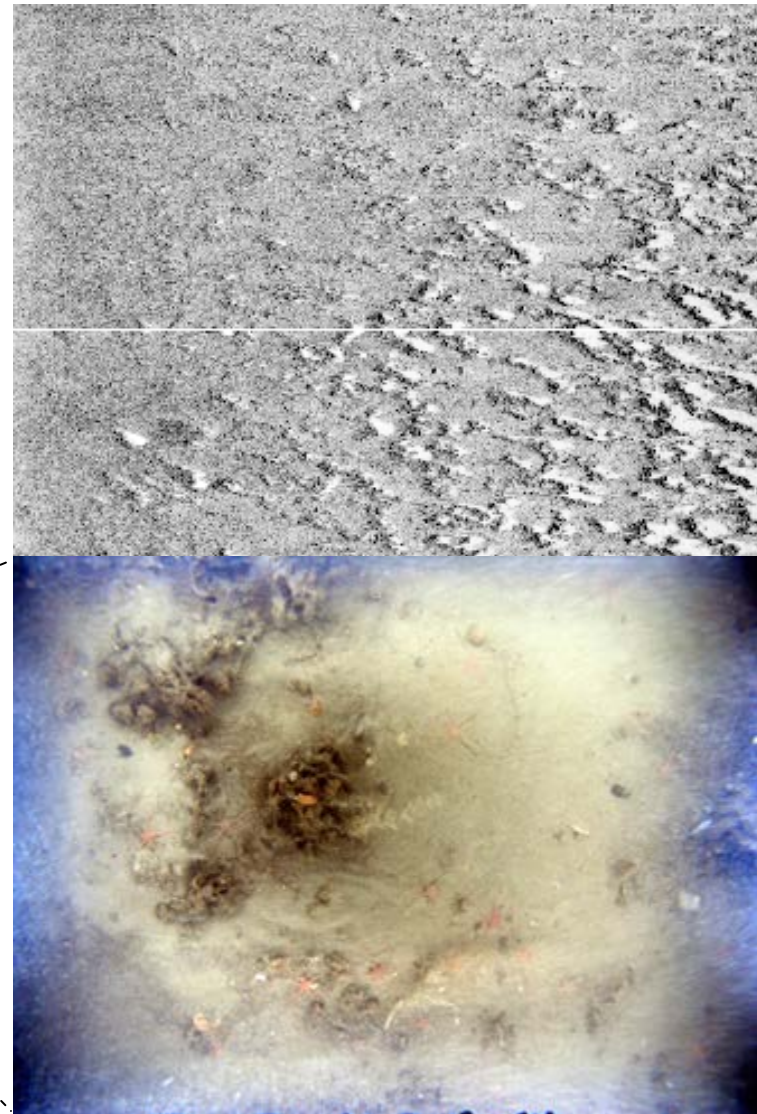
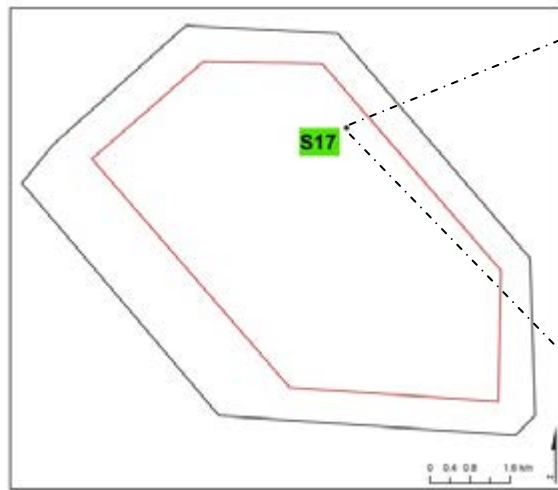


Plate 9. Example of the raw, high resolution, Side Scan Sonar (SSS) data and seabed imagery taken at ground-truth station S17(d) within TOWF during August 2012. This station was classified as *Sabellaria* accretions / sparse *Sabellaria* region.

Plate 10 shows the raw SSS data and associated seabed image taken at station 25. Interpretation of geophysical data identified the area as featureless sand which was corroborated by the seabed image.

Whilst there was a very good correlation, for the most part, between the photographs and the SSS data it is worth noting that this was not always the case. The drop-down camera system that was used during this survey was specifically adapted to take good photographs in the very poor visibility experienced at this site. This method is only able to give information about a very small area (approximately 0.5m²) and as such does not give an overview of the site, only snap shot views. Five images were taken at each site to help improve our view of the seabed at each location. The lack of correlation between the photographs and SSS data at a small number of sites is therefore most likely to reflect the patchiness of the *S. spinulosa* growth in this area.

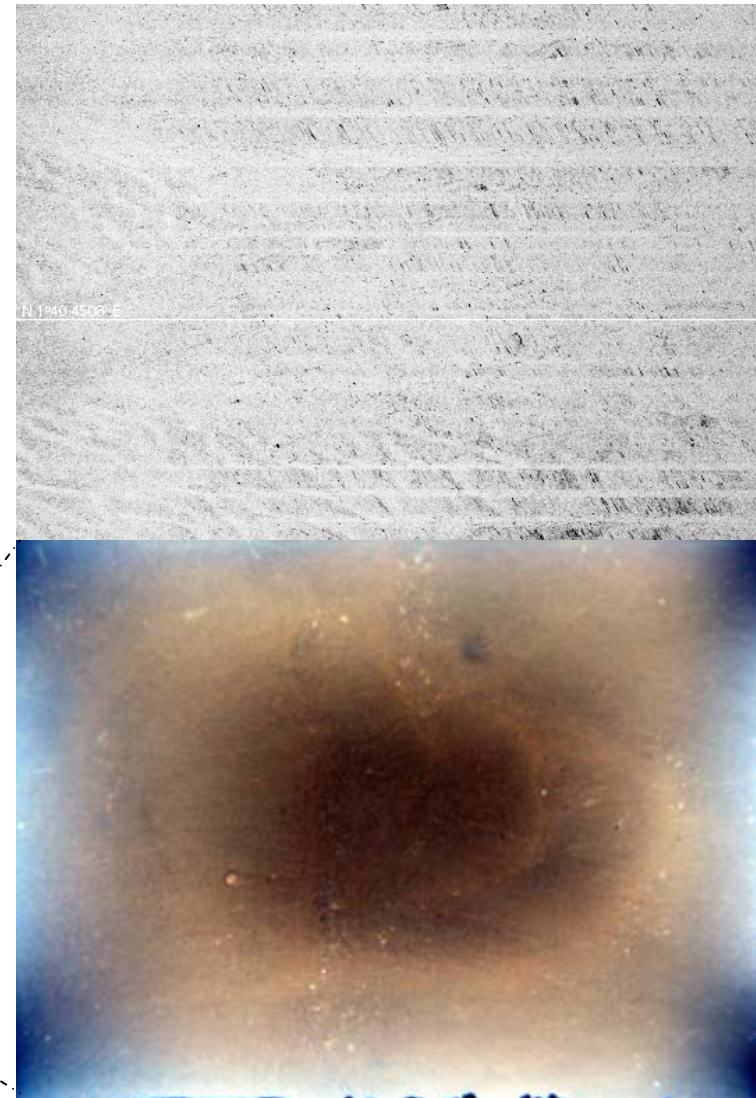
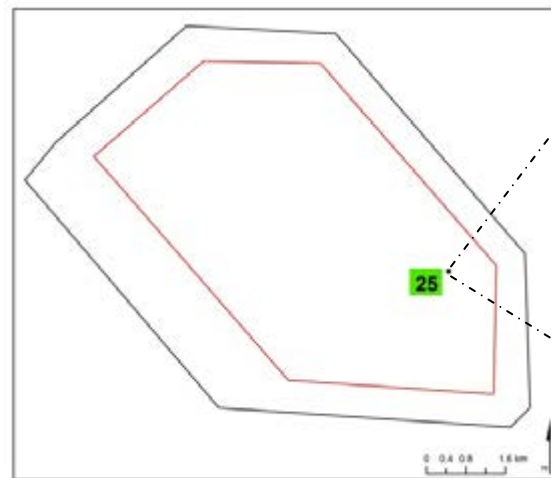


Plate 10. Example of the raw, high resolution, Side Scan Sonar (SSS) data and seabed imagery taken at ground-truth station 25(b) within TOWF during November 2012. This station was classified as sandy substrata / no *Sabellaria*.

G.3 Mapping the *Sabellaria spinulosa* Aggregations at TOWF

The *Sabellaria spinulosa* aggregation assessment (Figure 23) reflects the extent and density of *S. spinulosa* reef across the TOWF site. It was derived from a combination of SSS data, images taken during the seabed imagery survey of the site in August 2012 and an Inverse Distance Weighted (IDW) interpolation technique. More information regarding the processes involved, limitations and warnings concerning the use of the assessment, can be found in Appendix 21.

Figure 23 shows that *S. spinulosa* is present over a large part of the TOWF site (approximately 16% of the SSS survey area) and exists in different densities. It can be estimated that from the area surveyed by SSS 2.2% constitutes dense *Sabellaria* growth / reef, 5.1% moderate *Sabellaria* growth / patchy reef and 8.6% *Sabellaria* accretions / sparse *Sabellaria* region.

Regions of dense growth that could constitute reef are located to the eastern and central-southern regions of the survey area. Areas of *S. spinulosa* accretions and moderate growth have been located towards the north-west, central-west and surrounding areas identified as dense growth.

Throughout the pre-construction surveys *S. spinulosa* growth within the TOWF site was documented as being very patchy in nature. The 2012 data indicate that this is still true, although there are two dense aggregations identified as having a relatively substantial core becoming increasingly patchy towards its margins. This is very characteristic of *Sabellaria* reef structure²⁷, which is why scoring different reef features is critical in determining the boundaries.

²⁷ Hendrick, V.J. & Foster-Smith, R.L. (2006) *Sabellaria spinulosa* reef: a scoring system for evaluating 'reefiness' in the context of the Habitats Directive. *Journal of the Marine Biological Association of the United Kingdom*, **86**, 655-677.

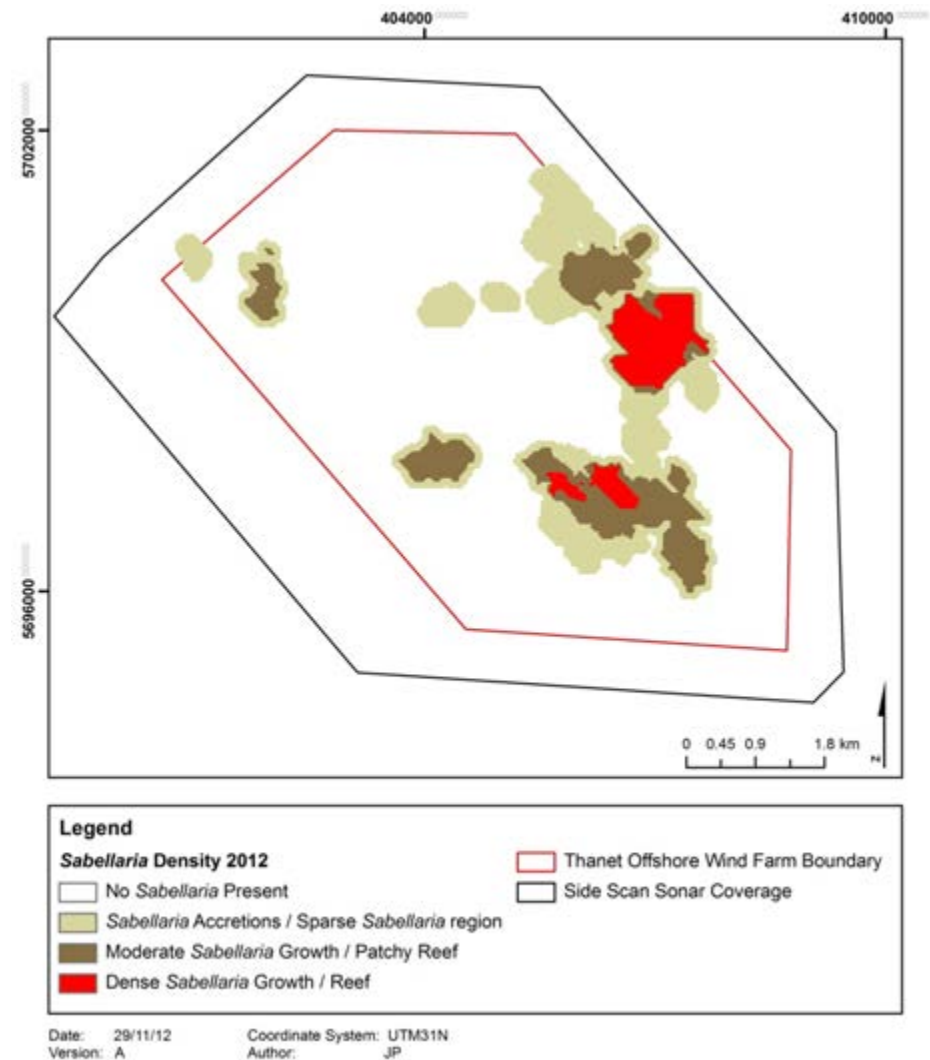


Figure 23. Interpretation of the high resolution SSS data as corroborated by seabed images obtained in August 2012 across TOWF survey area. Contours show the areas of relative *Sabellaria spinulosa* densities classified as dense growth, moderate growth and *Sabellaria* accretions.

G.4 Temporal Variability

A direct comparison of the 2007 and 2012 *Sabellaria spinulosa* distribution data is presented in Figure 24. Figure 24 illustrates that in 2012 there was a wider distribution of *S. spinulosa* aggregation categorised as 'moderate *Sabellaria* growth' and 'dense *Sabellaria* growth'. Dense aggregations of potential reef, as previously discussed, were located towards the eastern and central-southern portion of the SSS survey area. In 2007 *S. spinulosa* aggregations were identified within these locations, although the spatial extent was reduced and aggregations were recorded as being majority sparse-moderate in density.

The longevity of an aggregation is an essential feature in establishing the importance of a biogenic reef habitat. A comparison between 2007 and 2012 data indicates that moderate-dense aggregations are temporally stable, with colonies being established at some sites for at least 5 years. It is assumed that a long-lived colony has a greater value in relation to the aims of the Habitat Directive because it provides a stable biogenic habitat enabling species to become established where they may not have otherwise been present⁷.

A slight change in distribution has been observed particularly towards the west of the site, where in 2007 a spatially large but sparse *Sabellaria* region was recorded. These sparse aggregations are known to be ephemeral.

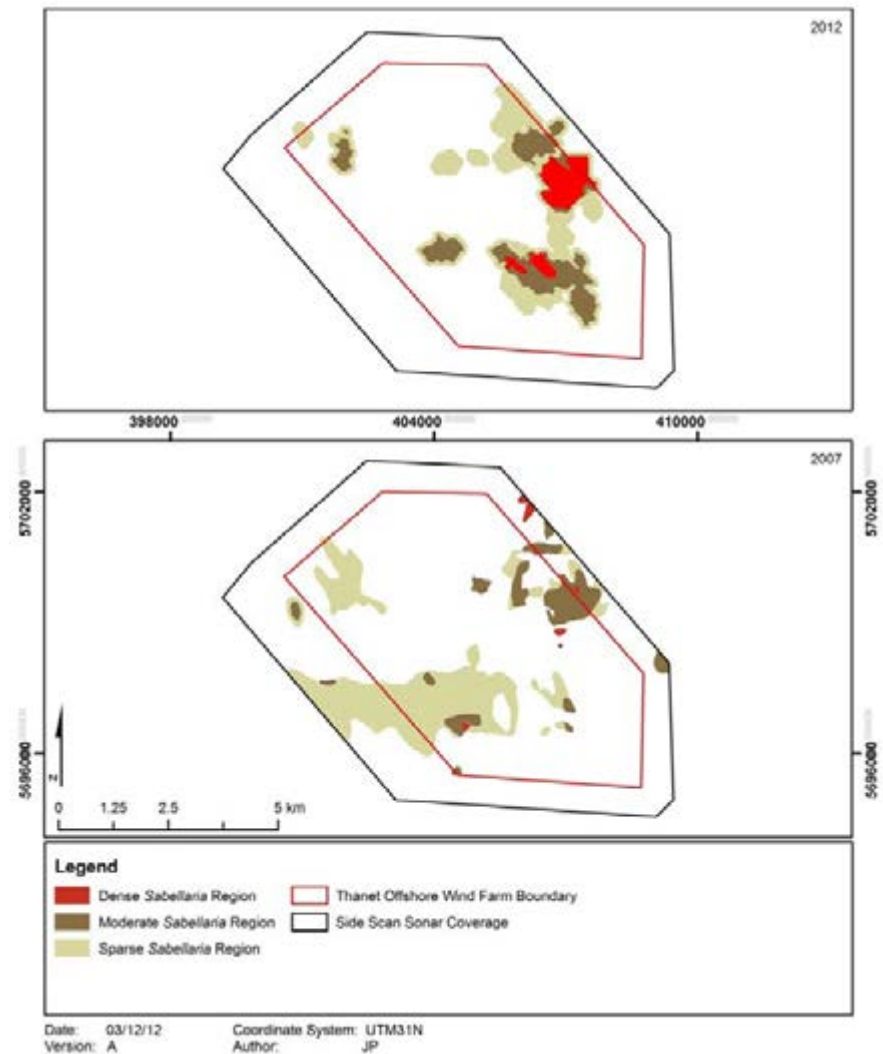


Figure 24. Thematic charts showing the 2012 (top) and 2007 (bottom) nature and extent of *Sabellaria spinulosa* aggregations across the TOWF survey area determined by Interpretation of the high resolution SSS data as corroborated by seabed images.

A *Sabellaria spinulosa* assessment was undertaken in 2005, although the SSS survey area was concentrated to only the south of the site (Figure 25). Figure 25 shows the 2005 *S. spinulosa* extent in comparison with that recorded within the same area in 2007. It can be seen that there was a general decline in *Sabellaria* recorded between the years 2005 and 2007, within the survey area. The 2008 report²⁸ concluded that the general decline across the survey area could have been attributed to damaging fishing activities, on account of the significant trawling damage that was recorded throughout the area (Plate 11).

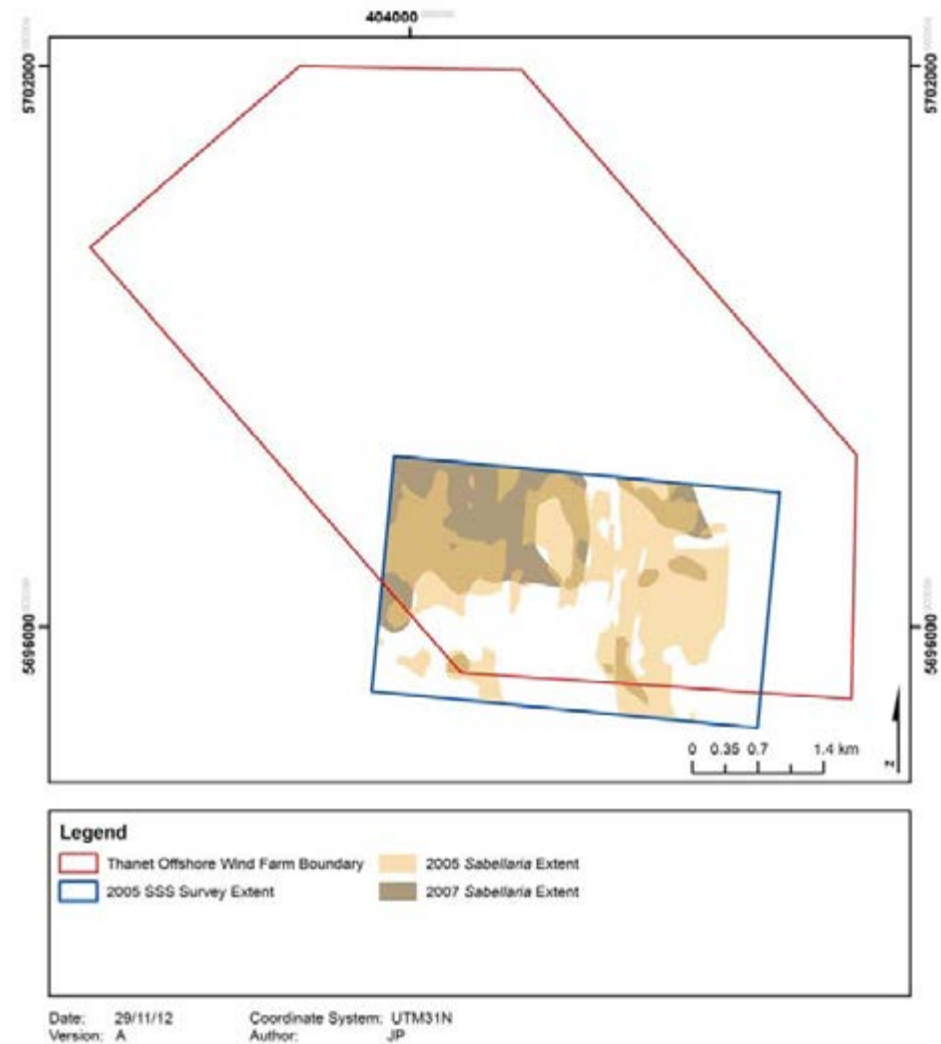


Figure 25. Thematic chart showing the 2005 and 2007 *Sabellaria spinulosa* extent within the southern portion of the TOWF site, determined by SSS interpretation and seabed imagery.

²⁸ Marine Ecological Surveys Ltd 2008. Benthic & Conservation Resources Survey. Technical Report POSTHA1007 prepared for Haskoning UK Ltd. 166pp.

G.5 TOWF as a Refuge for *Sabellaria spinulosa* Aggregations

During the 2005 and 2007 pre-construction surveys *Sabellaria spinulosa* aggregations identified within the TOWF region were predominantly classified as aggregations with low to moderate growth. There were numerous accounts of aggregations that constituted mainly *S. spinulosa* rubble and broken tubes, showing obvious damage from bottom fishing gear. Plate 11 shows an example of the raw SSS data and associated seabed image taken at station GT16 in 2007. The SSS data exhibited the classic stippled signature of *S. spinulosa* aggregations with clear evidence of trawl damage. The trawl damage was also evident in the seabed images, to the extent that in 2007 this site was classified as a moderate / patchy *S. spinulosa* aggregation due to the high proportion of damaged or broken tubes observed.

The 2012 *S. spinulosa* assessment, as described in Section G.3, classified a large portion of the *S. spinulosa* aggregations as areas of either dense or moderate growth. Moreover, there was a reduction in the recorded amount of *S. spinulosa* rubble and damage, when compared with 2005 and 2007 data. It can therefore be assumed that the positive growth and stable *S. spinulosa* aggregations across the site may be partially attributed to the refuge provided by TOWF from destructive bottom fishing activities that hampered growth in the past.

There has been no recorded evidence of damage to *S. spinulosa* aggregations from construction or operational activities associated with the development of the TOWF.



Plate 11. Example of the raw, high resolution, Side Scan Sonar data and seabed imagery taken at ground-truth station GT16 within the TOWF site in 2007. This station showed clear damage from trawling.

H. CONCLUSIONS

1. The seabed within Thanet Offshore Wind Farm (TOWF) is characterised by a mixture of coarse sands, fine sands and cobbles, with bedrock outcrops in the central-southern portion of the site. The organic matter content of these sediments varied between <0.20% and 1.50%, representing low to moderate levels.
2. A wide range of benthic invertebrate species were recorded across the TOWF survey area; a total of 264 taxa were identified. Taxa belonging to the Phylum Annelida dominated the benthic communities in terms of abundance and species diversity. Taxa belonging to the phylum Echinodermata made a considerable contribution to total biomass, which was ascribed to the presence of large taxa that included the common heart urchin *Echinocardium cordatum* and the serpent's table brittle star *Ophiura albida*.
3. There was considerable variation in abundance (4 to 1574 individuals per station) and diversity (30 to 81 species per station) recorded across the site. High abundances of macrofauna recorded at stations 09 and 10 were attributed to high abundances of the ross worm *Sabellaria spinulosa* and the long clawed porcelain crab *Pisidia longicornis*, which is typically found associated with *S. spinulosa* aggregations.
4. The most abundant species was the long clawed porcelain crab *Pisidia longicornis*, which accounted for approximately 16% of all fauna sampled. Examination of the data indicated that whilst this species was abundant within the area, it only occurred at a relatively limited number of stations.
5. The top ten most abundant species accounted for 63% of the total faunal abundance. Of the species that occurred in the highest proportion of samples, five of these taxa belonged to the Phylum Annelida and of these, the bristle worm *Spiophanes bombyx* occurred most frequently.
6. A total of 4 infaunal groups were identified through multivariate analysis, the similarity between infauna recorded from each of the sampling sites was relatively low, which is a likely result of the sediments sampled being broadly similar.
7. Statistical techniques revealed a significant relationship between patterns observed in the particle size distribution data to those seen in the faunal communities.
8. The 2012 scour pit assessment demonstrated that, within the assessed scour pits, substrates comprised a mixture of coarse sediments ranging from muddy sandy Gravels (msG) to Cobbles (C). On average these sediments were coarser than those recorded from samples throughout the TOWF site.
9. Analysis of infaunal samples from scour pit locations E01 and E02 revealed that the most abundant and commonly occurring taxa were similar to those found across the TOWF site and surrounding region.
10. Epifaunal communities within the scour pits were characterised by species able to colonise coarse sediments and unstable cobbles. These communities included the bryozoan *Alcyonidium diaphanum*, the calcareous tube building worm *Pomatoceros* sp and the Dahlia anemone *Urticina felina*, with an abundance of other hydroids and bryozoans.

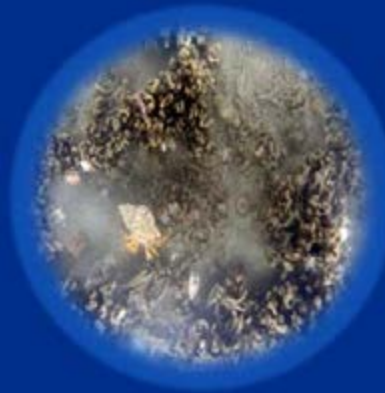
11. Seabed images obtained from scour pits revealed an abundance of the common starfish *Asterias rubens*. *Mytilus edulis* shell was also recorded in the seabed images at these scour pit locations, suggesting that *M. edulis* are likely to colonise the monopile foundations, therefore attracting predators such as *A. rubens*.
12. No *Sabellaria spinulosa* reef aggregations were identified in seabed images collected from the assessed scour pits. Any impact on *Sabellaria spinulosa* aggregations and benthic resources are likely to be restricted to the base of the monopile plus an approximate 5 metre circumference, as extrapolated from Titan 2012 data
13. Temporal comparisons of PSD data recorded pre- (2005 & 2007) and post-construction (2012) indicated that there were no significant differences in sediment composition following the construction and operation of TOWF.
14. Temporal comparisons of faunal data recorded pre- and post-construction, revealed that there has been an increase in mean infaunal abundance, diversity and biomass across the TOWF site.
15. Statistical analyses revealed significant overall differences between the benthic assemblages sampled during pre-construction compared to those sampled post-construction at TOWF. These differences contributed to an increase in the number of taxa that made up 90% of the population in 2012, in addition to a variation in the highest contributing taxa within the benthic communities.
16. Although significant, the differences between the pre- and post-construction faunal data were not large and differences between the benthic communities can be attributed to a level of natural variation corroborated by the variability recorded within reference conditions.
17. The 2012 *Sabellaria spinulosa* assessment revealed that *S. spinulosa* is present over a large portion of the TOWF site (approximately 16% of the SSS survey area). Regions of dense growth that could constitute reef are located to the eastern and central-southern regions of the survey area. Areas of *S. spinulosa* accretions and moderate growth have been located towards the north-west, central-west and surrounding areas identified as dense growth.
18. A direct comparison of the 2007 and 2012 *Sabellaria spinulosa* distribution data illustrates that in 2012 there was a wider distribution of *S. spinulosa* aggregation categorised as 'moderate *Sabellaria* growth' and 'dense *Sabellaria* growth'.
19. There was a reduction in the recorded amount of *S. spinulosa* rubble and damage in 2012, when compared with 2005 and 2007 data. It can therefore be assumed that the positive growth and stable *S. spinulosa* aggregations across the site may be partially attributed to the refuge provided by TOWF from destructive bottom fishing activities that hampered growth in the past. There has been no recorded evidence of damage to *S. spinulosa* aggregations from construction or operational activities associated with the development of the TOWF.



Thanet Offshore Wind Farm

A Post-Construction Monitoring Survey of Benthic Resources

Prepared for Thanet Offshore Wind Ltd.



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I. APPENDICES

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Appendix Plates

1. Benthic grab samples contact sheet - August 2012
2. Contact sheet of seabed images that were collected at stations where no grab sample could be obtained - November 2012
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4. Contact sheet of seabed images that were collected as part of the *Sabellaria spinulosa* assessment - August 2012



Appendix Table 1. Outline of Collection and Quality Assurance Procedure.

1. Collection of the samples was carried out by Marine Ecological Surveys Staff, Angela de Burgh and David Alexander both of whom have a B.Sc and M.Sc in Marine Biology and relevant disciplines.
2. Prior to the collection of seabed images, checks were made to ensure that the time, fix number and image number tallied on all computers used for image display, and that the image was saved correctly. At the end of each day the images, logs and data were saved and stored on CD whilst also being saved on the computers as a back-up.
3. All positions were checked with the ship's navigational officer at the time of collection and careful notes entered into a field notebook which contained the following information: Station number, date and time of collection, position of sample, number of attempts, and type of deposit, sample volume and details of any sub samples taken.
4. The field staff were responsible for careful labelling of the sealed sample vessels, for addition of formalin and for collection of appropriate sub-samples. The senior scientist checked the labelling and addition of formalin at each station before moving to the next sampling station.
5. A series of photographs of representative steps in the survey procedure are included in our standard survey protocol.
6. Following completion of the survey, the sealed samples were carefully checked against the field notes and transported to the MESL laboratory for analysis. In the case of the biological samples, the vessels were checked on arrival at the laboratory by our senior analyst Emma Delduca. Records are kept of the date of separation, date of analysis and a complete list of the macrofauna recorded in each sample. The signed laboratory notebook is kept as a record and can be made available to clients as required. Marine Ecological Surveys Limited is a participant in the National Marine Biological Analytical Quality Control (NMBAQC) Scheme.
7. A Reference collection is kept for uniformity of analysis, and the complete sample from each station is kept preserved in alcohol for validation. Macrofauna samples are kept for 3 months following report submission.
8. The data from the field and laboratory notebooks were then compiled into final data sheets for analysis of community composition. All data were crosschecked with two staff before entering to tables for analysis and were crosschecked with records from the navigational system to ensure that the positions entered into the final Report were correct.
8. All signed field log books, laboratory records and the original extracted samples of macrofauna from each sample site are available for inspection or validation following report submission.



Appendix Table 2. Table summarising the sampling log and navigational positions for stations where 0.1m² mini-Hamon grab samples were taken from within and surrounding the TOWF during benthic monitoring in August 2012. Navigational positions are recorded in UTM (WGS84) Zone 31 Northern. Additional information includes, date & time, the total sample volume (litres), the volume of sediment sub-sample obtained for PSD (Particle Size Distribution) analysis, the number of attempts per station, notes on the sediment description and other important observations. Numbered stations correspond to those first sampled in the 2005 baseline benthic resource survey, while stations with the prefix 'A' correspond to those sampled during the 2007 pre-construction survey. Stations highlighted in green correspond to stations sampled as part of the scour pit assessment.

Sample	Date Taken	Time Taken (GMT)	Depth (m)	Easting	Northing	Sample Volume (l)	PSD Volume (l)	Attempts	Sediment Description	Notes
02 A	20/Aug/2012	09:43	20.9	401603.1	5700206.9	10	1	1	gS & C	
02 B	20/Aug/2012	10:04	21.3	401603.0	5700209.4	7.5	0.5	3	gS & C	
02 C	20/Aug/2012	10:06	21.4	401602.7	5700209.3	9.5	1	1	gS & C	
06 A	20/Aug/2012	16:58	23.8	404386.9	5700593.7	9	1	1	mS	
06 B	20/Aug/2012	17:17	23.5	404388.8	5700594.1	9.5	1	1	mS	
06 C	20/Aug/2012	17:20	23.6	404388.6	5700593.8	9	1	1	mS	
08 A	21/Aug/2012	10:30	27.5	406257.4	5699399.2	8.5	1	1	S (Shelly)	
08 B	21/Aug/2012	10:37	27.9	406256.5	5699399.1	9	1	1	S (Shelly)	
08 C	21/Aug/2012	10:48	28	406256.5	5699398.8	9	1	1	S (Shelly)	
09 A	21/Aug/2012	11:00	26.1	406976.6	5698602.6	6.5	0	1	S	Characteristics attributable to <i>Sabellaria spinulosa</i> reef present in grab sample. Sampling at station relinquished. Station to be investigated by drop-down camera
10 A	21/Aug/2012	13:38	27.5	405914.7	5697643.5	5	0	1	gS & S	Characteristics attributable to <i>Sabellaria spinulosa</i> reef present in grab sample. Sampling at station relinquished. Station to be investigated by drop-down camera
13 A	20/Aug/2012	17:51	21.2	403088.2	5698559.6	6	0.8	1	mS	
13 B	20/Aug/2012	18:00	21.2	403088.1	5698559.8	6.5	0.8	1	mS	
13 C	20/Aug/2012	18:06	21.2	403088.6	5698559.8	7	1	1	S	
15 A	20/Aug/2012	19:34	18.1	403945.0	5697640.8	5	0	1	S	Characteristics attributable to <i>Sabellaria spinulosa</i> reef present in grab sample. Sampling at station relinquished. Station to be investigated by drop-down camera
16 A	21/Aug/2012	07:47	17.8	404473.6	5696958.4	3.5	0	1	sG, G & C	Small sample containing chalk. Thin layer of sediment overlying bed of chalk?
16 B	21/Aug/2012	07:53	17.8	404474.0	5696956.9	2.5	0	1	sG, G & C	Small sample containing chalk. Thin layer of sediment overlying bed of chalk?
17 A				404943.2	5696373.3					NO SAMPLE
18 A				405179.4	5697393.8					NO SAMPLE
19 A	20/Aug/2012	09:16	17.9	402689.9	5697795.2	0.5	0	4	G	
22 A				406563.8	5696547.2					NO SAMPLE
24 A	21/Aug/2012	11:23	26.5	408009.2	5698378.2	8.5	1	1	S	

Sample	Date Taken	Time Taken (GMT)	Depth (m)	Easting	Northing	Sample Volume (l)	PSD Volume (l)	Attempts	Sediment Description	Notes
24 B	21/Aug/2012	11:32	26.8	408008.8	5698378.0	8.5	1	1	sM & M	
24 C	21/Aug/2012	11:41	26.9	408008.0	5698378.6	8.5	1	1	sM	
25 A				407799.0	5697721.7					NO SAMPLE
26 A	21/Aug/2012	12:53	28	408382.7	5695997.1	9	1	1	S	
26 B	21/Aug/2012	13:02	28	408381.0	5695996.4	8.5	1	1	S	
26 C	21/Aug/2012	13:06	28.1	408381.7	5695996.2	8.5	1	1	S	
27 A	21/Aug/2012	09:05	23.8	407429.9	5695713.9	5.5	0.5	2	S	
27 B	21/Aug/2012	09:24	24	407429.1	5695713.2	5	0	3	S & C	
31 A				402381.1	5696604.7					NO SAMPLE
34 A	20/Aug/2012	11:08	25.1	403153.3	5702474.3	10	1	1	S, sM & M	
34 B	20/Aug/2012	11:19	25.3	403153.0	5702474.9	10	1	1	s & sM	
34 C	20/Aug/2012	11:22	25.6	403152.4	5702475.3	8	1	1	gS & sM	
45 A	20/Aug/2012	14:54	23.4	399371.4	5702455.3	9	1	1	S	
45 B	20/Aug/2012	15:10	23.4	399373.4	5702454.7	7	0.8	1	S	
45 C	20/Aug/2012	15:12	23.3	399379.2	5702453.1	8	1	1	S	
50 A	19/Aug/2012	15:05	18.7	404147.7	5693887.4	7	1	1	sG	
50 B	19/Aug/2012	15:14	18.6	404146.6	5693884.5	6	0.5	1	sG & C	
50 C	19/Aug/2012	15:14	18.5	404149.0	5693883.0	4	0	1	SG & C	
A06 A				402496.8	5695478.3					NO SAMPLE
A07 A	20/Aug/2012	10:28	23.2	402330.0	5700966.9	6	0.5	1	S	
A07 B	20/Aug/2012	10:37	23.3	402333.4	5700965.9	6	0.5	1	S	
A07 C	20/Aug/2012	10:40	23.3	402332.8	5700966.0	5	0	1	S	
A08 A	20/Aug/2012	16:28	24.1	403911.3	5701215.1	7.5	1	1	gS & S	
A08 B	20/Aug/2012	16:40	24.1	403910.8	5701216.2	7.5	1	1	S & sM	
A08 C	20/Aug/2012	16:42	23.8	403912.5	5701215.7	7	1	1	S	
A10 A	20/Aug/2012	18:27	21.9	404603.2	5698441.1	6.5	0.8	1	S	
A10 B	20/Aug/2012	18:36	22	404596.9	5698443.0	7	0.8	1	S	
A10 C	20/Aug/2012	18:38	21.8	404597.2	5698442.9	7	0.8	1	S	
A11 A	21/Aug/2012	09:58	24.7	406043.8	5698711.7	8	1	1	S (Shelly)	
A11 B	21/Aug/2012	10:07	24.9	406042.6	5698711.1	9	1	1	S (Shelly)	
A11 C	21/Aug/2012	10:16	24.9	406039.9	5698711.9	9	1	1	S (Shelly)	
E01 A	20/Aug/2012	11:44	26.4	403161.4	5701615.1	7	1	1	sG	Scour pit assessment
E01 B	20/Aug/2012	11:58	26	403156.5	5701614.7	7	1	1	sG & gS	Scour pit assessment
E01 C	20/Aug/2012	12:00	26.3	403156.6	5701615.5	8	0.8	1	gS	Scour pit assessment
E02 A	20/Aug/2012	15:45	24.8	403471.0	5701253.6	4.5	0	1	sG	Scour pit assessment
E02 B	20/Aug/2012	15:57	24.6	403472.4	5701253.4	7	0.8	1	sG & G	Scour pit assessment
E02 C	20/Aug/2012	15:59	24.5	403471.2	5701253.4	4	0	1	sG	Scour pit assessment
B09	20/Aug/2012			403996.1	5697581.1					NO SAMPLE
B11	20/Aug/2012			404623.1	5696856.3					NO SAMPLE

Appendix Table 3. Table summarising the sampling log and navigational positions for stations where seabed imagery was acquired from within and surrounding the TOWF during benthic monitoring in 2012. Stations highlighted in red correspond to stations sampled as part of the *Sabellaria spinulosa* reef assessment. Stations highlighted in green correspond to stations sampled as part of the scour pit assessment. Stations highlighted in yellow correspond to stations sampled where no grab sample was acquired with a mini-Hamon grab. Navigational positions are recorded in UTM (WGS84) Zone 31 Northern.

Station	Easting	Northing	Weather Conditions	Date Taken	Time Taken (GMT)	Depth (m)	Sediment Description	<i>Sabellaria</i> Elevation Score	<i>Sabellaria</i> Sediment Consolidation Score	Description of Fauna
S 01 - A	406867.31	5697221.78	F3	14/08/2012	19:24	25.7	Fine S	10	15%	<i>Sabellaria</i> , <i>Asterias</i> , <i>Ophiura</i> , <i>Hydroids</i>
S 01 - B	406867.31	5697221.78	F3	14/08/2012	19:25	25.7	Fine S	10	15%	<i>Sabellaria</i> , <i>Asterias</i> , <i>hydroids</i> & <i>Ophiura</i>
S 01 - C	406867.31	5697221.78	F3	14/08/2012	19:28	25.7	Fine S	80	60%	<i>Sabellaria</i> , <i>Liocarcinus</i> sp., <i>Pandalus</i> & <i>Sertulariidae</i>
S 01 - D	406867.31	5697221.78	F3	14/08/2012	19:31	25.7	Fine S	5	10%	<i>Sabellaria</i> , <i>Ophiura</i> , <i>Paguridae</i> , <i>Nemertesia</i> & <i>Sertulariidae</i>
S 01 - E	406867.31	5697221.78	F3	14/08/2012	19:36	25.7	Fine S	90	50%	<i>Sabellaria</i> , <i>Flustra</i> , <i>Alcyonidium diaphanum</i> , <i>Asterias</i> , <i>Liocarcinus</i> sp., <i>Sabella pavonina</i> , <i>Aequipecten opercularis</i> , <i>Nemertesia</i> & <i>Alcyonidium diaphanum</i>
S 02 - A	407340.48	5696591.79	F3	14/08/2012	18:55	24.6	Fine S	50	6%	<i>Sabellaria</i> , <i>Nemertesia</i> ?, <i>Galathea</i> , <i>Actinaria</i> , <i>Paguridae</i> , <i>Pandalus</i> & <i>Cancer pagurus</i>
S 02 - B	407340.48	5696591.79	F3	14/08/2012	18:56	24.6	Fine S	80	10%	<i>Sabellaria</i> , <i>Ophiura</i> , <i>Pandalus</i> , <i>hydroids</i> & <i>Galathea</i>
S 02 - C	407340.48	5696591.79	F3	14/08/2012	18:58	24.6	Fine S	70	15%	<i>Sabellaria</i> , <i>Liocarcinus</i> sp., <i>Ophiura</i> , <i>Actinaria</i> & <i>Alcyonidium</i>
S 02 - D	407340.48	5696591.79	F3	14/08/2012	18:59	24.6	Fine S	50	3%	<i>Sabellaria</i> , <i>Ophiura</i> , <i>evidence of burrows</i>
S 02 - E	407340.48	5696591.79	F3	14/08/2012	19:00	24.6	Fine S	70	20%	<i>Sabellaria</i> , <i>Alcyonidium</i> , <i>Galathea</i> , <i>Pandalus</i> , <i>Ophiura</i> , <i>hydroids</i> , <i>Actinaria</i> & <i>Nemertesia</i>
S 03 - A	406520.76	5697289.37	F2-3 SW	17/08/2012	19:27	22.8	sG	70	80%	<i>Sabellaria</i> , <i>Necora puber</i> , <i>Actinaria</i> , <i>Nemertesia</i> & <i>Asterias</i>
S 03 - B	406520.76	5697289.37	F2-3 SW	17/08/2012	19:28	22.8	sG	50	70%	<i>Sabellaria</i> , <i>hydroids</i> , <i>Alcyonidium diaphanum</i> , <i>Actinaria</i> , <i>Paguridae</i> & <i>Ebalia</i>
S 03 - C	406520.76	5697289.37	F2-3 SW	17/08/2012	19:28	22.8	sG	40	70%	<i>Alcyonidium diaphanum</i> , <i>Paguridae</i> , <i>Ophiura</i> , <i>Actinaria</i> , & <i>Ebalia</i>
S 03 - D	406520.76	5697289.37	F2-3 SW	17/08/2012	19:31	22.8	sG	60	60%	<i>Sabellaria</i> , <i>Asterias</i> , <i>Ophiura</i> & <i>Sertulariidae</i>
S 03 - E	406520.76	5697289.37	F2-3 SW	17/08/2012	19:32	22.8	sG	55	80%	<i>Sabellaria</i> , <i>Asterias</i> , <i>Buccinum</i> , <i>Ophiura</i>
S 04 - A	406231.83	5697232.9	F2-3 SW	17/08/2012	19:40	22.4	gS + C	5	3%	<i>Sabellaria</i> , <i>hydroids</i> , <i>Ophiura</i> , <i>Nemertesia</i> , <i>Hinia</i> sp. & <i>Sertulariidae</i>
S 04 - B	406231.83	5697232.9	F2-3 SW	17/08/2012	19:40	22.4	gS + C	4	3%	<i>Sabellaria</i> , <i>Alcyonidium diaphanum</i> , <i>Ophiura</i> & <i>Nemertesia</i>
S 04 - C	406231.83	5697232.9	F2-3 SW	17/08/2012	19:41	22.4	gS + C	10	10%	<i>Sabellaria</i> , <i>Alcyonidium diaphanum</i> , <i>Ophiura</i> & <i>Sertulariidae</i>
S 04 - D	406231.83	5697232.9	F2-3 SW	17/08/2012	19:42	22.4	gS	50	70%	<i>Sabellaria</i> , <i>Alcyonidium diaphanum</i> , <i>Ophiura</i> , <i>Actinaria</i> , <i>Nemertesia</i> & <i>Sertulariidae</i>
S 04 - E	406231.83	5697232.9	F2-3 SW	17/08/2012	19:43	22.4	gS	70	70%	<i>Sabellaria</i> , <i>Ophiura</i> , <i>Actinaria</i> & <i>Pandalus</i>
S 04 - F	406231.83	5697232.9	F2-3 SW	17/08/2012	19:44	22.4	gS	10	25%	<i>Sabellaria</i> & <i>Actinaria</i>
S 04 - G	406231.83	5697232.9	F2-3 SW	17/08/2012	19:44	22.4	gS	60	35%	<i>Sabellaria</i> , <i>Ophiura</i> , <i>Actinaria</i> & <i>Pandalus</i>
S 05 - A	405615.4	5697715.51	F3	18/08/2012	15:06	24.1	S	70	45%	<i>Sabellaria</i> , <i>Paguridae</i> , <i>Sertularidae</i> , <i>Nemertesia</i> , <i>Pandalus</i>

Station	Easting	Northing	Weather Conditions	Date Taken	Time Taken (GMT)	Depth (m)	Sediment Description	Sabellaria Elevation Score	Sabellaria Sediment Consolidation Score	Description of Fauna
S 05 - B	405615.4	5697715.51	F3	18/08/2012	15:07	24.1	S	80	30%	<i>Sertularidae, Asterias, Paguras, Nemertesia, Aequipecten, Liocarcinus, Sabellaria, Pandalus, Actinaria</i>
S 05 - C	405615.4	5697715.51	F3	18/08/2012	15:08	24.1	S	80	35%	<i>Sabellaria, swimming crab - Liocarcinus? Paguridae, Pandalus, Ophiura, Sertularidae, Nemertesia, Aequipecten</i>
S 05 - D	405615.4	5697715.51	F3	18/08/2012	18:09	24.1	S	60	10%	<i>Paguridae, Sabellaria, Pandalus, Ophiura, Carcinus</i>
S 05 - E	405615.4	5697715.51	F3	18/08/2012	15:10	24.1	S	70	30%	<i>Sabellaria, Pandalus, Sertularidae, Ophiura, Pandalus, Nemertesia, Actinaria</i>
S 06 - A	405817.45	5697474.99	F2-3 SW	17/08/2012	19:59	20.8		75	70%	<i>Sabellaria reef, Paguridae, Pandalus, Aequipecten opercularis, Actinaria & Sertulariidae</i>
S 06 - B	405817.45	5697474.99	F2-3 SW	17/08/2012	19:58	20.8		80	80%	<i>Sabellaria reef, Paguridae, Pandalus, Aequipecten opercularis & Sertulariidae</i>
S 06 - C	405817.45	5697474.99	F2-3 SW	17/08/2012	19:59	20.8		80	70%	<i>Sabellaria reef, Paguridae, Pandalus & Nemertesia</i>
S 06 - D	405817.45	5697474.99	F2-3 SW	17/08/2012	20:00	20.8		80	90%	<i>Sabellaria reef, Pandalus & Aequipecten opercularis</i>
S 06 - E	405817.45	5697474.99	F2-3 SW	17/08/2012	20:01	20.8		80	60%	<i>Sabellaria reef, Sertulariidae, Paguridae, Actinaria & Nemertesia</i>
S 07 - A	406467.04	5696359.55	F3	14/08/2012	18:41	23.4	sG	0	0	<i>Hydroids, Sertulariidae, Turritella?, encrusting bryozoans, Actinaria & Sabellaria rubble</i>
S 07 - B	406467.04	5696359.55	F3	14/08/2012	18:42	23.4	sG	0	0	<i>Sertulariidae</i>
S 07 - C	406467.04	5696359.55	F3	14/08/2012	18:43	23.4	sG	0	0	<i>Hydroids, Sertulariidae & Pomatoceros</i>
S 07 - D	406467.04	5696359.55	F3	14/08/2012	18:44	23.4	sG	0	0	<i>Ophiura, hydroids, Sertulariidae, Paguridae & Sabellaria rubble</i>
S 07 - E	406467.04	5696359.55	F3	14/08/2012	18:44	23.4	sG	0	0	<i>Sertulariidae, Actinaria & Urticina</i>
S 08 - A	406111.36	5696661.69	F3	14/08/2012	19:12	22.7	gS	0	0	<i>Ophiura</i>
S 08 - B	406111.36	5696661.69	F3	14/08/2012	19:13	22.7	gS	2	1-5%	<i>Sabellaria rubble, hydroids, Ophiura & Gobiidae</i>
S 08 - C	406111.36	5696661.69	F3	14/08/2012	19:13	22.7	sG	2	1-5%	<i>Sabellaria rubble & Ophiura</i>
S 08 - D	406111.36	5696661.69	F3	14/08/2012	19:14	22.7	gS	0	0	<i>Sabellaria rubble, Asterias & Ophiura</i>
S 08 - E	406111.36	5696661.69	F3	14/08/2012	19:15	22.7	gS	1	1-3%	<i>Sabellaria rubble</i>
S 09 - A	406951.18	5699020.11	F3	18/08/2012	15:41	22.9	S	60	90%	<i>Sabellaria, Alcyonidium, Pandalus, Sertularidae, Crab, Anenome, Actinaria, Nemertesia</i>
S 09 - B	406951.18	5699020.11	F3	18/08/2012	15:42	22.9	S	60	90%	<i>Sabellaria, Alcyonidium, Liocarcinus, Aequipecten, Ophiura, Actinaria</i>
S 09 - C	406951.18	5699020.11	F3	18/08/2012	15:43	22.9	S	65	90%	<i>Sabellaria, Pandalus, Paguridae, Aequipecten, Actinaria, Liocarcinus</i>
S 09 - D	406951.18	5699020.11	F3	18/08/2012	15:45	22.9	S	70	80%	<i>Sabellaria, Paguridae, Actinaria, Pandalus, Galathea, Aequipecten, Nemertesia</i>
S 09 - E	406951.18	5699020.11	F3	18/08/2012	15:46	22.9	S	60	90%	<i>Sabellaria, Liocarcinus? Actinaria, Paguridae, Aequipecten, Nemertesia, Ophiura</i>
S 10 - A	406678.09	5699533.18	F3	18/08/2012	16:33	21.1	S	70	95%	<i>Sabellaria, Buccinum, Asterias, Actinaria, Paguras, Nemertesia, Sabellaria rubble</i>

Station	Easting	Northing	Weather Conditions	Date Taken	Time Taken (GMT)	Depth (m)	Sediment Description	Sabellaria Elevation Score	Sabellaria Sediment Consolidation Score	Description of Fauna
S 10 - B	406678.09	5699533.18	F3	18/08/2012	16:34	21.1	S	75	95%	<i>Sertularidae, Sabellaria, Actinaria</i>
S 10 - C	406678.09	5699533.18	F3	18/08/2012	16:35	21.1	S	65	95%	<i>Sabellaria, fish - Goby? Nemertesia, Aequipecten, Sertularidae, Sabellaria rubble</i>
S 10 - D	406678.09	5699533.18	F3	18/08/2012	16:36	21.1	S	65	90%	<i>Sabellaria, Sertularidae, Spider crab? Actinaria, Sea squirt? Nemertesia, Pandalus, Paguridae, Sabellaria rubble</i>
S 10 - E	406678.09	5699533.18	F3	18/08/2012	16:37	21.1	S	30	75%	<i>Sabellaria (broken tubes), Paguras, Sabellaria rubble, Sertularidae, Actinaria, Sea squirt, Nemertesia</i>
S 11 - A	407048.33	5699278.45	F3	18/08/2012	16:19	21.8	S	70	95%	<i>Fish? Sabellaria, Actinaria, Nemertesia, Liocarcinus?</i>
S 11 - B	407048.33	5699278.45	F3	18/08/2012	16:20	21.8	S	70	95%	<i>Sabellaria, Asterias, Sertularidae, Nemertesia, Actinaria</i>
S 11 - C	407048.33	5699278.45	F3	18/08/2012	16:21	21.8	S	75	95%	<i>Sabellaria, Asterias, Paguras, Sertularidae, Aequipecten, Ebalia</i>
S 11 - D	407048.33	5699278.45	F3	18/08/2012	16:22	21.8	S	Rubble	Rubble	<i>Sabellaria, Paguras, Broken reef - Sabellaria rubble, Galathea? Nemertesia</i>
S 11 - E	407048.33	5699278.45	F3	18/08/2012	16:24	21.8	S	Rubble	Rubble	<i>Sabellaria, Paguras, Pandalus, Actinaria, Broken reef - Sabellaria rubble, Ophiura</i>
S 12 - A	407216.14	5699087.1	F3	18/08/2012	15:53	23.3	S	70	80%	<i>Sabellaria, Asterias, Actinaria</i>
S 12 - B	407216.14	5699087.1	F3	18/08/2012	15:54	23.3	S	70	80%	<i>Sabellaria, Anenome, Pandalus, Paguridae, Sertularidae, mysid? Aequipecten, Liocarcinus</i>
S 12 - C	407216.14	5699087.1	F3	18/08/2012	15:55	23.3	S	70	80%	<i>Sabellaria, Asterias, Sertularida, Nemertesia, Actinaria, Pandalus, Ebalia</i>
S 12 - D	407216.14	5699087.1	F3	18/08/2012	15:56	23.3	S	70	80%	<i>Sabellaria, Asterias, Paguridae, Aequipecten, Pandalus</i>
S 12 - E	407216.14	5699087.1	F3	18/08/2012	15:58	23.3	S	70	90%	<i>Sabellaria, Paguridae, Sertularidae, Actinaria, Aequipecten, Nemertesia, Pandalus</i>
S 13 - A	407343.89	5699258.71	F3	18/08/2012	16:04	23.9	S	70	90%	<i>Sabellaria, Asterias, Paguridae, Fish - blenny? Necora puber? Actinaria, Nemertesia</i>
S 13 - B	407343.89	5699258.71	F3	18/08/2012	16:06	23.9	S	70	90%	<i>Sabellaria, Asterias, Liocarcinus, Paguridae, Sertularidae, Actinaria, Ophiura, Pandalus</i>
S 13 - C	407343.89	5699258.71	F3	18/08/2012	16:08	23.9	S	80	75%	<i>Sabellaria, Sertularidae, Ophiura, Galathea? Liocarcinus? Pandalus, Paguridae, Actinaria, Nemertesia</i>
S 13 - D	407343.89	5699258.71	F3	18/08/2012	16:09	23.9	S	70	90%	<i>Sabellaria, Asterias, Paguridae, Ophiura, Nemertesia, Sabellaria rubble</i>
S 13 - E	407343.89	5699258.71	F3	18/08/2012	16:10	23.9	S	80	70%	<i>Sabellaria, Paguridae, Nemertesia, Pandalus, Actinaria</i>
S 14 - A	407064.76	5699582.01	F3	18/08/2012	16:45	21.8	S	0	0	<i>Actinaria, Ophiura</i>
S 14 - B	407064.76	5699582.01	F3	18/08/2012	16:46	21.8	sG	10	10%	<i>Paguras, Sabellaria, Crab, Sabellaria rubble, Nemertesia</i>
S 14 - C	407064.76	5699582.01	F3	18/08/2012	16:47	21.8	S	50	10%	<i>Sabellaria, Sabellaria rubble</i>
S 14 - D	407064.76	5699582.01	F3	18/08/2012	16:48	21.8	sG	20	10%	<i>Sabellaria patches, Paguras, Sertularidae, Ophiura</i>
S 14 - E	407064.76	5699582.01	F3	18/08/2012	16:50	21.8	sG	75	50%	<i>Sabellaria, Paguras, Sertularidae, Nemertesia, Pandalus</i>
S 15 - A	406103.26	5699914.95	F3	18/08/2012	19:02	19.5	S	50	20%	<i>Alcyonidium, Paguridae, Sabellaria, Sertularidae, Actinaria</i>

Station	Easting	Northing	Weather Conditions	Date Taken	Time Taken (GMT)	Depth (m)	Sediment Description	Sabellaria Elevation Score	Sabellaria Sediment Consolidation Score	Description of Fauna
S 15 - B	406103.26	5699914.95	F3	18/08/2012	19:03	19.5	gS	50	20%	<i>Sabellaria, Paguridae, Sertularidae, Pandalus, Nemertesia</i>
S 15 - C	406103.26	5699914.95	F3	18/08/2012	19:03	19.5	gS	75	20%	<i>Sabellaria, Sertularidae, Pandalus, Alcyonidium, Liocarcinus</i>
S 15 - D	406103.26	5699914.95	F3	18/08/2012	19:04	19.5	gS	60	10%	<i>Sabellaria, Sertularidae, Alcyonidium, Aequipecten</i>
S 15 - E	406103.26	5699914.95	F3	18/08/2012	19:05	19.5	S	75	20%	<i>Sabellaria, Liocarcinus, Alcyonidium, Paguridae</i>
S 16 - A	406376.25	5700050.6	F3	18/08/2012	18:50	20.9	S & C	75	35%	<i>Sabellaria, Sertularidae, Actinaria, Alcyonidium</i>
S 16 - B	406376.25	5700050.6	F3	18/08/2012	18:51	20.9	S & C	40	5%	<i>Alcyonidium, Sabellaria, Pomatoceros, Sertularidae, Actinaria</i>
S 16 - C	406376.25	5700050.6	F3	18/08/2012	18:52	20.9	gS & C	80	50%	<i>Sabellaria, Paguridae, Sertularidae, Nemertesia</i>
S 16 - D	406376.25	5700050.6	F3	18/08/2012	18:53	20.9	sG	80	30%	<i>Sabellaria, Crangon, Alcyonidium, Nemertesia</i>
S 16 - E	406376.25	5700050.6	F3	18/08/2012	18:54	20.9	gS	40	10%	<i>Actinaria, Sabellaria, Sertularidae, Paguridae, Alcyonidium</i>
S 17 - A	405680.79	5700674.7	F3	18/08/2012	18:35	23	Fine S	70	10%	<i>Sabellaria, Sertularidae, Nemertesia, Paguridae, Carcinus? Lagis?</i>
S 17 - B	405680.79	5700674.7	F3	18/08/2012	18:37	23	Fine S	75	40%	<i>Sabellaria, Sertularidae, Pandalus, Paguridae, Nemertesia</i>
S 17 - C	405680.79	5700674.7	F3	18/08/2012	18:38	23	Fine S	0	0	<i>Ophiura</i>
S 17 - D	405680.79	5700674.7	F3	18/08/2012	18:39	23	Fine S	50	10%	<i>Sabellaria, Sertularidae, Paguridae, Liocarcinus</i>
S 17 - E	405680.79	5700674.7	F3	18/08/2012	18:40	23	Fine S	0	0	<i>Ophiura, Sertularidae</i>
S 18 - A	405813.31	5700910.5	F3	18/08/2012	18:22	23.3	Fine S	0	0	<i>Lots of Ophiura</i>
S 18 - B	405813.31	5700910.5	F3	18/08/2012	18:24	23.3	Fine S	3	<5%	<i>Ophiura, Sabellaria - broken/small clump?</i>
S 18 - C	405813.31	5700910.5	F3	18/08/2012	18:25	23.3	Fine S	20	20%	<i>Sabellaria clumps, Ophiura, Nemertesia</i>
S 18 - D	405813.31	5700910.5	F3	18/08/2012	18:26	23.3	gS	0	0	<i>Ophiura, Paguridae, Sertularidae</i>
S 18 - E	405813.31	5700910.5	F3	18/08/2012	18:28	23.3	Fine S	10	10%	<i>Sabellaria clumps? Ophira, Paguridae, Nemertesia</i>
S 19 - A	402641.04	5699459.89	F2-3 S	17/08/2012	21:44	19.5	C & S	0	0	
S 19 - B	402641.04	5699459.89	F2-3 S	17/08/2012	21:45	19.5	C & S	0	0	<i>Sertularidae, Actinaria, Buccinum</i>
S 19 - C	402641.04	5699459.89	F2-3 S	17/08/2012	21:45	19.5	C	0	0	<i>Actinaria, gastropoda</i>
S 19 - D	402641.04	5699459.89	F2-3 S	17/08/2012	21:46	19.5	S	0	0	
S 19 - E	402641.04	5699459.89	F2-3 S	17/08/2012	21:47	19.5	S	0	0	<i>Sertularidae, Actinaria</i>
S 20 - A	402494.6	5699413.32	F2-3 S	17/08/2012	21:31	19.2	C	0	0	<i>Large cobble, Sertularidae, Actinothoe sphyrodeta, Actinaria, Alcyonidium diaphanum</i>
S 20 - B	402494.6	5699413.32	F2-3 S	17/08/2012	21:32	19.2	C & sG	0	0	<i>Large cobbles, Sertularidae, Actinothoe sphyrodeta, Alcyonidium diaphanum, Paguridae</i>
S 20 - C	402494.6	5699413.32	F2-3 S	17/08/2012	21:33	19.2	C & sG	0	0	<i>Alcyonidium diaphanum, Sertularidae, bivalves</i>
S 20 - D	402494.6	5699413.32	F2-3 S	17/08/2012	21:34	19.2	sG	0	0	<i>Sertularidae, Alcyonidium diaphanum</i>
S 20 - E	402494.6	5699413.32	F2-3 S	17/08/2012	21:35	19.2	C & sG	0	0	<i>Encrusting epifauna, Actinothoe sphyrodeta, Flustra, Alcyonidium diaphanum, Actinaria, Sertularidae</i>
S 21 - A	401908.92	5699783.47	F2-3 S	17/08/2012	21:57	21.4	S	50	60%	<i>Sabellaria, Asterias, Hyas, Carcinus, Sertularidae, Actinaria</i>
S 21 - B	401908.92	5699783.47	F2-3 S	17/08/2012	21:58	21.4	sG	0	0	<i>Sabellaria rubble, Ophiura, Hyas, Hydroids</i>

Station	Easting	Northing	Weather Conditions	Date Taken	Time Taken (GMT)	Depth (m)	Sediment Description	Sabellaria Elevation Score	Sabellaria Sediment Consolidation Score	Description of Fauna
S 21 - C	401908.92	5699783.47	F2-3 S	17/08/2012	21:59	21.4	gS	60	60%	<i>Sabellaria</i> , <i>Paguridae</i> , <i>Hyas</i> , <i>Sertularidae</i> , <i>Nemertesia</i>
S 21 - D	401908.92	5699783.47	F2-3 S	17/08/2012	22:01	21.4	gS	40	30%	<i>Sabellaria</i> , <i>Paguridae</i> , <i>Asterias</i> , <i>Hyas</i> , <i>Ophiura</i>
S 21 - E	401908.92	5699783.47	F2-3 S	17/08/2012	22:02	21.4	gS	45	40%	<i>Sabellaria</i> , <i>Paguridae</i> , <i>Hyas</i> , <i>Ophiura</i> , <i>Sertularidae</i> , <i>Actinaria</i>
S 22 - A	401912.03	5700086.51	F2-3 S	17/08/2012	22:11	21.5	gS	20	60%	<i>Sabellaria clumps</i> , <i>Paguridae</i> , <i>Ophiura</i> , <i>Sertularidae</i> , <i>Actinaria</i> , <i>Nemertesia</i>
S 22 - B	401912.03	5700086.51	F2-3 S	17/08/2012	22:12	21.5	S	40	50%	<i>Sabellaria</i> , <i>Paguridae</i> , <i>Ophiura</i> , <i>Sertularidae</i> , <i>Nemertesia</i>
S 22 - C	401912.03	5700086.51	F2-3 S	17/08/2012	22:14	21.5	gS	20	40%	<i>Sabellaria</i> , <i>Paguridae</i> , <i>Ophiura</i> , <i>Actinaria</i> , <i>Sertularidae</i> , <i>Nemertesia</i>
S 22 - D	401912.03	5700086.51	F2-3 S	17/08/2012	22:15	21.5	S	50	30%	<i>Sabellaria</i> , <i>Sertularidae</i> , <i>Nemertesia</i> , <i>Actinaria</i>
S 22 - E	401912.03	5700086.51	F2-3 S	17/08/2012	22:16	21.5	gS	0	0	<i>Sabellaria rubble</i> , <i>Ophiura</i>
S 23 - A	402248.64	5700248.12	F2-3 S	17/08/2012	22:27	22.2	S	0	0	Small amount of <i>Sabellaria rubble</i> & shelly fragments
S 23 - B	402248.64	5700248.12	F2-3 S	17/08/2012	22:27	22.2	S	0	0	Small amount of <i>Sabellaria rubble</i> & shelly fragments. <i>Lagis koreni</i>
S 23 - C	402248.64	5700248.12	F2-3 S	17/08/2012	22:28	22.2	S	0	0	Small amount of <i>Sabellaria rubble</i> & shelly fragments. <i>Ophiura</i>
S 23 - D	402248.64	5700248.12	F2-3 S	17/08/2012	22:29	22.2	S	5	3%	Small amount of <i>Sabellaria rubble</i> & shelly fragments. <i>Ophiura</i> , <i>Actinaria</i> , <i>Nemertesia</i>
S 23 - E	402248.64	5700248.12	F2-3 S	17/08/2012	22:30	22.2	S	0	0	Small amount of <i>Sabellaria rubble</i> & shelly fragments. <i>Ophiura</i>
S 24 - A	401672.09	5700563.65	F3	18/08/2012	13:55	22.7	gS	0	0	Shelly fragments, <i>Paguridae</i> , <i>Ophiura</i>
S 24 - B	401672.09	5700563.65	F3	18/08/2012	13:56	22.7	gS	0	0	<i>Alcyonidium</i> , <i>Lagis koreni</i> , <i>Paguridae</i> , shelly fragments, <i>Ophiura</i>
S 24 - C	401672.09	5700563.65	F3	18/08/2012	13:57	22.7	gS	0	0	<i>Sertularidae</i> , shelly fragments, <i>Alcyonidium</i> , <i>Ophiura</i>
S 24 - D	401672.09	5700563.65	F3	18/08/2012	13:58	22.7	gS	0	0	Shelly fragments, <i>Ophiura</i> , <i>Paguridae</i> , <i>Alcyonidium</i>
S 24 - E	401672.09	5700563.65	F3	18/08/2012	13:58	22.7	gS	5	5%	<i>Alcyonidium</i> , <i>Sertularidae</i> , shelly fragments, <i>Ophiura</i> , <i>Sabellaria clumps</i>
S 25 - A	400978.89	5700350.64	F3	18/08/2012	13:42	22.7	sG	0	0	<i>Alcyonidium</i> , shelly fragments, <i>Ophiura</i> , <i>Ensis</i> , <i>Sertularidae</i>
S 25 - B	400978.89	5700350.64	F3	18/08/2012	13:43	21.5	sG	0	0	Shelly fragments, <i>Ensis</i> ? <i>Lagis koreni</i> , <i>Alcyonidium</i> , <i>Ophiura</i>
S 25 - C	400978.89	5700350.64	F3	18/08/2012	13:44	21.5	gS	0	0	Shelly fragments, <i>Lagis koreni</i> , <i>Sertularidae</i> , <i>Actinaria</i>
S 25 - D	400978.89	5700350.64	F3	18/08/2012	13:45	21.5	gS	6	10%	<i>Sertularidae</i> ? <i>Ophiura</i> , shelly fragments, <i>Nemertesia</i>
S 25 - E	400978.89	5700350.64	F3	18/08/2012	13:46	21.5	sG + C	0	0	<i>Sertularidae</i> , shelly fragments, <i>Actinaria</i> , <i>Lagis</i> ? <i>Alcyonidium</i> , <i>Ensis</i>
S 26 - A	400588.16	5700340.3	F3	18/08/2012	13:28	21.7	gS	0	0	<i>Ophiura</i> , shelly fragments
S 26 - B	400588.16	5700340.3	F3	18/08/2012	13:29	21.7	gS	0	0	<i>Asterias</i> , shelly fragments, <i>Ophiura</i>
S 26 - C	400588.16	5700340.3	F3	18/08/2012	13:30	21.7	gS	0	0	Shelly fragments, <i>Actinaria</i> , <i>Alcyonidium</i> , <i>Ophiura</i>
S 26 - D	400588.16	5700340.3	F3	18/08/2012	13:31	21.7	gS	0	0	<i>Paguridae</i> , shelly fragments, <i>Alcyonidium</i> , <i>Actinaria</i>
S 26 - E	400588.16	5700340.3	F3	18/08/2012	13:33	21.7	gS	0	0	<i>Asterias</i> , <i>Paguridae</i> , shelly fragments

Station	Easting	Northing	Weather Conditions	Date Taken	Time Taken (GMT)	Depth (m)	Sediment Description	Sabellaria Elevation Score	Sabellaria Sediment Consolidation Score	Description of Fauna
S 27 - A	403897.8	5697612.26	F2 S	17/08/2012	20:30	19.6	gS	5	20%	<i>Sabellaria</i> , <i>Paguridae</i> , <i>Nemertesia</i> , <i>Ophiura</i> , <i>Ebalia</i> , <i>Actinaria</i>
S 27 - B	403897.8	5697612.26	F2 S	17/08/2012	20:31	19.6	gS	80	50%	<i>Sabellaria</i> , <i>Nemertesia</i> , <i>Asterias</i> , <i>hydroids</i> , <i>Ophiura</i> , <i>Sertularidae</i>
S 27 - C	403897.8	5697612.26	F2 S	17/08/2012	20:32	19.6	S	2	4%	<i>Sabellaria</i> , <i>Paguridae</i> , <i>Nemertesia</i> , <i>Ophiura</i> , <i>hydroids</i> , <i>Asterias</i>
S 27 - D	403897.8	5697612.26	F2 S	17/08/2012	20:32	19.6	gS	80	30%	<i>Sabellaria</i> , <i>Paguridae</i> , <i>Nemertesia</i> , <i>Asterias</i> , <i>Pandalus</i> , <i>Sertularidae</i> , <i>Actinaria</i>
S 27 - E	403897.8	5697612.26	F2 S	17/08/2012	20:33	19.6	gS	80	20%	<i>Sabellaria</i> , <i>Paguridae</i> , <i>Nemertesia</i> , <i>Asterias</i> , <i>hydroids</i> , <i>Pandalus</i> , <i>Sertularidae</i>
S 28 - A	404145.52	5697725.82	F2-3 SW	17/08/2012	20:19	19.5	S	30	10%	<i>Sabellaria</i> , <i>Alcyonidium diaphanum</i> , <i>Ophiura</i> , <i>Nemertesia</i> , <i>Actinaria</i> , <i>Paguridae</i>
S 28 - B	404145.52	5697725.82	F2-3 SW	17/08/2012	20:19	19.5	S	60	10%	<i>Sabellaria</i> , <i>Asterias</i> , <i>Nemertesia</i> , <i>Actinaria</i> , <i>Paguridae</i> , <i>hydroids</i>
S 28 - C	404145.52	5697725.82	F2-3 SW	17/08/2012	20:20	19.5	S	60	15%	<i>Sabellaria</i> , <i>Ophiura</i> , <i>Nemertesia</i> , <i>Sertularidae</i> , <i>Paguridae</i> , <i>Pandalus</i>
S 28 - D	404145.52	5697725.82	F2-3 SW	17/08/2012	20:21	19.5	S	30	10%	<i>Sabellaria</i> , <i>Asterias</i> , <i>hydroids</i> , <i>Pandalus</i> , <i>Ensis</i> , <i>Nemertesia</i>
S 28 - E	404145.52	5697725.82	F2-3 SW	17/08/2012	20:22	19.5	S	50	20%	<i>Sabellaria</i> , <i>Nemertesia</i> , <i>Ophiura</i> , <i>Paguridae</i>
S 28 - F	404145.52	5697725.82	F2-3 SW		20:23	19.5	S	25	20%	<i>Sabellaria</i> , <i>Asterias</i> , <i>Ophiura</i> , <i>Actinaria</i>
S 29 - A	404799.8	5696841.85	F2-3 S	17/08/2012	20:58	17.2	gS + C	0	0	<i>Ophiura</i> , <i>urchin</i>
S 29 - B	404799.8	5696841.85	F2-3 S	17/08/2012	20:59	17.2	gS + C	0	0	<i>Ophiura</i> , <i>Paguridae</i> , <i>Actinaria</i> , <i>Echinus</i>
S 29 - C	404799.8	5696841.85	F2-3 S	17/08/2012	20:59	17.2	gS + C	0	0	<i>Sertulariidae</i> , <i>Paguridae</i> , <i>Actinaria</i>
S 29 - D	404799.8	5696841.85	F2-3 S	17/08/2012	21:00	17.2	S + C	0	0	<i>Sertulariidae</i> , <i>Paguridae</i> , <i>Ophiura</i>
S 29 - E	404799.8	5696841.85	F2-3 S	17/08/2012	21:01	17.2	S + C	0	0	<i>Sertulariidae</i> , <i>Actinaria</i>
S 30 - A	406007.93	5695664.01	F3	14/08/2012	18:27	20	gS	0	0	<i>Ophiura</i> , <i>hydroids</i> , <i>Paguridae</i> , <i>Actinaria</i> & <i>Psammechinus</i>
S 30 - B	406007.93	5695664.01	F3	14/08/2012	18:28	20	gS	0	0	<i>Flustra</i> , <i>Ophiura</i> , <i>hydroids</i> & <i>Sertulariidae</i>
S 30 - C	406007.93	5695664.01	F3	14/08/2012	18:29	20	gS	0	0	<i>Ophiura</i> , <i>hydroids</i> , <i>Sertulariidae</i> , <i>Psammechinus</i> & <i>Paguridae</i>
S 30 - D	406007.93	5695664.01	F3	14/08/2012	18:34	19.9	gS	0	0	<i>Ophiura</i> , <i>hydroids</i> , <i>Psammechinus</i> & <i>Alcyonidium diaphanum</i>
S 30 - E	406007.93	5695664.01	F3	14/08/2012	18:34	19.9	gS + C	0	0	<i>Ophiura</i> , <i>hydroids</i> , <i>Psammechinus</i> , <i>Sertulariidae</i> , <i>Spatangus?</i>
HMa - A	408179.38	5698830.31	F3	18/08/2012	19:02	19.5	B	0	0	<i>Asterias</i> , <i>encrusting fauna</i> , <i>Sertularidae</i> , <i>large lump of rock</i> , <i>Actinaria</i>
HMa - B	408179.38	5698830.31	F3	18/08/2012	19:03	19.5	B	0	0	<i>uneven bottom - rock</i> , <i>Actinaria</i> , <i>hydroid</i>
HMa - C	408179.38	5698830.31	F3	18/08/2012	19:09	19.5	B	0	0	<i>Asterias</i> , <i>Sertularidae</i> , <i>hydroids?</i> <i>Boulders</i>
HMa - D	408179.38	5698830.31	F3	18/08/2012	19:04	19.5	sG	0	0	<i>Mytilus shell fragments</i>
HMa - E	408179.38	5698830.31	F3	18/08/2012	19:05	19.5	B	0	0	<i>Boulders</i> , <i>Sertularidae</i> , <i>Asterias</i> , <i>Actinaria</i>
HSa - A	404727.22	5696626.85	F2-3 S	17/08/2012	20:47	18.2	S	0	0	<i>Sabellaria Rubble</i> , <i>Pomatoceros</i> , <i>Sertularidae</i>

Station	Easting	Northing	Weather Conditions	Date Taken	Time Taken (GMT)	Depth (m)	Sediment Description	Sabellaria Elevation Score	Sabellaria Sediment Consolidation Score	Description of Fauna
HSa - B	404727.22	5696626.85	F2-3 S	17/08/2012	20:48	18.2	gS	0	0	<i>Sabellaria Rubble, Buccinum, Actinaria</i>
HSa - C	404727.22	5696626.85	F2-3 S	17/08/2012	20:49	18.2	S	0	0	<i>Small amount of Sabellaria Rubble, Actinaria</i>
HSa - D	404727.22	5696626.85	F2-3 S	17/08/2012	20:50	18.2	S	0	0	<i>Sabellaria Rubble</i>
HSa - E	404727.22	5696626.85	F2-3 S	17/08/2012	20:51	18.2	gS	5	15%	<i>Sabellaria Rubble, Actinaria</i>
HSb - A	406870.11	5698794.52	F3	18/08/2012	15:25	24.2	gS	85	40%	<i>Sabellaria, Sertularidae, Squid, Dragonet, Pandalus, Sea scorpion, Nemertesia, Aequipecten</i>
HSb - B	406870.11	5698794.52	F3	18/08/2012	15:26	24.2	gS	85	40%	<i>Sabellaria, Sertularidae, Squid, Dragonet, Pandalus, Sea scorpion, Nemertesia, Aequipecten</i>
HSb - C	406870.11	5698794.52	F3	18/08/2012	15:29	24.2	S	70	60%	<i>Sabellaria, Ophiura, Pandalus, Nemertesia, Sertularidae, Paguridae</i>
HSb - D	406870.11	5698794.52	F3	18/08/2012	15:30	24.2	S	85	45%	<i>Sabellaria, Alcyonidium, Paguridae, Ophiura, Pandalus, Aequipecten</i>
HSb - E	406870.11	5698794.52	F3	18/08/2012	15:31	24.2	gS	85	15%	<i>Sabellaria, Liocarcinus, Ophiura, Pandalus, Aequipecten, Nemertesia</i>
HSb - F	406870.11	5698794.52	F3	19/08/2012	15:33	24.2	S	70	20%	<i>Sabellaria, Ophiura, Nemertesia, Pandalus</i>
HSc - A	407264.66	5699761.86	F3	18/08/2012	16:58	23.8	S	50	10%	<i>Ophiura, Sabellaria patch, bivalve, Paguras, Actinaria, Nemertesia</i>
HSc - B	407264.66	5699761.86	F3	18/08/2012	17:01	23.8	S	85	70%	<i>Sabellaria, Sertularidae, Pandalus, Nemertesia, silty</i>
HSc - C	407264.66	5699761.86	F3	18/08/2012	17:04	23.8	S	95	70%	<i>Sabellaria, Crangon, Paguridae, Aequipecten, Nemertesia</i>
HSc - D	407264.66	5699761.86	F3	18/08/2012	17:06	23.8	S	65	10%	<i>Sabellaria, Ophiura, Aequipecten, Nemertesia, Actinaria</i>
HSc - E	407264.66	5699761.86	F3	18/08/2012	17:08	23.8	S	80	40%	<i>Sabellaria, Sertularidae, Nemertesia, Pandalus</i>
B09 - A	403993.77	5697579.9	F3	18/08/2012	14:30	21.2	G & C	0	0	<i>Alcyonidium</i>
B09 - B	403993.77	5697579.9	F3	18/08/2012	14:31	21.2	C	0	0	<i>Bryozoa, Pomatoceros</i>
B09 - C	403993.77	5697579.9	F3	18/08/2012	14:32	21.2	C	0	0	<i>Big Asterias, Sertularidae, Pomatoceros</i>
B09 - D	403993.77	5697579.9	F3	18/08/2012	14:33	21.2	C	0	0	<i>Asterias, Anenome?</i>
B09 - E	403993.77	5697579.9	F3	18/08/2012	14:34	21.2	G & C	0	0	<i>Asterias, Buccinum</i>
B11 - A	404624.04	5696856.14	F2-3 S	18/08/2012	14:48	19.2	C & G	0	0	<i>Buccinum, Asterias, Paguras, chalky</i>
B11 - B	404624.04	5696856.14	F2-3 S	18/08/2012	14:49	19.2	C & G	0	0	<i>Asterias, Paguras, encrusting Bryozoa, Pomatoceros, encrusting fauna, chalk</i>
B11 - C	404624.04	5696856.14	F2-3 S	18/08/2012	14:49	19.2	C & G	0	0	<i>Asterias, Buccinum, Actinaria, Mytilus shell, Sertularidae, chalk</i>
B11 - D	404624.04	5696856.14	F2-3 S	18/08/2012	14:50	19.2	C & G	0	0	<i>Asterias, Buccinum, Actinaria - Urticina felina, Sertularidae, Mytilus clump, chalk</i>
B11 - E	404624.04	5696856.14	F2-3 S	18/08/2012	14:51	19.2	gC	0	0	<i>Asterias, Buccinum, Paguras, Sertularidae, Actinaria, Alcyonidium, Pomatoceros, Mytilus clump, chalk</i>
E01 - A	403157.16	5701613.53	F3	18/08/2012	17:58	21.8	sG	0	0	<i>Asterias, Paguridae, Sertularidae, shelly fragments, Buccinum, broken Mytilus</i>
E01 - B	403157.16	5701613.53	F3	18/08/2012	17:59	21.8	sG	0	0	<i>Asterias, Paguridae, Sertularidae, shelly fragments, cobble</i>
E01 - C	403157.16	5701613.53	F3	18/08/2012	18:00	21.8	sG	0	0	<i>Actinaria, Asterias</i>

Station	Easting	Northing	Weather Conditions	Date Taken	Time Taken (GMT)	Depth (m)	Sediment Description	Sabellaria Elevation Score	Sabellaria Sediment Consolidation Score	Description of Fauna
E01 - D	403157.16	5701613.53	F3	18/08/2012	18:01	21.8	sG	0	0	Shelly fragments, Sertularidae, Alcyonidium
E01 - E	403157.16	5701613.53	F3	18/08/2012	18:03	21.8	sG	0	0	Squid, Paguridae, Asterias, Buccinum
E02 - A	403471.8	5701253.92	F3	18/08/2012	17:42	22.2	sG	0	0	Asterias, Sertularidae, Carcinus, evidence of Mytilus
E02 - B	403471.8	5701253.92	F3	18/08/2012	17:43	22.2	sG & C	0	0	Asterias, spider crab -Hyas, crab, Sertularidae, broken Mytilus shells
E02 - C	403471.8	5701253.92	F3	18/08/2012	17:45	22.2	sG	0	0	Sertularidae, Paguridae, spider crab, Mytilus shells, Alcyonidium
E02 - D	403471.8	5701253.92	F3	18/08/2012	17:46	22.2	sG	0	0	Sertularidae, Alcyonidium, Actinaria
E02 - E	403471.8	5701253.92	F3	18/08/2012	17:47	22.2	sG & C	0	0	Sertularida
09 - A	406974.61	5698601.74	F1-2	15/11/2012	13:37	28	S	0	0	
09 - B	406974.61	5698601.74	F1-2	15/11/2012	13:37	28	S	0	0	Ophiura
09 - C	406974.61	5698601.74	F1-2	15/11/2012	13:38	28	S	0	0	
09 - D	406974.61	5698601.74	F1-2	15/11/2012	13:39	28	fine S	0	0	Ophiura
09 - E	406974.61	5698601.74	F1-2	15/11/2012	13:39	28	fine S	0	0	
10 - A	405913.23	5697643.36	F1-2	15/11/2012	13:24	27.5	S	0	0	Sabellaria
10 - B	405913.23	5697643.36	F1-2	15/11/2012	13:24	27.5	S	0	0	Sabellaria, Sertulariidae
10 - C	405913.23	5697643.36	F1-2	15/11/2012	13:25	27.5	S	0	0	Sabellaria, Carcinus
10 - D	405913.23	5697643.36	F1-2	15/11/2012	13:25	27.5	S	0	0	Sabellaria, Paguridae
10 - E	405913.23	5697643.36	F1-2	15/11/2012	13:26	27.5	S	0	0	
15 - A	403933.23	5697635.51	F1-2	15/11/2012	12:21	23.1	S	50	30%	Sabellaria
15 - B	403933.23	5697635.51	F1-2	15/11/2012	12:21	23.1	S	20	10%	Sabellaria, Pandalus, Paguridae, Nemertesia
15 - C	403933.23	5697635.51	F1-2	15/11/2012	12:21	23.1	S	20	5%	Sabellaria, Aequipecten, Pandalus, Paguridae
15 - D	403933.23	5697635.51	F1-2	15/11/2012	12:22	23.1	S	20	25%	Sabellaria patchy and clumps
15 - E	403933.23	5697635.51	F1-2	15/11/2012	12:22	23.1	S	0	0	Aequipecten
16 - A	404476.89	5696960.26	F1-2	15/11/2012	12:36	22.3	sG with chalk	0	0	Pomatoceros sp.
16 - B	404476.89	5696960.26	F1-2	15/11/2012	12:36	22.3	sG + C with chalk	0	0	Pomatoceros sp.
16 - C	404476.89	5696960.26	F1-2	15/11/2012	12:36	22.3	sG + C with chalk	0	0	Pomatoceros sp.
16 - D	404476.89	5696960.26	F1-2	15/11/2012	12:37	22.3	sG with chalk	0	0	Pomatoceros sp.
16 - E	404476.89	5696960.26	F1-2	15/11/2012	12:37	22.3	gS with chalk	0	0	Pomatoceros sp.
17 - A	404941.57	5696375.97	F1-2	15/11/2012	12:46	21.5	sG + C	0	0	Sertulariidae
17 - B	404941.57	5696375.97	F1-2	15/11/2012	12:46	21.5	sG + C with chalk	0	0	Sertulariidae
17 - C	404941.57	5696375.97	F1-2	15/11/2012	12:46	21.5	sG + C with chalk	0	0	Pomatoceros sp., Buccinum undatum
17 - D	404941.57	5696375.97	F1-2	15/11/2012	12:47	21.5	gS + C	0	0	Asterias, Buccinum undatum, Flustra foliacea, Sertulariidae
17 - E	404941.57	5696375.97	F1-2	15/11/2012	12:47	21.5	Boulder	0	0	Asterias, ACTINIARIA, Sertulariidae, Tubularia?
18 - A	405181.8	5697393.24	F1-2	15/11/2012	12:57	22.6	gS + C	0	0	Paguridae
18 - B	405181.8	5697393.24	F1-2	15/11/2012	12:58	22.6	gS + C with chalk	0	0	Pomatoceros sp.
18 - C	405181.8	5697393.24	F1-2	15/11/2012	12:58	22.6	gS + C	0	0	Asterias
18 - D	405181.8	5697393.24	F1-2	15/11/2012	13:11	22.6	gS + C	0	0	Asterias
18 - E	405181.8	5697393.24	F1-2	15/11/2012	13:12	22.6	gS + C	0	0	Ophiura
19 - A	402688.21	5697798.38	F1-2	15/11/2012	12:07	21.8	sG with chalk	0	0	Ophiura, Asterias

Station	Easting	Northing	Weather Conditions	Date Taken	Time Taken (GMT)	Depth (m)	Sediment Description	<i>Sabellaria</i> Elevation Score	<i>Sabellaria</i> Sediment Consolidation Score	Description of Fauna
19 - B	402688.21	5697798.38	F1-2	15/11/2012	12:08	21.8	sG with chalk	0	0	<i>Asterias</i>
19 - C	402688.21	5697798.38	F1-2	15/11/2012	12:08	21.8	sG + C with chalk	0	0	<i>Pomatoceros sp.</i>
19 - D	402688.21	5697798.38	F1-2	15/11/2012	12:08	21.8	gS with chalk	0	0	<i>Ophiura</i>
19 - E	402688.21	5697798.38	F1-2	15/11/2012	12:09	21.8	sG with chalk	0	0	<i>Sertulariidae, Paguridae, Ophiura</i>
22 - A	406563.29	5696547.86	F1-2	15/11/2012	14:08	24	sG	60	40%	<i>Sabellaria, Actinaria, Aequipecten, Sertulariidae</i>
22 - B	406563.29	5696547.86	F1-2	15/11/2012	14:09	24	sG with chalk	0	0	<i>Sabellaria rubble, Asterias</i>
22 - C	406563.29	5696547.86	F1-2	15/11/2012	14:09	24	sG with chalk	0	0	<i>Sabellaria rubble, Actinaria, Ophiura</i>
22 - D	406563.29	5696547.86	F1-2	15/11/2012	14:10	24	sG with chalk	10	50%	<i>Sabellaria clumps and rubble, Asterias, Ophiura</i>
22 - E	406563.29	5696547.86	F1-2	15/11/2012	14:10	24	sG with chalk	50	50%	<i>Sabellaria</i>
25 - A	407800.29	5697721.51	F1-2	15/11/2012	13:51	27.2	fine S overlying bedrock	0	0	
25 - B	407800.29	5697721.51	F1-2	15/11/2012	13:51	27.2	fine S overlying bedrock	0	0	
25 - C	407800.29	5697721.51	F1-2	15/11/2012	13:52	27.2	fine S overlying bedrock	0	0	
25 - D	407800.29	5697721.51	F1-2	15/11/2012	13:52	27.2	fine S overlying bedrock	0	0	
25 - E	407800.29	5697721.51	F1-2	15/11/2012	13:53	27.2	fine S overlying bedrock	0	0	
27 - A	407426.6	5695717.99	F1-2	15/11/2012	14:22	27.2	Fine S	0	0	
27 - B	407426.6	5695717.99	F1-2	15/11/2012	14:23	27.2	Fine S	0	0	
27 - C	407426.6	5695717.99	F1-2	15/11/2012	14:23	27.2	Fine S overlying bedrock	0	0	<i>Hyas?</i>
27 - D	407426.6	5695717.99	F1-2	15/11/2012	14:23	27.2	Fine S overlying bedrock	0	0	
27 - E	407426.6	5695717.99	F1-2	15/11/2012	14:24	27.2	Fine S overlying bedrock	0	0	
31 - A	402383.97	5696603.34	F1-2	15/11/2012	11:52	19.8	sG + C with Chalk	0	0	<i>Asterias, actinaria</i>
31 - B	402383.97	5696603.34	F1-2	15/11/2012	11:52	19.8	sG + C	0	0	
31 - C	402383.97	5696603.34	F1-2	15/11/2012	11:52	19.8	sG + C	0	0	<i>Asterias</i>
31 - D	402383.97	5696603.34	F1-2	15/11/2012	11:52	19.8	sG + C with Chalk	0	0	<i>Sertularidae</i>
31 - E	402383.97	5696603.34	F1-2	15/11/2012	11:52	19.8	sG	0	0	<i>Asterias</i>
A06 - A	402496.65	5695480.69	F1-2	15/11/2012	11:38	20.3	sG + C with Chalk	0	0	
A06 - B	402496.65	5695480.69	F1-2	15/11/2012	11:38	20.3	sG + C with Chalk	0	0	<i>Pomatoceros sp.</i>
A06 - C	402496.65	5695480.69	F1-2	15/11/2012	11:39	20.3	sG + C with Chalk	0	0	<i>Pomatoceros sp.</i>
A06 - D	402496.65	5695480.69	F1-2	15/11/2012	11:40	20.3	sG + C with Chalk	0	0	<i>Pomatoceros sp.</i>
A06 - E	402496.65	5695480.69	F1-2	15/11/2012	11:40	20.3	sG + C with Chalk	0	0	<i>Pomatoceros sp.</i>

Appendix Table 4. Table summarising the Particle Size Distribution (PSD) of benthic stations sampled with a 0.1m² Hamon grab from within and surrounding the TOWF during benthic monitoring in August 2012. The sieve apertures are to BS 1377:Part2:1990 standards and are shown in millimetres. The data are expressed as absolute percentage retained. Numbered stations correspond to stations first sampled in the 2005 baseline benthic resource survey, while stations with the prefix 'A' correspond to those sampled during the 2007 pre-construction survey. Stations highlighted in green correspond to stations sampled as part of the monopile scour pit assessment.

Station	Sieve Aperture (mm)											
	63	31.5	16	8	4	2	1	0.5	0.25	0.125	0.063	Pan
002A	0	0	0	2.2	1.36	1.76	2.49	5.54	22.68	52.1	2.24	9.63
002B	0	11.1	14.97	7.86	2.98	2.29	3.49	6.56	19.94	21.23	1.64	7.94
002C	0	9.8	8.74	3.86	3.65	3.16	4.56	7.74	20.79	27.04	1.19	9.47
006A	0	0	0	0.21	0.65	0.83	1.4	4.77	29.7	42.39	2.35	17.7
006B	0	0	0	0.02	0.18	0.31	0.56	2.98	27.32	45.12	1.65	21.86
006C	0	0	0	0.25	0.22	0.4	1.08	5.35	32.29	41.68	1.35	17.38
008A	0	0	0.66	3.77	5.42	8.47	16.73	29.06	31.95	2.09	0.38	1.47
008B	0	0	0.67	1.4	4.39	6.7	14.48	33.82	35.19	1.51	0.57	1.27
008C	0	0	1.23	4.03	3.36	5.02	12.19	33.73	35.87	1.62	0.75	2.2
013A	0	0	0	0.34	0.95	1.14	1.71	4.92	26.39	36.74	3.37	24.44
013B	0	0	0	0.34	0.78	1.14	1.66	4.9	30.04	36.49	3.4	21.25
013C	0	0	0	0.82	1.6	2.08	3.35	7.35	46.78	28.84	1.81	7.37
024A	0	0	0	0	0.07	0.37	1.47	6.38	69.58	15.84	1.08	5.21
024B	0	0	0	0	0.06	0.25	0.59	1.57	41.09	29.66	3.04	23.74
024C	0	0	0	0	0.24	0.39	0.58	1.36	34.53	28.25	3.18	31.47
026A	0	0	0	0.55	0.64	0.48	0.58	2.25	75.46	18.04	0.26	1.74
026B	0	0	0.29	0.22	0.52	0.85	0.75	2.64	79.37	13.26	0.51	1.59
026C	0	0	0	0.13	0.35	0.44	0.26	2.08	81.4	13.86	0.26	1.22
027A	0	0	11.36	2.34	0.68	0.82	0.94	4.84	66.84	9.94	0.32	1.92
034A	0	0	0	0.14	0.33	0.36	0.83	3.91	35.47	34.48	4.38	20.1
034B	0	0	0	0.34	0.25	0.32	0.93	4.33	38.66	28.6	4.11	22.46
034C	0	0	0	0	0.33	0.42	1.02	3.99	35.21	33.37	4.07	21.59
045A	0	0	0	0.07	0.55	1.05	1.51	2.26	13.28	58.98	1.8	20.5
045B	0	2	1.99	0	0.51	0.72	1.01	1.91	11.96	57.88	2.38	19.64
045C	0	0	0	0	0.06	0.18	0.33	1.38	13.13	64.43	2.62	17.87
050A	0	9.03	19.17	5.28	6.33	4.27	3.72	7.9	22.85	11.88	1.25	8.32
050B	0	0	13.4	6.2	6.63	3.79	3.42	9.12	26.37	16.73	2.43	11.91
A07A	0	0	0	0.13	0.33	0.69	1.23	4.38	37.04	38.86	2.87	14.47
A07B	0	0	0	0.13	0.1	0.22	0.57	2.94	33.26	45.3	1.84	15.64
A08A	0	0	0	0	0.12	0.52	1.59	11.53	38.94	27.62	2.37	17.31
A08B	0	0	0	0	0.2	0.26	0.79	9.26	37.98	28.37	2.47	20.67
A08C	0	0	0	0.48	0.26	0.68	1.91	14.76	47.75	22.54	1.33	10.29
A10A	0	0	0	1	0.99	1.34	2.08	6.48	44.15	23.7	3.18	17.08
A10B	0	0	0	0.59	1.13	1.92	3.05	8.77	53.34	18.77	2.4	10.03
A10C	0	0	0	0.74	1.08	1.76	2.97	7.87	52.57	17.32	1.34	14.35
A11A	0	0	0	0.56	1.93	5.52	14.27	35.86	39.21	1.05	0.14	1.46
A11B	0	0	0	1.57	3	7.42	15.44	32.43	37.35	1.25	0.2	1.34
A11C	0	0	0.47	0.97	4.52	8.25	22.46	35.41	24.41	1.32	0.36	1.83
E01A	0	0	15.67	12.1	10.24	6.79	6.34	10.08	28.79	4.85	1.93	3.21
E01B	0	0	0	11.4	9.76	7.53	8.31	12.89	32.45	7.22	2.72	7.72
E01C	0	10.65	4.02	11.52	8.28	5.93	6.35	10.53	29.62	6.27	1.28	5.55
E02B	0	0	13.15	39.27	16.12	4.73	2.26	2.33	5.8	9.4	0.54	6.4

Appendix Table 5. Table summarising the percentage gravel ($\geq 2\text{mm}$), sand ($1\text{mm}-0.063\text{mm}$) and silt ($<0.063\text{mm}$) of benthic stations sampled with a 0.1m^2 Hamon grab from within and surrounding the TOWF during benthic monitoring in August 2012. Triplicate data were averaged to allow a folk sediment class and multivariate sediment group to be determined for each station. Numbered stations correspond to stations first sampled in the 2005 baseline benthic resource survey, while stations with the prefix 'A' correspond to those sampled during the 2007 pre-construction survey. Stations highlighted in green correspond to stations sampled as part of the monopile scour pit assessment.

Station	%Gravel	%Sand	%Silt	Folk Sediment Class	Multivariate Sediment Group
2	24.58	66.41	9.01	gmS	e
6	1.02	80.00	18.98	(g)mS	d
8	15.04	83.31	1.65	gS	a
13	3.06	79.25	17.69	(g)mS	d
24	0.46	79.40	20.14	mS	d
26	1.49	96.99	1.52	(g)S	b
27	15.20	82.88	1.92	gS	b
34	0.83	77.79	21.38	mS	d
45	2.38	78.29	19.34	(g)mS	c
50	37.05	52.84	10.12	msG	e
A07	0.80	84.15	15.06	mS	d
A08	0.84	83.07	16.09	mS	d
A10	3.52	82.66	13.82	(g)mS	d
A11	11.40	87.05	1.54	gS	a
E01	37.96	56.54	5.49	sG	-
E02	73.27	20.33	6.40	msG	-

Appendix Table 6. Table summarising the sampling log and percentage organic matter for stations where sediment samples were collected with a 0.1m² mini Hamon grab for organic content analysis (OCA). Samples were obtained from within and surrounding the TOWF during benthic monitoring in August 2012. Additional information includes date & time, the total sample volume (kg), the number of attempts per station, notes on the sediment description and other important observations. Numbered stations correspond to those first sampled in the 2005 baseline benthic resource survey, while stations with the prefix 'A' correspond to those sampled during the 2007 pre-construction survey. Stations highlighted in green correspond to stations sampled as part of the monopile scour pit assessment. Locations where no OCA data were collected represent stations that could not be sampled due to the nature of the substrata, or where grabbing retrieved *Sabellaria spinulosa* aggregations in the first grab, therefore was relinquished from further sampling. Navigational positions are recorded in UTM (WGS84) Zone 31 Northern.

Sample	Date Taken	Easting	Northing	Time Taken (GMT)	Depth (m)	OCA Volume (1Kg)	Attempts	Sediment Description	Percentage Organic Matter	Notes
02 OCA	20/Aug/2012	404473.2	5696959.5	09:38	20.7	1	1	gS	<0.20	
06 OCA	20/Aug/2012	404387.7	5700594.3	16:58	23.8	1	1	S & sM	0.88	
08 OCA	21/Aug/2012	406254.4	5699397.6	10:26	28.1	1	1	S (Shelly)	0.20	
09 OCA	21/Aug/2012	406976.6	5698602.6	11:00	26.1	0	-	Potential <i>Sabellaria</i> reef	no sample	Characteristics attributable to <i>Sabellaria spinulosa</i> reef present in grab sample. Sampling at station relinquished. Station to be investigated by drop-down camera
10 OCA	21/Aug/2012	405914.7	5697643.5	13:38	27.5	0	-	Potential <i>Sabellaria</i> reef	no sample	Characteristics attributable to <i>Sabellaria spinulosa</i> reef present in grab sample. Sampling at station relinquished. Station to be investigated by drop-down camera
13 OCA	20/Aug/2012	403085.2	5698563.7	17:44	21.3	1	1	mS	0.96	
15 OCA	20/Aug/2012	403939.2	5697629.1	19:30	18.2	1	1	gS & S	0.58	A small clump of <i>Sabellaria</i> present in sample
16 OCA	21/Aug/2012	404473.2	5696959.5	07:41	17.8	1	2	sG	0.54	
17 OCA	21/Aug/2012	404941.3	5696374.2	08:24	16.9	1	3	G & C	0.76	Difficult to obtain a sample
18 OCA	21/Aug/2012	405180.3	5697393.9	13:54	22.8	1	1	sG & C	0.47	
19 OCA	20/Aug/2012	402689.9	5697795.2	-	-	0	3	-	no sample	
22 OCA	21/Aug/2012	406563.8	5696547.2	-	-	0	3	-	no sample	
24 OCA	21/Aug/2012	408010.5	5698377.7	11:19	26.5	1	1	sM	1.50	
25 OCA	21/Aug/2012	407799	5697721.7	12:24	26.8	1	1	S	0.53	
26 OCA	21/Aug/2012	408381.7	5695999.4	12:49	28.1	1	1	S	<0.20	
27 OCA	21/Aug/2012	407429.5	5695714.4	09:00	23.8	1	1	S	<0.20	
31 OCA	19/Aug/2012	402381.1	5696604.7	-	-	0	3	-	no sample	
34 OCA	20/Aug/2012	403153.5	5702473.7	11:03	25.1	1	1	S	1.10	
45 OCA	20/Aug/2012	399371.2	5702455.2	14:54	23.4	1	1	mS	0.68	
50 OCA	19/Aug/2012	404146.7	5693884.7	15:05	18.7	1	1	sG	0.27	
A06 OCA	19/Aug/2012	402496.8	5695478.3	-	-	0	3	-	no sample	
A07 OCA	20/Aug/2012	402329.7	5700966.7	10:23	23.1	1	1	-	0.68	
A08 OCA	20/Aug/2012	403916.1	5701214.5	16:24	24	1	1	gS	1.10	
A10 OCA	20/Aug/2012	404599	5698443.5	18:23	22.1	1	1	gS & S	0.48	
A11 OCA	21/Aug/2012	406041.8	5698711.5	09:55	24.6	1	1	gS (Shelly)	<0.20	
E01 OCA	20/Aug/2012	403156.2	5701614.1	11:40	25.8	1	1	gS	0.53	
E02 OCA	20/Aug/2012	403470.9	5701254.5	15:45	24.8	1	1	sG & G	0.68	
B09 OCA	20/Aug/2012	403996.1	5697581.1	-	-	0	3	-	no sample	
B11 OCA	20/Aug/2012	404623.1	5696856.3	-	-	0	3	-	no sample	

TaxonName	02 A	02 B	02 C	06 A	06 B	06 C	08 A	08 B	08 C	09 A	10 A	13 A	13 B	13 C	15 A	16 A	16 B	19 A	24 A	24 B	24 C	26 A	26 B	26 C	27 A
<i>Mysta barbata</i>	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Mysta picta</i>	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Anaitides maculata</i>	-	-	-	-	-	-	-	-	-	24	17	-	-	-	5	-	-	-	-	-	-	-	-	-	-
<i>Anaitides mucosa</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Anaitides rosea</i>	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Eulalia bilineata</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Eulalia mustela</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Eulalia ornata</i>	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Eumida</i>	-	1	-	-	1	-	-	-	-	-	1	-	-	-	1	1	2	-	-	-	-	-	-	-	-
<i>Eumida bahusiensis</i>	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Eumida sanguinea</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-
<i>Sige fusigera</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Glycera</i>	-	-	2	-	-	-	1	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Glycera alba</i>	-	2	2	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Glycera lapidum</i>	-	-	-	-	-	-	1	-	-	2	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1
<i>Glycera oxycephala</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Glycera tridactyla</i>	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
Goniadidae	1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Glycinde nordmanni</i>	1	3	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Goniada maculata</i>	1	3	1	-	1	1	-	-	-	1	-	-	2	-	1	-	1	-	-	-	-	-	-	-	-
<i>Podarkeopsis capensis</i>	-	-	-	2	-	2	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-
<i>Microphthalmus similis</i>	-	-	-	-	-	-	-	1	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
<i>Syllis (Type D)</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Syllis (Type E)</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Syllis armillaris</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Syllides japonicus</i>	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Autolytus</i>	1	1	1	-	-	-	-	-	4	8	8	-	-	-	3	-	-	-	-	-	-	-	-	-	-
Nereididae	-	1	3	-	-	-	1	-	-	1	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-
<i>Eunereis longissima</i>	-	-	1	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Nephtys</i>	1	1	-	5	6	1	1	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	1	1	-
<i>Nephtys assimilis</i>	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Nephtys caeca</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
<i>Nephtys cirrosa</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Nephtys hombergii</i>	-	-	-	2	7	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Marphysa</i>	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Marphysa bellii</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Nematonereis unicornis</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lumbrineridae	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Lumbrineris cingulata</i>	1	2	-	1	-	-	-	-	-	10	11	-	-	-	1	4	-	-	-	-	-	-	-	-	-
<i>Protodorvillea kefersteini</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Schistomeringos rudolphi</i>	-	-	1	-	-	-	-	-	-	-	5	-	-	-	1	-	-	-	-	-	-	-	-	-	-
<i>Scoloplos armiger</i>	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Aricidea minuta</i>	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Aricidea wassi</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-
<i>Paradoneis lyra</i>	1	4	6	-	-	-	-	-	-	1	7	-	-	-	1	-	-	-	-	-	-	-	-	-	-
<i>Poecilochaetus serpens</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-

TaxonName	27 B	34 A	34 B	34 C	45 A	45 B	45 C	50 A	50 B	50 C	A07 A	A07 B	A07 C	A08 A	A08 B	A08 C	A10 A	A10 B	A10 C	A11 A	A11 B	A11 C	
Bodotriidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Bodotria scorpioides</i>	-	-	2	-	1	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Diastylis bradyi</i>	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
DECAPODA	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	-
Hippolytidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Processa</i>	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Pandalus montagui</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Upogebia</i>	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paguridae	-	-	-	-	-	1	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-
<i>Pagurus bernhardus</i>	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
<i>Galathea</i>	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Galathea intermedia</i>	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Pisidia longicornis</i>	-	-	1	-	1	-	-	5	3	3	-	-	-	-	-	-	-	-	-	-	1	-	-
<i>Ebalia</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Ebalia tuberosa</i>	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Majidae	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Hyas</i>	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Inachus dorsettensis</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
<i>Liocarcinus</i>	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
<i>Pilumnus hirtellus</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Leptochiton asellus</i>	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Caecum glabrum</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
<i>Polinices pulchellus</i>	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
<i>Buccinum undatum</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Hinia reticulata</i>	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Chrysallida interstincta</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Odostomia</i>	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Brachystomia</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NUDIBRANCHIA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Onchidorididae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PELECYPODA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Nucula nitidosa</i>	-	3	2	5	1	2	2	-	-	-	1	-	2	-	-	2	-	-	-	-	-	-	-
<i>Nucula nucleus</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mytilidae	-	-	2	-	-	-	-	4	2	7	-	-	-	-	1	-	-	1	-	1	2	-	-
<i>Modiolarca tumida</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pectinidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Chlamys varia</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Aequipecten opercularis</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anomiidae	-	-	-	-	-	-	-	4	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Thyasira flexuosa</i>	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Kurtiella bidentata</i>	-	13	44	19	9	9	7	1	1	-	1	8	9	13	45	13	-	-	-	-	-	-	-
<i>Tellimya ferruginosa</i>	-	12	20	10	3	5	1	-	-	-	9	16	10	3	-	16	-	-	-	-	-	-	-
<i>Acanthocardia echinata</i>	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
<i>Mactra stultorum</i>	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Spisula</i>	1	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	3	1	1	-	-	-	-
<i>Spisula elliptica</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-

TaxonName	E01 A	E01 B	E01 C	E02 A	E02 B	E02 C
PORIFERA	-	-	-	-	P	-
<i>Tubularia</i>	-	-	-	-	-	-
<i>Eudendrium</i>	-	-	-	-	-	-
<i>Leuckartiara octona</i>	-	-	-	-	-	-
Bougainvilliidae	-	-	P	-	-	-
<i>Hydractinia echinata</i>	P	-	-	P	-	-
<i>Calycella syringa</i>	-	-	-	-	-	-
<i>Abietinaria abietina</i>	-	-	-	-	-	-
<i>Hydrallmania falcata</i>	-	-	-	-	-	-
<i>Sertularella</i>	-	-	-	-	-	-
<i>Sertularia</i>	-	-	-	-	-	-
<i>Nemertesia antennina</i>	-	-	-	-	-	-
Campanulariidae	P	-	-	-	-	-
<i>Rhizocaulus verticillatus</i>	-	-	-	-	-	-
<i>Clytia hemisphaerica</i>	-	-	-	-	-	-
<i>Obelia</i>	P	-	P	P	P	P
<i>Alcyonium digitatum</i>	-	-	-	-	-	-
ACTINIARIA	-	-	-	-	2	-
NEMERTEA	1	1	4	1	1	4
NEMATODA	-	-	-	-	2	-
ENTOPROCTA	-	-	-	-	-	-
<i>Pedicellina</i>	-	-	-	-	-	-
Golfingiidae	-	-	-	-	-	-
<i>Golfingia elongata</i>	-	-	-	-	-	-
Aphroditidae	-	-	-	-	-	-
<i>Aphrodita aculeata</i>	-	-	-	-	-	-
Polynoidae	-	-	-	-	-	-
<i>Enipo kinbergi</i>	-	-	-	-	-	-
<i>Harmothoe impar</i>	-	-	-	-	-	-
<i>Harmothoe pagenstecheri</i>	-	-	-	-	-	-
<i>Malmgreniella darbouxii</i>	-	-	-	-	-	-
<i>Malmgreniella glabra</i>	-	-	-	-	-	-
<i>Lepidonotus squamatus</i>	-	-	-	-	-	-
<i>Polynoe scolopendrina</i>	-	-	-	-	-	-
<i>Pholoe baltica</i> (sensu Petersen)	-	-	-	-	-	2
<i>Pholoe inornata</i> (sensu Petersen)	-	-	-	-	-	-
<i>Sthenelais boa</i>	-	-	-	1	1	-
<i>Eteone longa</i>	-	-	1	-	-	-
<i>Hesionura elongata</i>	-	-	-	-	-	-

TaxonName	E01 A	E01 B	E01 C	E02 A	E02 B	E02 C
<i>Mysta barbata</i>	-	-	-	-	-	-
<i>Mysta picta</i>	-	-	-	-	-	-
<i>Anaitides maculata</i>	-	-	-	-	-	-
<i>Anaitides mucosa</i>	-	-	-	1	-	-
<i>Anaitides rosea</i>	-	-	-	-	-	-
<i>Eulalia bilineata</i>	-	-	-	-	-	-
<i>Eulalia mustela</i>	-	-	-	-	-	-
<i>Eulalia ornata</i>	-	-	-	-	-	-
<i>Eumida</i>	-	-	1	-	-	-
<i>Eumida bahusiensis</i>	-	-	-	1	-	-
<i>Eumida sanguinea</i>	-	-	-	-	-	-
<i>Sige fusigera</i>	-	-	-	-	-	-
<i>Glycera</i>	-	2	1	1	-	-
<i>Glycera alba</i>	1	-	-	-	1	1
<i>Glycera lapidum</i>	-	-	-	-	-	-
<i>Glycera oxycephala</i>	-	-	-	-	-	-
<i>Glycera tridactyla</i>	-	-	-	-	-	-
Goniadidae	1	-	-	-	-	-
<i>Glycinde nordmanni</i>	-	-	-	-	1	-
<i>Goniada maculata</i>	-	-	-	1	3	1
<i>Podarkeopsis capensis</i>	-	1	1	1	2	1
<i>Microphthalmus similis</i>	-	-	4	-	-	-
<i>Syllis</i> (Type D)	-	-	-	-	-	-
<i>Syllis</i> (Type E)	-	-	-	-	-	-
<i>Syllis armillaris</i>	-	-	-	-	-	-
<i>Syllides japonicus</i>	-	-	-	-	-	-
<i>Autolytus</i>	-	-	-	-	-	-
Nereididae	-	-	-	-	-	1
<i>Eunereis longissima</i>	-	-	-	-	1	1
<i>Nephtys</i>	-	-	-	1	2	-
<i>Nephtys assimilis</i>	-	-	-	-	-	-
<i>Nephtys caeca</i>	-	-	-	-	-	-
<i>Nephtys cirrosa</i>	-	-	-	-	-	-
<i>Nephtys hombergii</i>	-	-	-	-	-	-
<i>Marphysa</i>	-	-	-	-	-	-
<i>Marphysa bellii</i>	1	-	1	-	-	1
<i>Nematonereis unicornis</i>	-	-	-	-	-	-
Lumbrineridae	-	-	-	-	-	-
<i>Lumbrineris cingulata</i>	5	4	3	1	3	5
<i>Protodorvillea kefersteini</i>	1	1	1	-	-	-
<i>Schistomeringos rudolphi</i>	-	-	-	-	-	-
<i>Scoloplos armiger</i>	-	-	-	-	-	-
<i>Aricidea minuta</i>	-	1	-	-	-	-
<i>Aricidea wassi</i>	1	-	-	-	-	-
<i>Paradoneis lyra</i>	-	-	-	-	4	-
<i>Poecilochaetus serpens</i>	-	-	-	-	-	-

TaxonName	E01 A	E01 B	E01 C	E02 A	E02 B	E02 C
<i>Aonides oxycephala</i>	-	-	-	-	-	-
<i>Aonides paucibranchiata</i>	-	-	-	-	-	-
<i>Laonice</i>	-	-	-	-	-	-
<i>Laonice bahusiensis</i>	-	-	-	-	-	-
<i>Polydora</i>	-	-	-	-	-	-
<i>Polydora caeca</i>	-	-	-	1	-	-
<i>Polydora caulleryi</i>	-	-	-	-	-	-
<i>Pseudopolydora</i>	-	-	-	-	-	-
<i>Pseudopolydora pulchra</i>	-	-	-	-	-	-
<i>Spio filicornis</i>	-	-	-	-	-	-
<i>Spio gonioccephala</i>	-	-	-	-	-	-
<i>Spiophanes bombyx</i>	2	6	9	-	4	-
<i>Aphelochaeta</i> (Type A)	-	-	-	-	-	-
<i>Aphelochaeta marioni</i>	-	-	-	-	-	-
<i>Caulleriella alata</i>	-	-	-	1	2	1
<i>Chaetozone christiei</i>	-	-	-	-	-	-
<i>Chaetozone zetlandica</i>	1	1	1	-	-	-
<i>Dodecaceria</i>	-	-	-	-	-	-
<i>Tharyx killariensis</i>	-	-	-	-	-	-
<i>Flabelligera affinis</i>	-	-	-	-	-	-
<i>Macrochaeta</i>	-	-	-	-	-	-
<i>Mediomastus fragilis</i>	21	12	5	2	14	11
<i>Notomastus latericeus</i>	-	-	-	-	4	6
Maldanidae	-	-	-	-	-	-
<i>Clymenura</i>	-	-	-	-	-	-
<i>Euclymene</i> (Type A)	-	-	-	-	-	-
<i>Euclymene oerstedii</i>	-	-	-	-	-	-
<i>Praxillella affinis</i>	-	-	-	-	-	-
<i>Ophelia borealis</i>	-	-	-	-	-	-
<i>Scalibregma celticum</i>	-	-	-	-	-	-
<i>Scalibregma inflatum</i>	-	1	1	-	-	-
<i>Galathowenia oculata</i>	-	-	-	-	-	-
<i>Owenia fusiformis</i>	-	-	-	1	1	1
<i>Lagis koreni</i>	-	-	-	-	-	-
<i>Sabellaria spinulosa</i>	1	1	5	5	5	5
Ampharetidae	-	-	-	-	-	-
<i>Ampharete lindstroemi</i>	-	-	-	5	15	11
<i>Terebellides stroemi</i>	-	-	-	-	-	-
Terebellidae	-	-	-	-	-	-
<i>Lanice conchilega</i>	4	1	1	-	-	2
<i>Lysilla loveni</i>	-	-	-	-	-	-
<i>Polycirrus</i>	-	-	-	1	-	-
<i>Thelepus</i>	-	-	-	-	-	-
<i>Thelepus setosus</i>	-	-	-	-	-	-
Sabellidae	-	-	-	-	-	-
<i>Pseudopotamilla reniformis</i>	-	-	-	-	-	-

TaxonName	E01 A	E01 B	E01 C	E02 A	E02 B	E02 C
Serpulidae	-	-	-	-	-	1
<i>Pomatoceros lamarcki</i>	-	-	1	2	2	-
<i>Pomatoceros triqueter</i>	-	-	-	-	-	-
<i>Tubificoides amplivasatus</i>	-	-	-	-	-	-
<i>Tubificoides pseudogaster</i>	-	-	-	-	-	-
<i>Tubificoides galiciensis</i>	-	-	-	-	-	1
<i>Nymphon brevirostre</i>	-	-	-	-	-	-
<i>Achelia echinata</i>	-	-	-	-	-	-
Callipallenidae	-	-	-	-	-	-
<i>Callipallene brevirostris</i>	-	-	-	-	-	-
<i>Anoplodactylus petiolatus</i>	-	-	-	-	-	1
CIRRIPEDIA	4	-	-	-	-	-
<i>Verruca stroemia</i>	-	-	-	-	-	-
<i>Balanus crenatus</i>	1	-	-	-	-	-
<i>Peltogaster paguri</i>	-	-	-	-	-	-
COPEPODA	-	-	-	1	-	-
MYSIDACEA	-	-	-	-	-	-
<i>Gastrosaccus spinifer</i>	-	-	-	-	-	-
<i>Stenothoe marina</i>	-	-	-	-	-	-
<i>Urothoe</i>	-	-	-	-	-	-
<i>Urothoe brevicornis</i>	-	-	-	-	-	-
<i>Urothoe elegans</i>	-	-	-	-	-	-
<i>Acidostoma obesum</i>	-	-	-	-	-	-
<i>Ampelisca</i>	3	-	2	-	8	-
<i>Ampelisca diadema</i>	-	-	-	-	1	-
<i>Ampelisca spinipes</i>	1	2	2	3	3	2
<i>Ampelisca tenuicornis</i>	-	-	-	-	-	-
<i>Bathyporeia elegans</i>	-	-	-	-	-	-
Melitidae	-	-	-	-	-	-
<i>Abludomelita obtusata</i>	-	-	-	-	2	-
<i>Maera othonis</i>	-	-	2	2	-	-
<i>Maerella tenuimana</i>	-	-	-	-	-	-
Isaeidae	-	-	-	-	-	-
<i>Gammaropsis maculata</i>	1	-	-	-	-	-
<i>Photis</i>	-	-	-	-	-	-
<i>Photis longicaudata</i>	-	-	-	-	-	-
<i>Erichthonius punctatus</i>	-	-	-	-	-	-
<i>Jassa</i>	-	-	-	-	-	-
<i>Monocorophium sextonae</i>	-	-	-	-	-	-
<i>Unciola crenatipalma</i>	1	-	-	-	-	-
<i>Phtisica marina</i>	-	-	-	-	-	-
<i>Pseudoprotella phasma</i>	-	-	-	-	-	-
<i>Anthura gracilis</i>	-	-	-	-	-	-
<i>Janira maculosa</i>	-	-	-	-	-	-
<i>Arcturella</i>	-	-	-	-	-	-
Bopyridae	-	-	-	-	-	-

TaxonName	E01 A	E01 B	E01 C	E02 A	E02 B	E02 C
Bodotriidae	-	-	-	-	-	-
<i>Bodotria scorpioides</i>	-	-	-	-	-	-
<i>Diastylis bradyi</i>	-	-	-	-	-	-
DECAPODA	-	-	-	-	-	-
Hippolytidae	-	-	-	-	-	-
<i>Processa</i>	-	-	-	-	-	-
<i>Pandalus montagui</i>	-	-	-	-	-	-
<i>Upogebia</i>	1	-	-	-	-	1
Paguridae	2	-	6	-	-	-
<i>Pagurus bernhardus</i>	1	-	-	1	-	-
<i>Galathea</i>	-	-	-	-	-	-
<i>Galathea intermedia</i>	-	-	-	-	-	-
<i>Pisidia longicornis</i>	4	-	2	1	2	2
<i>Ebalia</i>	-	-	-	-	-	-
<i>Ebalia tuberosa</i>	-	-	-	-	-	-
Majidae	-	-	-	-	-	-
<i>Hyas</i>	-	-	-	-	-	-
<i>Inachus dorsettensis</i>	-	-	-	-	-	-
<i>Liocarcinus</i>	-	-	-	-	-	-
<i>Pilumnus hirtellus</i>	-	-	-	-	-	-
<i>Leptochiton asellus</i>	-	-	-	-	-	-
<i>Caecum glabrum</i>	-	-	-	-	-	-
<i>Polinices pulchellus</i>	-	-	-	-	-	-
<i>Buccinum undatum</i>	1	-	-	1	-	-
<i>Hinia reticulata</i>	-	-	-	-	-	-
<i>Chrysallida interstincta</i>	-	-	-	-	-	-
<i>Odostomia</i>	-	-	-	-	-	-
<i>Brachystomia</i>	-	-	-	-	-	-
NUDIBRANCHIA	-	-	-	-	-	-
Onchidorididae	-	-	-	-	-	1
PELECYPODA	-	-	-	-	-	-
<i>Nucula nitidosa</i>	-	-	-	-	-	-
<i>Nucula nucleus</i>	-	-	-	-	-	-
Mytilidae	-	-	-	1	-	1
<i>Modiolarca tumida</i>	-	-	-	-	-	-
Pectinidae	-	-	-	-	-	-
<i>Chlamys varia</i>	-	-	-	-	-	-
<i>Aequipecten opercularis</i>	-	-	-	-	-	-
Anomiidae	-	-	-	-	-	-
<i>Thyasira flexuosa</i>	-	-	-	-	-	-
<i>Kurtiella bidentata</i>	-	-	1	-	-	2
<i>Tellimya ferruginosa</i>	-	-	-	-	-	-
<i>Acanthocardia echinata</i>	-	-	-	-	-	-
<i>Mactra stultorum</i>	-	-	-	-	-	-
<i>Spisula</i>	-	-	-	-	-	-
<i>Spisula elliptica</i>	-	-	-	-	-	-

TaxonName	E01 A	E01 B	E01 C	E02 A	E02 B	E02 C
Pharidae	-	-	-	-	-	-
<i>Ensis</i>	-	-	-	-	-	-
<i>Phaxas pellucidus</i>	-	-	-	-	-	-
Tellinidae	-	-	-	-	-	-
<i>Fabulina fabula</i>	-	-	-	-	-	-
<i>Moerella donacina</i>	-	-	-	-	-	-
<i>Abra</i>	-	1	-	7	10	8
<i>Abra alba</i>	-	-	1	6	9	17
<i>Tapes</i>	-	-	-	-	-	-
<i>Timoclea ovata</i>	-	-	-	-	-	-
<i>Sphenia binghami</i>	-	-	-	-	-	-
<i>Corbula gibba</i>	-	-	-	-	-	-
<i>Alcyonidium</i>	-	-	-	P	-	-
<i>Alcyonidium diaphanum</i>	-	-	P	-	-	-
<i>Alcyonidium mytili</i>	-	-	P	-	-	P
<i>Alcyonidium parasiticum</i>	-	-	-	-	-	-
<i>Anguinella palmata</i>	-	-	-	-	-	-
<i>Vesicularia spinosa</i>	-	-	-	-	-	-
<i>Conopeum reticulum</i>	P	P	P	P	P	P
<i>Electra</i>	-	-	-	-	-	-
<i>Electra monostachys</i>	P	P	P	-	-	P
<i>Electra pilosa</i>	-	-	P	P	P	P
<i>Aspidelectra melolontha</i>	-	-	P	P	-	-
<i>Flustra foliacea</i>	-	-	-	-	-	-
<i>Bicelliariella ciliata</i>	-	-	-	-	-	-
<i>Scrupocellaria scruposa</i>	-	-	-	-	-	-
<i>Escharella immersa</i>	-	-	-	-	-	-
<i>Schizomavella</i>	-	-	P	-	-	-
<i>Phoronis</i>	-	-	-	-	-	-
OPHIUROIDEA	-	-	-	-	-	-
<i>Ophiothrix</i>	-	-	-	-	-	-
<i>Ophiothrix fragilis</i>	-	-	-	-	-	-
<i>Acrocnida brachiata</i>	-	-	-	-	-	-
<i>Amphipholis squamata</i>	-	-	-	-	-	-
<i>Ophiura albida</i>	-	-	-	-	-	-
<i>Psammechinus miliaris</i>	-	-	-	-	-	-
<i>Echinocyamus pusillus</i>	-	-	-	-	-	-
<i>Echinocardium</i>	-	-	-	-	-	-
<i>Echinocardium cordatum</i>	-	-	-	-	-	-
ASCIDIACEA	-	-	-	-	-	-
Gobiidae	-	-	-	-	-	-

Appendix Table 8. Table summarising the biomass (gAFDW), by major taxonomic group, of macrofauna (>1mm) from sediments obtained from within and surrounding TOWF during benthic monitoring in August 2012. Data have been calculated from blotted wet weight using conversion factors as outlined in Eleftheriou & Basford (1989). The values are expressed as grams Ash Free Dry Weight (AFDW) per 0.1m² mini Hamon grab sample. Numbered stations correspond to those first sampled in the 2005 baseline benthic resource survey, while stations with the prefix 'A' correspond to those sampled during the 2007 pre-construction survey. Stations highlighted in green correspond to stations sampled as part of the monopile scour pit assessment.

Sample	Annelida	Crustacea	Mollusca	Echinodermata	Miscellaneous	Total
02 A	0.1577	0.0752	3.2456	0.0000	0.0107	3.4893
02 B	0.0589	0.0896	0.0637	0.0973	0.1471	0.4566
02 C	0.0956	0.2397	0.0582	0.0434	0.0000	0.4369
06 A	0.4798	0.0052	0.2975	1.1206	0.0396	1.9427
06 B	0.1834	0.0002	0.2064	2.0287	0.0169	2.4355
06 C	0.2594	0.0028	0.0797	2.4362	0.0125	2.7906
08 A	0.0012	0.0000	0.0002	0.0000	0.0004	0.0018
08 B	0.0022	0.0036	0.0001	0.0000	0.0000	0.0059
08 C	0.0159	0.0000	0.0000	0.0000	0.0007	0.0166
09 A	0.9485	0.7609	0.0816	0.0711	0.4104	2.2727
10 A	0.7466	0.5310	0.0161	0.0001	0.0814	1.3751
13 A	0.2428	0.0007	0.0008	0.0010	0.0000	0.2453
13 B	0.2015	0.0004	0.0041	0.0000	0.0001	0.2061
13 C	0.0374	0.0000	0.0206	0.0000	0.0000	0.0581
15 A	0.2229	0.0490	0.0156	0.0001	0.3281	0.6157
16 A	0.0209	0.0038	0.0000	0.0222	0.0793	0.1262
16 B	0.0547	0.0150	0.0000	0.0000	0.0292	0.0989
19 A	0.0519	0.0000	0.0000	0.0000	0.0000	0.0519
24 A	0.0066	0.0120	0.0012	0.0000	0.0000	0.0200
24 B	0.1176	0.0000	0.0000	0.0000	0.0004	0.1180
24 C	0.0046	0.0000	0.0352	0.0000	0.0000	0.0398
26 A	0.0017	0.0000	0.0000	0.0000	0.0000	0.0017
26 B	0.0105	0.0000	0.0216	0.0000	0.0000	0.0321
26 C	0.0018	0.0000	0.0000	0.0000	0.0000	0.0018
27 A	0.0258	0.0014	0.0009	0.0000	0.1366	0.1647
27 B	0.0875	0.0030	0.0002	0.0000	0.0000	0.0907
34 A	0.2444	0.0122	0.6093	1.9792	0.0013	2.8464
34 B	0.3419	0.0161	0.1612	3.7153	0.0002	4.2346
34 C	0.1835	0.0005	0.2379	4.8052	0.0033	5.2305
45 A	0.0862	0.0739	2.3359	3.5743	0.1637	6.2340
45 B	0.1755	0.0209	0.4241	3.0609	0.0268	3.7081
45 C	0.0698	0.0027	0.5862	3.7861	0.0000	4.4448
50 A	0.3112	0.0361	0.0224	0.0685	0.0112	0.4493
50 B	3.9794	0.0791	0.0069	0.4218	0.0119	4.4991
50 C	0.2195	0.0287	0.0032	0.0003	0.0608	0.3126

Sample	Annelida	Crustacea	Mollusca	Echinodermata	Miscellaneous	Total
A07 A	0.0925	0.0038	0.5452	9.7474	0.0002	10.3891
A07 B	0.0574	0.0345	2.4260	6.3235	0.0000	8.8414
A07 C	0.0155	0.0000	0.7677	4.9182	0.0000	5.7014
A08 A	0.8608	0.0000	0.2951	0.9119	0.0000	2.0678
A08 B	0.4528	0.0039	0.1704	0.0569	0.0051	0.6891
A08 C	0.4201	0.0019	0.0691	2.7330	0.0079	3.2320
A10 A	0.1149	0.0000	0.0448	0.0000	0.0000	0.1597
A10 B	0.1268	0.0004	0.0013	0.0335	0.0000	0.1619
A10 C	0.0871	0.0000	0.0008	0.0000	0.0000	0.0880
A11 A	0.0011	0.0003	0.0001	0.0006	0.0032	0.0053
A11 B	0.0284	0.0007	0.0001	0.0000	0.0001	0.0293
A11 C	0.0023	0.0001	0.0000	0.0000	0.0003	0.0027
E01 A	0.0383	0.1265	1.7143	0.0000	0.0003	1.8794
E01 B	0.0180	0.0017	0.0001	0.0000	0.0003	0.0202
E01 C	0.0295	0.0241	0.0011	0.0000	0.0008	0.0555
E02 A	0.1132	0.0705	1.6536	0.0000	0.0025	1.8397
E02 B	0.2044	0.0198	0.0071	0.0000	3.9533	4.1846
E02 C	0.1042	0.0023	0.0126	0.0000	0.0250	0.1441

Appendix Table 9. The abundance (N), species diversity (S), and biomass (B) in g AFDW, of infauna sampled from within and surrounding TOWF during benthic monitoring in August 2012. Numbered stations correspond to those first sampled in the 2005 baseline benthic resource survey, while stations with the prefix 'A' correspond to those sampled during the 2007 pre-construction survey. Stations highlighted in green correspond to stations sampled as part of the scour pit assessment.

Sample	Abundance (N)	Diversity (S)	Biomass (B) gAFDW
02 A	137	44	3.4893
02 B	268	53	0.4566
02 C	230	51	0.4369
06 A	223	40	1.9427
06 B	205	25	2.4355
06 C	100	24	2.7906
08 A	17	15	0.0018
08 B	15	11	0.0059
08 C	20	12	0.0166
09 A	1584	81	2.2727
10 A	1095	73	1.3751
13 A	15	6	0.2453
13 B	18	11	0.2061
13 C	24	14	0.0581
15 A	344	54	0.6157
16 A	32	16	0.1262
16 B	15	13	0.0989
19 A	7	7	0.0519
24 A	29	9	0.0200
24 B	12	8	0.1180
24 C	4	4	0.0398
26 A	2	2	0.0017
26 B	7	7	0.0321
26 C	3	2	0.0018
27 A	134	9	0.1647
27 B	20	9	0.0907
34 A	154	40	2.8464
34 B	326	43	4.2346
34 C	209	38	5.2305
45 A	240	47	6.2340
45 B	182	36	3.7081
45 C	178	34	4.4448
50 A	434	77	0.4493
50 B	329	75	4.4991
50 C	255	59	0.3126

Sample	Abundance (N)	Diversity (S)	Biomass (B) gAFDW
A07 A	94	29	10.3891
A07 B	67	17	8.8414
A07 C	86	20	5.7014
A08 A	219	22	2.0678
A08 B	391	38	0.6891
A08 C	259	37	3.2320
A10 A	15	12	0.1597
A10 B	29	18	0.1619
A10 C	18	12	0.0880
A11 A	11	8	0.0053
A11 B	27	17	0.0293
A11 C	13	10	0.0027
E01 A	65	28	1.8794
E01 B	37	16	0.0202
E01 C	65	32	0.0555
E02 A	56	32	1.8397
E02 B	109	31	4.1846
E02 C	96	32	0.1441

Appendix 10. Multivariate Analysis Techniques – Methods Statement

10a. Univariate Analysis

Univariate statistical analyses were carried out by MESL using Microsoft Excel (2007). The data were analysed in a number of ways in order to extract information regarding the abundance of fauna, the number of taxa present (diversity) and the total major group biomass (gAFDW) at each station. Additional summary data are presented where appropriate.

10b. Multivariate Analysis

All multivariate analysis was carried out using the PRIMER V6 software package (Clarke & Warwick 2001a¹, Clarke & Gorley 2001b²). Sample 16 was removed from this analysis due to the sample volume equating to less than 1L. The following routines were employed on the remaining 48 samples:-

Hierarchical Cluster Analysis

Cluster analysis aims to find “natural groupings” such that samples within a group are more similar to each other than samples in different groups. The most commonly used clustering techniques are the hierarchical agglomerative methods. These start with a similarity matrix and “fuse” the samples into groups and the groups into larger clusters, starting with the highest mutual similarities then gradually lowering the similarity level at which groups are formed until all of the samples are contained in a single cluster. The results of hierarchical clustering are represented by a tree diagram or dendrogram, with the *x*-axis representing the full set of samples and the *y*-axis representing the similarity level at which the groups are considered to have fused.

¹ Clarke, K.A. & Warwick, R.M.2001a. *Change in Marine Communities: An Approach to Statistical Analysis and Interpretation*. Second Edition. Primer-E Ltd, Plymouth, UK.

² Clarke, K.R. & Gorley, R.N. 2001b. PRIMER v5: User Manual/Tutorial. Primer-E Ltd., Plymouth Marine Laboratory, Prospect Place, West Hoe, Plymouth PL1 3DH, UK. 91pp.

The SIMPROF Test

A similarity profile permutation test (SIMPROF) looks for statistically significant evidence of genuine clusters in samples. Tests are performed at every node of a completed dendrogram, testing whether the group that has been subdivided has ‘significant’ internal structure.

Multidimensional Scaling (MDS) Ordination

This technique allows the construction of a configuration of the samples in multidimensional space. This configuration attempts to position the samples as accurately as possible to reflect their similarity. For example, if sample 1 has a greater similarity to sample 2 than it does to sample 3 then sample 1 will be positioned more closely to sample 2 than it is to sample 3. This “map” of the relative similarities between samples is then plotted in two dimensions. It is important to remember that this two-dimensional plot is a representation of a multidimensional picture. When large numbers of samples are analysed, or datasets that include samples that are very different to one another the accuracy of the plot may be reduced. A measure of this stress on the two-dimensional representation is given on the MDS plot. Stress values <0.2 correspond to a good ordination; values between 0.2 and 0.3 give a useful two-dimensional picture but one should not place too much reliance on the fine details of the plot; stress >0.3 indicates that the samples are close to being positioned in an arbitrary manner and should not be regarded as necessarily similar to one another.

The SIMPER routine

The SIMPER routine allows comparisons between groups of samples to be made. Following the comparison of similarities between groups the taxa (or particle size fractions) responsible for the dissimilarities between sites are sub-listed in decreasing order of importance in order to facilitate the discrimination of the groups. This routine also provides information on the species responsible for within-site similarities and their contribution to the internal similarity of the group.

Appendix 10. Multivariate Analysis Techniques – Methods Statement

Analysis of Similarity (ANOSIM)

This was used to test the null hypothesis (H_0) that there are no differences in community (or sediment) composition between the pooled sample categories featured in the present investigation. This routine goes through three main stages in the examination of H_0 .

These are as follows:-

1. The calculation of the ANOSIM statistic from the dataset.
2. Recalculation of the R statistic under permutations of the sample labels.
3. Calculating the significance level.

The results expressed represent the extent of the similarities and differences between pooled data.

Note

R Statistics approaching zero = very slight differences & therefore a high degree of overlap between the groups

R Statistics of 0.2-0.3 – some difference but still with some degree of overlap between the groups

R Statistics approaching 1 (>0.5) = large differences & therefore only slight overlap between the groups

However, it is important to remember the importance of the statistical significance of the R Statistic. This value assists in the determination of whether the R statistical returned by the test is a 'real' result, which was unlikely to be achieved by chance, or whether the R value is in fact coincidental bi-product of the sample data.

Matching Two Multivariate Patterns (RELATE & BIO-ENV)

The RELATE routine provides a means of testing for correlations between two multivariate patterns. This is used to test for correlations between biological communities and environmental variables, in this case sediment composition. The BIO-ENV routine is an exploratory tool that matches multivariate patterns so that combinations of variables are considered at ever increasing levels of complexity in order to find the BEST sub-set of variables that match with the biological patterns.

Appendix Table 11. Table summarising the key species that contributed to the similarity within faunal groups identified through multivariate analysis on Bray-Curtis similarity of square root transformed benthic abundance data recorded in the samples collected across TOWF and adjacent areas in August 2012. The dissimilarity between faunal groups is also shown. Similarity cut off shown at 75% and Dissimilarity cut-off shown at 50% to facilitate presentation. Note: faunal data collected as part of the scour pit assessment were not included within these analyses.

Faunal Group a					
Average similarity: 54.01					
Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
<i>Spiophanes bombyx</i>	6.9	5.89	1.6	10.9	10.9
<i>Abra alba</i>	4.16	4.76	2.53	8.82	19.72
<i>Kurtiella bidentata</i>	3.46	3.56	3.25	6.59	26.31
<i>Owenia fusiformis</i>	2.69	2.25	1.56	4.16	30.47
<i>Abra</i>	2.1	2.03	1.79	3.75	34.22
<i>Lanice conchilega</i>	1.75	1.97	5.61	3.65	37.87
<i>Tellimya ferruginosa</i>	2.19	1.94	1.2	3.59	41.47
<i>Ampharete lindstroemi</i>	2.48	1.86	1.36	3.44	44.91
<i>Lagis koreni</i>	2.15	1.8	2.03	3.34	48.25
<i>Ophiura albida</i>	1.68	1.56	1.81	2.9	51.15
<i>Nephtys</i>	1.43	1.45	2.73	2.69	53.84
<i>Echinocardium cordatum</i>	1.55	1.31	1.17	2.42	56.26
<i>Photis longicaudata</i>	1.77	1.23	1.21	2.28	58.54
<i>Scalibregma inflatum</i>	1.13	1.1	2.87	2.04	60.58
<i>Conopeum reticulum</i>	0.9	1.07	3.69	1.98	62.55
<i>Notomastus latericeus</i>	1.46	1.05	1.83	1.94	64.49
<i>Goniada maculata</i>	1.02	0.99	6.77	1.83	66.33
<i>Obelia</i>	0.84	0.98	5.03	1.82	68.15
<i>Nephtys hombergii</i>	1.14	0.92	1.12	1.7	69.85
<i>Nucula nitidosa</i>	0.99	0.9	1.3	1.66	71.5
<i>Eumida</i>	0.72	0.81	3.57	1.49	73
<i>Ampelisca</i>	1.95	0.8	0.81	1.48	74.48
<i>Podarkeopsis capensis</i>	0.86	0.8	1.29	1.47	75.95

Faunal Group b					
Average similarity: 46.12					
Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
<i>Pisidia longicornis</i>	15.14	5.09	1.11	11.03	11.03
<i>Sabellaria spinulosa</i>	13.08	4.84	1.14	10.5	21.53
Mytilidae	4.06	1.85	4.06	4.01	25.54
<i>Mediomastus fragilis</i>	2.9	1.65	6.1	3.58	29.13
ASCIDIACEA	3.91	1.55	1.21	3.35	32.48
<i>Lumbrineris cingulata</i>	2.59	1.3	2.25	2.81	35.29
Polynoidae	2.67	1.22	3.65	2.65	37.94
<i>Gammaropsis maculata</i>	2.55	1.2	2.99	2.59	40.54
ACTINIARIA	1.94	1.14	3.82	2.46	43
<i>Notomastus latericeus</i>	2.16	1.13	3.22	2.45	45.45
<i>Kurtiella bidentata</i>	2.29	1.12	1.52	2.42	47.87
NEMERTEA	1.81	1.06	13.03	2.29	50.16
<i>Autolytus</i>	2.1	1.05	2.59	2.27	52.43
<i>Scalibregma inflatum</i>	2.08	1.01	8.59	2.19	54.62
<i>Unciola crenatipalma</i>	2.32	0.99	3.97	2.14	56.76
<i>Stenothoe marina</i>	1.88	0.94	4.44	2.05	58.81
<i>Anaitides maculata</i>	2.81	0.94	0.89	2.04	60.85
<i>Abra alba</i>	1.74	0.94	2.74	2.03	62.88
<i>Abra</i>	1.87	0.93	2.6	2.02	64.9
<i>Ampharete lindstroemi</i>	2.11	0.92	6.09	1.99	66.89
<i>Sphenia binghami</i>	1.76	0.87	3.01	1.89	68.78
NEMATODA	1.66	0.74	1.99	1.61	70.39
<i>Lagis koreni</i>	1.21	0.73	8.11	1.59	71.98
<i>Paradoneis lyra</i>	1.48	0.72	6.13	1.57	73.55
<i>Amphipholis squamata</i>	1.46	0.69	2.13	1.49	75.03

Faunal Group c

Average similarity: 32.19

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Urothoe brevicornis	2.31	12.17	#####	37.81	37.81
Mytilidae	4.36	5.44	#####	16.91	54.72
Urothoe	1.02	4.44	#####	13.81	68.52
Scalibregma inflatum	0.93	3.85	#####	11.96	80.48

Faunal Group d

Average similarity: 32.35

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Ophelia borealis	1.12	4.63	5.75	14.3	14.3
Spiophanes bombyx	1.11	3.72	1.75	11.5	25.8
Mytilidae	0.86	3.2	3.71	9.89	35.7
Conopeum reticulum	0.64	2.85	17.69	8.82	44.52
Glycera	0.89	2.1	0.9	6.49	51.01
NEMERTEA	0.79	1.95	0.91	6.03	57.04
Aspidelectra melolontha	0.6	1.56	0.9	4.82	61.87
Microphthalmus similis	0.43	1.47	0.91	4.56	66.42
Nephtys	0.43	1.39	0.91	4.3	70.72
Electra monostachys	0.49	1.38	0.91	4.27	74.98
Notomastus latericeus	0.96	1.25	0.41	3.88	78.86

Dissimilarity

Faunal Groups a & d						
Average dissimilarity = 83.13						
Species	Group a	Group d				
	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
<i>Spiophanes bombyx</i>	6.9	1.11	5.89	1.58	7.09	7.09
<i>Abra alba</i>	4.16	0.25	4.3	2.4	5.17	12.26
<i>Kurtiella bidentata</i>	3.46	0	3.63	3.17	4.37	16.63
<i>Owenia fusiformis</i>	2.69	0	2.76	1.88	3.32	19.95
<i>Tellimya ferruginosa</i>	2.19	0	2.48	1.51	2.99	22.94
<i>Ampharete lindstroemi</i>	2.48	0.14	2.25	1.88	2.7	25.64
<i>Abra</i>	2.1	0.25	2	1.94	2.41	28.05
<i>Lagis koreni</i>	2.15	0.29	1.94	1.49	2.33	30.38
<i>Lanice conchilega</i>	1.75	0	1.84	4	2.21	32.6
<i>Echinocardium cordatum</i>	1.55	0	1.81	1.29	2.18	34.78
<i>Photis longicaudata</i>	1.77	0	1.66	1.76	2	36.78
<i>Ampelisca</i>	1.95	0.29	1.6	0.97	1.92	38.7
<i>Ophiura albida</i>	1.68	0.2	1.57	1.82	1.89	40.59
<i>Ampelisca spinipes</i>	1.57	0	1.43	1.02	1.72	42.31
<i>Notomastus latericeus</i>	1.46	0.96	1.32	1.7	1.59	43.89
<i>Nephtys hombergii</i>	1.14	0	1.26	1.57	1.52	45.41
<i>Ophelia borealis</i>	0	1.12	1.2	3.11	1.44	46.85
<i>Scalibregma inflatum</i>	1.13	0	1.15	3.23	1.38	48.23
<i>Nucula nitidosa</i>	0.99	0	1.07	1.9	1.29	49.52
<i>Nephtys</i>	1.43	0.43	1.04	1.73	1.25	50.77

Faunal Groups a & b						
Average dissimilarity = 75.82						
Species	Group a	Group b				
	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
<i>Pisidia longicornis</i>	0.19	15.14	6.39	1.67	8.43	8.43
<i>Sabellaria spinulosa</i>	0.98	13.08	5.35	1.72	7.06	15.48
<i>Spiophanes bombyx</i>	6.9	1.26	2.65	1.41	3.49	18.97
Mytilidae	0.33	4.06	1.66	2.05	2.19	21.16
ASCIDIACEA	0.19	3.91	1.63	1.81	2.15	23.31
<i>Pomatoceros lamarcki</i>	0	3.42	1.55	0.68	2.04	25.35
<i>Anaitides maculata</i>	0	2.81	1.22	1.61	1.61	26.96
Polynoidae	0	2.67	1.17	2.63	1.54	28.51
<i>Abra alba</i>	4.16	1.74	1.14	1.92	1.5	30.01
<i>Owenia fusiformis</i>	2.69	0.25	1.09	1.65	1.44	31.45
<i>Gammaropsis maculata</i>	0.17	2.55	1.05	2.36	1.39	32.84
<i>Tellimya ferruginosa</i>	2.19	0	1.04	1.59	1.37	34.2
<i>Unciola crenatipalma</i>	0.53	2.32	0.96	1.97	1.27	35.47
<i>Mediomastus fragilis</i>	0.91	2.9	0.89	2.04	1.17	36.64
<i>Sphenia binghami</i>	0	1.76	0.86	1.58	1.14	37.78
<i>Lumbrineris cingulata</i>	0.6	2.59	0.86	1.91	1.14	38.92
<i>Polydora caeca</i>	0	1.72	0.85	0.89	1.13	40.04
ACTINIARIA	0.17	1.94	0.84	2.18	1.1	41.15
<i>Stenothoe marina</i>	0	1.88	0.82	4	1.09	42.23
<i>Ampelisca</i>	1.95	1.22	0.79	1.2	1.04	43.27
<i>Autolytus</i>	0.38	2.1	0.78	1.98	1.03	44.3
<i>Photis longicaudata</i>	1.77	0	0.77	1.6	1.02	45.32
<i>Ampelisca spinipes</i>	1.57	0.8	0.75	1.09	0.99	46.31
<i>Echinocardium cordatum</i>	1.55	0	0.74	1.42	0.98	47.29
<i>Ampharete lindstroemi</i>	2.48	2.11	0.74	1.57	0.97	48.26
<i>Kurtiella bidentata</i>	3.46	2.29	0.69	1.36	0.91	49.17
<i>Amphipholis squamata</i>	0	1.46	0.65	2.44	0.86	50.03

Faunal Groups d & b

Average dissimilarity = 88.97

Species	Group d		Group b		Contrib%	Cum.%
	Av.Abund	Av.Abund	Av.Diss	Diss/SD		
<i>Pisidia longicornis</i>	0.14	15.14	8.5	1.76	9.55	9.55
<i>Sabellaria spinulosa</i>	0	13.08	7.66	1.87	8.6	18.15
ASCIDIACEA	0	3.91	2.3	1.98	2.58	20.74
<i>Pomatoceros lamarcki</i>	0.14	3.42	2.04	0.67	2.3	23.04
Mytilidae	0.86	4.06	1.88	1.84	2.11	25.15
<i>Anaitides maculata</i>	0	2.81	1.63	1.65	1.83	26.98
Polynoidae	0	2.67	1.56	2.85	1.76	28.74
<i>Gammaropsis maculata</i>	0	2.55	1.5	3.12	1.68	30.43
<i>Lumbrineris cingulata</i>	0	2.59	1.5	3.75	1.68	32.11
<i>Mediomastus fragilis</i>	0.39	2.9	1.49	4.01	1.68	33.78
<i>Kurtiella bidentata</i>	0	2.29	1.48	1.71	1.66	35.44
<i>Unciola crenatipalma</i>	0	2.32	1.35	2.24	1.52	36.96
ACTINIARIA	0	1.94	1.24	2.36	1.39	38.36
<i>Scalibregma inflatum</i>	0	2.08	1.21	3.22	1.36	39.72
<i>Sphenia binghami</i>	0	1.76	1.2	1.44	1.35	41.07
<i>Polydora caeca</i>	0	1.72	1.19	0.9	1.33	42.4
<i>Ampharete lindstroemi</i>	0.14	2.11	1.12	2.13	1.26	43.67
<i>Stenothoe marina</i>	0	1.88	1.1	4.97	1.23	44.9
<i>Autolytus</i>	0.29	2.1	1.08	2.26	1.22	46.12
<i>Abra</i>	0.25	1.87	1.01	1.72	1.14	47.26
<i>Abra alba</i>	0.25	1.74	0.94	1.89	1.05	48.31
<i>Amphipholis squamata</i>	0	1.46	0.88	2.45	0.99	49.3
<i>Notomastus latericeus</i>	0.96	2.16	0.88	1.37	0.99	50.29

Faunal Groups a & c

Average dissimilarity = 89.26

Species	Group a		Group c		Contrib%	Cum.%
	Av.Abund	Av.Abund	Av.Diss	Diss/SD		
<i>Spiophanes bombyx</i>	6.9	0.9	6.26	1.61	7.01	7.01
Mytilidae	0.33	4.36	4.29	1.1	4.81	11.82
<i>Abra alba</i>	4.16	0.41	4.22	2.32	4.72	16.54
<i>Kurtiella bidentata</i>	3.46	0	3.71	3.07	4.16	20.7
<i>Tellimya ferruginosa</i>	2.19	0	2.54	1.46	2.85	23.55
<i>Urothoe brevicornis</i>	0	2.31	2.52	4.04	2.83	26.38
<i>Ampharete lindstroemi</i>	2.48	0	2.37	1.8	2.66	29.04
<i>Owenia fusiformis</i>	2.69	0.41	2.36	1.47	2.64	31.68
<i>Lagis koreni</i>	2.15	0	2.3	1.73	2.58	34.26
<i>Abra</i>	2.1	0.29	1.95	1.86	2.19	36.44
<i>Lanice conchilega</i>	1.75	0	1.88	3.83	2.11	38.55
<i>Echinocardium cordatum</i>	1.55	0	1.86	1.24	2.08	40.63
<i>Ophiura albida</i>	1.68	0	1.81	2.09	2.02	42.66
<i>Ampelisca</i>	1.95	0	1.79	1.01	2.01	44.66
<i>Photis longicaudata</i>	1.77	0	1.69	1.72	1.9	46.56
<i>Nephtys</i>	1.43	0	1.53	2.7	1.72	48.28
<i>Ampelisca spinipes</i>	1.57	0	1.46	0.99	1.63	49.91
<i>Ophelia borealis</i>	0	1.29	1.37	1.67	1.54	51.45

Faunal Groups d & c

Average dissimilarity = 77.02

Species	Group d		Group c		Contrib%	Cum.%
	Av.Abund	Av.Abund	Av.Diss	Diss/SD		
Mytilidae	0.86	4.36	8.49	1.03	11.02	11.02
<i>Urothoe brevicornis</i>	0.14	2.31	5.66	5.72	7.35	18.38
<i>Urothoe</i>	0	1.02	2.62	8.26	3.4	21.78
<i>Notomastus latericeus</i>	0.96	0.41	2.54	1.26	3.3	25.07
<i>Scalibregma inflatum</i>	0	0.93	2.49	2.79	3.24	28.31
<i>Glycera</i>	0.89	0	2.31	1.27	3	31.31
NEMERTEA	0.79	0	2.06	1.29	2.67	33.99
<i>Ophelia borealis</i>	1.12	1.29	1.82	2.4	2.36	36.35
<i>Pisidia longicornis</i>	0.14	0.5	1.4	1.06	1.81	38.16
<i>Spiophanes bombyx</i>	1.11	0.9	1.38	1.17	1.79	39.96
NEMATODA	0.53	0	1.37	0.9	1.77	41.73
<i>Macrochaeta</i>	0.45	0	1.24	0.92	1.62	43.35
<i>Abra alba</i>	0.25	0.41	1.24	1.04	1.61	44.96
<i>Spisula</i>	0.32	0.35	1.24	1.02	1.61	46.57
<i>Aspidelectra melolontha</i>	0.6	0.35	1.21	1.17	1.57	48.14
<i>Aricidea wassi</i>	0.45	0.29	1.18	1.36	1.54	49.67
<i>Owenia fusiformis</i>	0	0.41	1.17	0.93	1.52	51.2

Faunal Groups b & c

Average dissimilarity = 90.75

Species	Group b		Group c		Contrib%	Cum.%
	Av.Abund	Av.Abund	Av.Diss	Diss/SD		
<i>Pisidia longicornis</i>	15.14	0.5	8.37	1.65	9.22	9.22
<i>Sabellaria spinulosa</i>	13.08	0	7.75	1.81	8.54	17.76
ASCIDIACEA	3.91	0	2.33	1.91	2.57	20.32
Mytilidae	4.06	4.36	2.12	1.56	2.34	22.66
<i>Pomatoceros lamarcki</i>	3.42	0	2.1	0.64	2.31	24.97
<i>Anaitides maculata</i>	2.81	0	1.65	1.6	1.82	26.79
Polynoidae	2.67	0	1.58	2.76	1.75	28.53
<i>Mediomastus fragilis</i>	2.9	0.35	1.54	3.99	1.7	30.24
<i>Gammaropsis maculata</i>	2.55	0	1.52	3.01	1.67	31.91
<i>Lumbrineris cingulata</i>	2.59	0	1.51	3.63	1.67	33.57
<i>Kurtiella bidentata</i>	2.29	0	1.5	1.64	1.65	35.22
<i>Urothoe brevicornis</i>	0	2.31	1.47	3.92	1.62	36.84
<i>Unciola crenatipalma</i>	2.32	0	1.37	2.17	1.51	38.35
<i>Autolytus</i>	2.1	0	1.27	3.16	1.4	39.75
ACTINIARIA	1.94	0	1.26	2.26	1.38	41.13
<i>Ampharete lindstroemi</i>	2.11	0	1.23	2.39	1.35	42.49
<i>Sphenia binghami</i>	1.76	0	1.22	1.38	1.35	43.83
<i>Polydora caeca</i>	1.72	0	1.2	0.87	1.33	45.16
<i>Stenothoe marina</i>	1.88	0	1.11	4.82	1.22	46.38
NEMERTEA	1.81	0	1.1	8.74	1.21	47.59
<i>Notomastus latericeus</i>	2.16	0.41	1.09	1.89	1.21	48.8
NEMATODA	1.66	0	1	2.51	1.1	49.9
<i>Abra</i>	1.87	0.29	1	1.78	1.1	50.99

Appendix Table 12. Results of the RELATE and BIO-ENV analyses performed to identify the relationships between sediment and infauna and to find the combination of sediment parameters that correlated most highly with the patterns observed in the infaunal communities sampled at the sampling stations across TOWF and adjacent area in August 2012.

RELATE

Parameters

Rank correlation method: Spearman

Sample statistic (Rho): **0.525**

Significance level of sample statistic: **0.2 %**

Number of permutations: **999**

Number of permuted statistics greater than or equal to Rho: **1**

BIO-ENV

Variables

- 1. 63
- 2. 31.5
- 3. 16
- 4. 8
- 5. 4
- 6. 2
- 7. 1
- 8. 0.5
- 9. 0.25
- 10. 0.125
- 11. 0.063
- 12. Pan

Best results

No.Vars	Corr.	Selections
5	0.689	3,4,8,9,12
5	0.689	3,5,8,9,12
5	0.688	2,3,8,9,12
4	0.687	3,8,9,12
5	0.687	1,3,8,9,12
5	0.686	3-5,8,9
5	0.686	3,6,8,9,12
5	0.685	3,8,9,11,12
5	0.684	3,5,6,8,9
4	0.684	3,5,8,9

Taxon Name	A01A	A01B	A01C	A02A	A02B	A03A	A04A	A05A	A05B	A05C	A06A	A06B	A07A	A07B	A07C	A08A	A08B	A08C	A10A	A10B	A10C	A11A	A11B
<i>Bodotria scorpioides</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Eudorella truncatula</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DECAPODA (juv)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hippolytidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Axius stirhynchus</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Callianassa subterranea</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Upogebia deltaura</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Pagurus bernhardus</i>	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Galathea intermedia</i>	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Pisidia longicornis</i>	-	-	-	-	-	1	7	2	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Ebalia tuberosa</i>	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
<i>Ebalia tumefacta</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Inachus dorsettensis</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Macropodia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Liocarcinus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Liocarcinus (juv)</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
<i>Liocarcinus holsatus</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Liocarcinus marmoreus</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Liocarcinus pusillus</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Necora puber</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Pilumnus hirtellus</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Leptochiton (juv)</i>	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Leptochiton asellus</i>	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Gibbula cineraria</i>	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Epitonium clathratulum</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Crepidula fornicata</i>	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
<i>Polinices pulchellus</i>	-	-	-	-	-	-	-	-	-	-	-	-	3	1	1	-	-	1	-	-	-	-	-
<i>Hinia reticulata</i>	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-
<i>Doto</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PELECYPODA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PELECYPODA (juv)	-	-	-	-	-	1	2	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Nucula nitidosa</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
<i>Nucula nucleus</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mytilidae (juv)	-	1	1	11	29	-	2	10	1	-	-	-	-	1	-	-	-	-	-	-	-	-	1
<i>Musculus discors</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Chlamys varia</i>	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Aequipecten opercularis</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anomiidae	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Mysella bidentata</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
<i>Tellimya ferruginosa</i>	-	-	-	-	-	-	-	-	-	-	-	-	4	1	5	-	-	1	-	-	-	-	-
<i>Acanthocardia echinata</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
<i>Mactra stultorum</i>	-	-	-	-	-	-	-	-	-	-	-	-	7	6	9	1	-	-	-	-	-	-	-
<i>Spisula (juv)</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Solenidae (juv)	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Ensis</i>	-	-	-	-	-	-	-	-	-	-	-	-	26	26	11	4	2	8	-	-	-	-	-
<i>Ensis (juv)</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-

Taxon Name	A11C	GT3A	GT3B	GT3B	GT24A	GT24B	GT24C
PORIFERA	-	-	-	-	-	-	-
<i>Hydractinia echinata</i>	-	-	-	-	-	-	-
Campanulariidae	-	-	-	-	-	-	P
<i>Clytia hemisphaerica</i>	-	-	-	-	-	-	P
<i>Obelia</i>	-	-	-	-	-	-	-
<i>Alcyonium digitatum</i>	-	-	-	-	-	-	-
<i>Cerianthus</i>	-	2	-	-	-	-	-
ACTINIARIA	-	45	53	19	9	3	1
CONICA	-	-	-	-	-	-	-
<i>Halecium</i>	-	-	-	-	-	-	P
<i>Sertularella gaudichaudi</i>	-	-	-	-	-	-	P
<i>Sertularia</i>	-	-	-	-	-	-	-
<i>Plumularia setacea</i>	-	-	-	-	-	-	P
TURBELLARIA	1	2	4	-	4	-	-
NEMERTEA	1	4	18	24	12	4	4
NEMATODA	-	-	-	-	22	1	-
ENTOPROCTA	-	-	-	-	-	-	-
SIPUNCULA	-	-	-	-	-	3	-
<i>Golfingia (juv)</i>	-	-	-	-	1	-	2
<i>Golfingia</i>	-	-	-	-	-	-	-
<i>Golfingia elongata</i>	-	-	-	-	-	-	2
<i>Golfingia vulgaris</i>	-	-	-	-	-	-	1
<i>Pisione remota</i>	1	-	-	-	-	-	-
<i>Gattyana cirrosa</i>	-	-	-	-	-	-	-
<i>Harmothoe</i>	-	26	41	73	37	10	16
<i>Harmothoe impar</i>	-	-	-	-	5	-	2
<i>Malmgreniella</i>	-	-	1	4	4	-	1
<i>Malmgreniella arenicolae</i>	-	-	2	-	4	1	1
<i>Lepidonotus</i>	-	6	-	-	11	1	-
<i>Lepidonotus squamatus</i>	-	1	11	6	5	-	-
<i>Pholoe baltica (sensu petersen)</i>	-	-	-	2	-	-	-
<i>Pholoe inornata (sensu petersen)</i>	-	10	-	4	35	-	-
<i>Sthenelais boa</i>	-	-	1	10	12	-	1
<i>Sthenelais limicola</i>	-	-	-	-	-	-	-
Phyllodoceidae	1	-	-	-	-	-	-
<i>Eteone longa</i>	-	-	1	-	-	-	-
<i>Mysta barbata</i>	-	1	-	-	-	-	-
<i>Mysta picta</i>	-	-	-	-	-	-	1
<i>Anaitides groenlandica</i>	-	-	-	-	3	-	-
<i>Anaitides longipes</i>	-	1	1	-	-	-	2
<i>Anaitides maculata</i>	-	-	-	-	-	1	-
<i>Anaitides mucosa</i>	-	-	-	-	-	-	-

Taxon Name	A11C	GT3A	GT3B	GT3B	GT24A	GT24B	GT24C
<i>Anaitides rosea</i>	-	-	-	-	-	-	-
<i>Eulalia bilineata</i>	-	-	-	-	-	-	-
<i>Eulalia ornata</i>	-	2	10	8	3	2	4
<i>Eumida</i>	-	1	2	9	17	-	1
<i>Eumida bahusiensis</i>	-	-	-	-	-	-	-
<i>Nereiphylla</i>	-	1	-	-	-	-	-
<i>Glycera (juv)</i>	2	3	2	-	9	-	2
<i>Glycera alba</i>	-	1	-	-	-	-	-
<i>Glycera lapidum</i>	-	-	1	4	1	2	2
<i>Glycera tridactyla</i>	-	-	1	8	-	-	-
<i>Glycinde nordmanni</i>	-	1	-	-	-	-	-
<i>Goniada maculata</i>	-	4	16	7	-	-	2
<i>Sphaerodorum gracilis</i>	-	4	3	-	-	-	-
Hesionidae	1	-	-	-	-	-	-
Hesionidae (juv)	-	-	-	-	-	-	-
<i>Psamathe fusca</i>	-	4	1	-	-	1	-
<i>Podarkeopsis capensis</i>	-	-	2	9	-	1	-
Syllidae	-	-	-	-	-	-	-
<i>Syllidia armata</i>	-	1	-	-	1	-	1
<i>Syllis</i>	-	1	-	-	-	3	3
<i>Typosyllis variegata</i>	-	-	-	-	-	1	-
<i>Eusyllis blomstrandii</i>	-	-	-	-	-	-	-
<i>Exogone hebes</i>	-	-	-	-	-	-	1
<i>Sphaerosyllis taylora</i>	-	-	-	-	-	-	-
<i>Autolytus</i>	-	9	1	-	16	4	1
Nereididae (juv)	-	-	-	6	-	-	-
<i>Hediste diversicolor</i>	-	-	2	11	-	-	-
<i>Nereis (juv)</i>	-	5	7	-	-	-	-
<i>Nereis longissima</i>	-	1	-	-	7	3	7
<i>Nereis zonata</i>	-	-	-	-	-	-	-
<i>Nephtys (juv)</i>	-	-	6	8	1	-	2
<i>Nephtys cirrosa</i>	-	-	-	-	-	-	-
<i>Nephtys hombergii</i>	-	-	1	-	-	-	-
<i>Nephtys kersivalensis</i>	-	2	2	-	2	-	1
<i>Marphysa bellii</i>	-	-	-	1	-	-	1
<i>Marphysa sanguinea</i>	-	-	-	-	-	-	1
Lumbrineridae	-	-	1	-	-	-	-
Lumbrineridae (juv)	-	-	-	1	-	-	-
<i>Lumbrineris gracilis</i>	-	19	18	20	8	18	22
<i>Schistomeringos neglecta</i>	-	-	-	-	-	-	-
<i>Schistomeringos rudolphi</i>	-	1	1	1	-	-	-
<i>Scoloplos armiger</i>	-	-	-	-	-	-	-
<i>Aricidea minuta</i>	-	-	-	-	-	-	-
<i>Paraonis fulgens</i>	-	-	-	-	-	-	-
<i>Poecilochaetus serpens</i>	-	3	1	-	-	-	-
<i>Aonides oxycephala</i>	-	-	1	4	-	-	-

Taxon Name	A11C	GT3A	GT3B	GT3B	GT24A	GT24B	GT24C
<i>Aonides paucibranchiata</i>	-	-	-	-	-	-	1
<i>Laonice bahusensis</i>	-	-	-	-	-	-	-
<i>Polydora</i>	-	-	1	-	-	-	-
<i>Polydora caeca</i>	-	4	-	-	6	-	2
<i>Polydora caulleryi</i>	-	2	-	-	-	-	1
<i>Polydora cornuta</i>	-	-	-	-	-	1	-
<i>Pseudopolydora pulchra</i>	-	-	-	-	4	-	-
<i>Pygospio elegans</i>	-	-	-	-	-	-	-
<i>Scolelepis</i>	-	5	2	-	-	-	-
<i>Scolelepis bonnieri</i>	-	-	-	-	-	-	-
<i>Spio filicornis</i>	-	-	-	-	-	-	-
<i>Spio gonioccephala</i>	-	-	-	-	-	-	-
<i>Spiophanes bombyx</i>	-	1	-	-	-	-	-
<i>Magelona (juv)</i>	-	-	-	-	1	-	-
<i>Magelona alleni</i>	-	-	1	-	-	1	-
<i>Magelona filiformis</i>	-	-	-	-	-	-	-
<i>Magelona johnstoni</i>	-	-	-	-	-	-	-
<i>Caulleriella alata</i>	-	4	2	3	62	28	19
<i>Caulleriella zetlandica</i>	-	1	-	-	-	-	-
<i>Chaetozone christiei</i>	-	-	-	-	-	-	-
<i>Cirratulus (juv)</i>	-	-	-	-	1	-	-
<i>Cirratulus</i>	-	1	-	-	-	-	-
<i>Pherusa</i>	-	2	1	-	-	1	1
<i>Pherusa flabellata</i>	-	-	-	4	-	-	-
<i>Capitella</i>	-	-	-	-	-	-	-
<i>Mediomastus fragilis</i>	-	2	1	-	16	12	11
<i>Notomastus latericeus</i>	-	11	13	31	85	15	16
Maldanidae	-	-	-	-	-	1	-
<i>Clymenura</i>	-	-	-	-	-	-	-
<i>Euclymene oerstedii</i>	-	-	-	-	-	-	-
<i>Praxillella affinis</i>	-	-	-	-	-	-	-
<i>Ophelia (juv)</i>	-	-	-	-	-	-	-
<i>Ophelia borealis</i>	-	-	-	-	-	-	-
<i>Asclerocheilus intermedius</i>	-	-	-	-	-	-	-
<i>Scalibregma celticum</i>	-	-	-	-	4	-	-
<i>Scalibregma inflatum</i>	-	1	-	4	4	-	1
<i>Galathowenia oculata</i>	-	-	-	-	-	1	-
<i>Owenia fusiformis</i>	-	1	1	-	-	-	-
<i>Lagis koreni</i>	-	-	1	-	-	-	-
<i>Sabellaria spinulosa</i>	3	641	2947	3384	2749	134	336
Ampharetidae	-	2	1	-	11	-	1
<i>Ampharete lindstroemi</i>	-	56	76	181	63	5	10
<i>Amphicteis midas</i>	-	-	-	-	1	-	2
<i>Terebellides stroemi</i>	-	-	-	5	-	-	-
Terebellidae (juv)	-	-	1	-	-	-	-
Terebellidae	-	3	-	-	-	-	-

Taxon Name	A11C	GT3A	GT3B	GT3B	GT24A	GT24B	GT24C
<i>Lanice conchilega</i>	-	-	2	-	2	1	-
<i>Nicolea venustula</i>	-	-	3	1	-	-	-
<i>Pista lornensis</i>	-	-	-	-	-	-	-
<i>Polycirrus</i>	-	2	3	-	-	-	1
<i>Thelepus cincinnatus</i>	-	-	-	-	-	2	2
Sabellidae (juv)	-	-	-	-	7	-	-
Sabellidae	-	-	4	-	1	8	-
<i>Pseudopotamilla reniformis</i>	-	-	-	-	-	-	-
<i>Pomatoceros</i>	-	-	-	-	2	-	2
<i>Pomatoceros lamarcki</i>	-	4	3	-	21	10	5
<i>Pomatoceros triqueter</i>	-	-	-	-	-	-	-
<i>Tubificoides amplivasatus</i>	-	-	-	-	1	-	-
<i>Tubificoides benedii</i>	-	-	-	-	-	-	-
<i>Tubificoides pseudogaster</i>	-	-	-	-	-	-	-
<i>Achelia echinata</i>	-	4	-	-	-	1	2
<i>Verruca stroemia</i>	-	-	-	-	-	-	-
OSTRACODA	-	1	-	-	12	2	-
<i>Rissoides desmaresti</i>	-	1	1	-	-	-	-
AMPHIPODA	-	-	-	-	1	-	-
<i>Iphimedia minuta</i>	-	1	2	-	-	-	-
<i>Pontocrates altamarinus</i>	-	-	-	-	-	-	-
<i>Amphilochus neapolitanus</i>	-	-	-	-	-	2	-
Lysianassidae	-	1	2	-	-	1	-
<i>Orchomene</i>	-	-	4	-	-	-	-
<i>Ampelisca</i>	-	-	5	-	-	-	1
<i>Ampelisca diadema</i>	-	22	4	5	-	-	-
<i>Ampelisca spinipes</i>	-	-	2	-	31	1	4
<i>Bathyporeia pelagica</i>	-	-	-	-	-	-	-
<i>Abludomelita obtusata</i>	-	-	1	-	-	-	-
<i>Cheirocratus sundevallii</i>	-	-	-	-	-	-	-
<i>Melita palmata</i>	-	-	-	-	39	-	-
<i>Gammaropsis</i>	-	36	12	13	25	36	33
<i>Gammaropsis maculata</i>	-	-	5	-	-	-	-
<i>Photis longicaudata</i>	-	2	-	-	-	-	-
<i>Ericthonius</i>	-	6	5	-	-	-	1
<i>Ericthonius punctatus</i>	-	2	2	-	-	-	1
Corophiidae	-	2	-	9	-	-	2
<i>Corophium volutator</i>	-	-	-	-	-	6	-
<i>Monocorophium sextonae</i>	-	3	1	-	10	-	3
<i>Unciola crenatipalma</i>	-	146	3	-	4	22	37
<i>Phthisica marina</i>	-	-	-	-	-	2	-
<i>Pseudoprotella phasma</i>	-	-	-	-	-	-	1
Anthuridae	-	-	-	-	-	-	-
<i>Anthura gracilis</i>	-	-	-	-	-	-	-
Bopyridae	-	2	2	-	8	-	-
TANAIDACEA (juv)	-	-	-	-	-	-	-

Taxon Name	A11C	GT3A	GT3B	GT3B	GT24A	GT24B	GT24C
<i>Bodotria scorpioides</i>	-	-	1	-	1	-	1
<i>Eudorella truncatula</i>	-	-	-	4	-	-	-
DECAPODA (juv)	-	-	-	-	-	1	-
Hippolytidae	-	-	2	-	-	-	-
<i>Axius stihynchus</i>	-	-	2	-	-	-	-
<i>Callianassa subterranea</i>	-	2	2	1	-	-	-
<i>Upogebia deltaura</i>	-	1	-	-	-	-	-
<i>Pagurus bernhardus</i>	-	-	-	-	-	1	-
<i>Galathea intermedia</i>	-	3	7	5	5	-	-
<i>Pisidia longicornis</i>	-	215	514	510	828	356	520
<i>Ebalia tuberosa</i>	-	3	-	1	-	-	3
<i>Ebalia tumefacta</i>	-	-	1	-	-	-	-
<i>Inachus dorsettensis</i>	-	-	1	-	-	-	-
<i>Macropodia</i>	-	2	-	4	-	-	-
<i>Liocarcinus</i>	-	1	1	-	-	-	-
<i>Liocarcinus (juv)</i>	-	-	-	-	-	-	-
<i>Liocarcinus holsatus</i>	-	1	1	-	-	-	-
<i>Liocarcinus marmoreus</i>	-	-	-	1	-	-	-
<i>Liocarcinus pusillus</i>	-	-	1	-	-	-	-
<i>Necora puber</i>	-	-	-	-	-	1	-
<i>Pilumnus hirtellus</i>	-	3	2	12	16	3	7
<i>Leptochiton (juv)</i>	-	-	-	-	-	-	-
<i>Leptochiton asellus</i>	-	-	-	-	-	-	-
<i>Gibbula cineraria</i>	-	-	-	-	-	-	-
<i>Epitonium clathratulum</i>	-	-	-	8	-	-	-
<i>Crepidula fornicata</i>	-	-	-	-	2	-	-
<i>Polinices pulchellus</i>	-	2	-	-	-	-	-
<i>Hinia reticulata</i>	-	-	5	3	4	-	2
<i>Doto</i>	-	-	-	-	-	1	-
PELECYPODA	-	-	-	4	-	-	-
PELECYPODA (juv)	-	-	-	-	-	-	-
<i>Nucula nitidosa</i>	-	-	-	-	-	-	-
<i>Nucula nucleus</i>	-	-	-	-	-	1	-
Mytilidae (juv)	-	3	-	-	31	16	2
<i>Musculus discors</i>	-	1	-	-	-	-	-
<i>Chlamys varia</i>	-	-	-	-	-	-	-
<i>Aequipecten opercularis</i>	-	6	3	8	-	-	-
Anomiidae	-	-	-	-	-	-	-
<i>Mysella bidentata</i>	-	-	-	2	5	-	-
<i>Tellimya ferruginosa</i>	-	-	-	-	-	-	-
<i>Acanthocardia echinata</i>	-	-	-	-	-	-	-
<i>Mactra stultorum</i>	-	-	-	-	-	-	-
<i>Spisula (juv)</i>	-	-	-	-	-	2	-
Solenidae (juv)	-	-	-	-	-	-	-
<i>Ensis</i>	-	-	-	-	-	-	-
<i>Ensis (juv)</i>	-	-	-	-	-	-	-

Taxon Name	A11C	GT3A	GT3B	GT3B	GT24A	GT24B	GT24C
<i>Macoma balthica</i>	-	-	-	4	-	-	-
<i>Abra (juv)</i>	-	-	-	-	-	-	-
<i>Abra alba</i>	-	9	4	1	252	6	11
<i>Tapes (juv)</i>	-	-	-	-	1	-	-
<i>Timoclea ovata</i>	-	-	-	-	-	-	-
<i>Mya (juv)</i>	-	-	-	-	4	-	-
<i>Mya arenaria</i>	-	-	-	-	-	-	-
<i>Sphenia binghami</i>	-	-	-	-	-	-	-
<i>Corbula gibba</i>	-	-	-	-	-	-	-
<i>Disporella hispida</i>	-	-	-	-	-	-	-
<i>Anguinella palmata</i>	-	-	-	-	-	-	-
<i>Conopeum reticulatum</i>	-	-	-	-	-	-	-
<i>Electra monostachys</i>	-	-	-	-	-	-	-
<i>Electra pilosa</i>	-	-	-	P	-	-	-
<i>Aspidelectra melolontha</i>	P	-	-	-	-	-	-
<i>Callopora</i>	-	-	-	-	-	-	-
<i>Callopora dumerilli</i>	-	-	-	-	-	-	-
<i>Escharella immersa</i>	-	-	-	-	-	-	-
<i>Schizomavella auriculata</i>	-	-	-	-	-	-	-
<i>Phoronis</i>	-	11	-	-	-	1	1
ASTEROIDEA (juv)	-	-	-	1	-	-	-
<i>Asterias rubens</i>	-	-	-	-	1	-	-
OPHIUROIDEA (juv)	-	25	19	13	28	3	14
<i>Ophiothrix fragilis</i>	-	-	-	-	-	-	-
<i>Amphipholis squamata</i>	-	7	4	8	47	2	15
Ophiuridae (juv)	-	-	-	-	-	-	-
<i>Ophiura (juv)</i>	-	-	-	-	-	-	-
<i>Ophiura albida</i>	-	69	12	13	-	-	-
ECHINOIDEA (juv)	-	-	-	1	-	-	-
<i>Psammechinus miliaris</i>	-	-	-	-	-	-	2
<i>Echinocardium cordatum</i>	-	-	-	-	-	-	-
<i>Polycarpa (juv)</i>	-	-	-	-	-	2	-
<i>Dendrodoa grossularia</i>	-	-	-	-	-	-	-
<i>Molgula (juv)</i>	-	-	-	-	-	-	-
<i>Molgula manhattensis</i>	-	4	1	-	-	-	-
<i>Ciliata septentrionalis</i>	-	-	-	-	-	1	-

Appendix Table 15. Table summarising the biomass (g AFDW), by major taxonomic group, of macrofauna (>1mm) from sediments in the turbine array and cable route of the TOWF sampled in May-June 2005. Data have been calculated from blotted wet weight using conversion factors as outlined in Eleftheriou & Basford (1989). The values are expressed as grams Ash Free Dry Weight (AFDW) per 0.1m² mini Hamon grab sample.

Sample	Annelida	Crustacea	Mollusca	Echinodermata	Miscellania
1A	0.0029	0.0000	0.0048	0.0001	0.0001
4A	1.3113	0.0002	0.0011	0.0002	0.0066
4B	0.4120	0.0000	0.0651	0.0000	0.0010
4C	0.4055	0.0001	0.0133	0.0001	0.0000
5A	0.1889	0.0006	0.0000	0.0286	0.0005
5B	0.4849	0.0000	0.0000	0.0000	0.0000
5C	0.2395	0.0004	0.0003	0.0000	0.0000
6A	0.5351	0.0000	0.0003	0.0000	0.0011
6B	0.2634	0.0022	0.0129	0.0001	0.0000
6C	0.8491	0.0023	0.0001	0.0001	0.0000
7A	0.0095	0.0002	0.0000	0.0000	0.0003
7B	0.0330	0.0014	0.0000	0.0000	0.0000
7C	0.0979	0.0000	0.0000	0.0000	0.0000
8A	0.0484	0.0000	0.0001	0.0000	0.0000
8B	0.0117	0.0001	0.0000	0.0000	0.0000
8C	0.1672	0.0004	0.0000	0.0000	0.0023
9A	0.0041	0.0009	0.0000	0.0000	0.0000
9B	0.3413	0.0284	0.0010	0.0006	0.1216
9C	0.0032	0.0002	0.0241	0.0001	0.0000
10A	0.0051	0.0005	0.0000	0.0000	0.0000
10B	0.0380	0.0014	0.0000	0.0000	0.0024
10C	0.4217	0.0009	0.0000	0.0037	0.0000
11A	0.0226	0.0070	0.1601	0.0000	0.0049
11B	0.0630	0.0000	0.0000	0.0000	0.0037
11C	0.0090	0.0002	0.0726	0.0000	0.0013
12A	0.2213	0.0004	0.0000	0.0000	0.0000
12B	0.5408	0.0000	0.0121	0.0000	0.0124
12C	0.1740	0.0000	0.1048	0.0000	0.0012
13A	0.0321	0.0000	0.0176	0.0000	0.0000
13B	0.0846	0.0610	0.0000	0.0000	0.0000
13C	0.0072	0.0000	0.0065	0.0000	0.0000
14A	0.0289	0.0025	0.0008	0.0000	0.0000
14B	0.0114	0.0000	0.0000	0.0003	0.0000
14C	0.1122	0.0021	0.0039	0.0152	0.0000
18A	0.0871	0.0220	0.0033	0.0261	0.3058
21A	1.0510	0.3282	0.0019	0.0006	0.0308
22A	1.2200	0.9347	0.0093	0.0353	0.9528
23A	0.0067	0.0000	0.0000	0.0033	0.0000
23B	0.0147	0.0000	0.0000	0.0151	0.0076

Sample	Annelida	Crustacea	Mollusca	Echinodermata	Miscellania
23C	0.2396	0.0000	0.0141	0.0003	0.5484
24A	0.0325	0.0021	0.0000	0.0000	0.0000
24B	0.0728	0.0000	0.0102	0.0000	0.0000
24C	0.1091	0.0016	0.0196	0.0000	0.0000
26A	0.0616	0.0001	0.0000	0.0000	0.0000
26B	0.1437	0.0002	0.0000	0.0000	0.0000
26C	0.0063	0.0004	0.0002	0.0000	0.0000
27A	0.0152	0.0030	0.0000	0.0000	0.0000
27B	0.0161	0.0007	0.0000	0.0000	0.0007
27C	0.0008	0.0003	0.0000	0.0000	0.0000
29A	0.0585	0.0140	0.0001	0.0000	0.0000
31A	1.5232	0.0337	2.4625	0.0037	2.9358
31B	0.0740	0.2586	0.3976	0.0008	0.5196
31C	0.1078	0.1764	0.0865	0.0020	0.2394
32A	0.0343	0.0013	0.0005	0.0786	4.1038
32B	0.0009	0.0136	0.0000	0.0042	0.0001
32C	0.0130	0.0002	0.2260	0.0000	0.0001
33A	0.0600	0.0000	0.0001	0.0000	0.0028
33B	0.0178	0.0000	0.0000	0.0000	0.0311
33C	0.2445	0.0001	0.0001	0.0001	0.0000
34A	0.4624	0.1236	0.0016	0.0001	0.0000
34B	0.5476	0.0000	0.0058	0.0000	0.0000
34C	0.1065	0.0000	0.0020	0.0000	0.0000
35A	0.4174	0.0008	0.0000	0.0000	0.0000
35B	0.0782	0.0054	0.0000	0.0000	0.0022
35C	0.0291	0.0080	0.0869	0.0000	0.0000
36A	0.0104	0.0000	0.1394	0.0000	0.0001
36B	0.0345	0.0066	0.0000	0.0000	0.0001
36C	0.0145	0.0002	0.0000	0.0000	0.0004
37A	0.0035	0.0000	0.0000	0.0000	0.0095
37B	0.0015	0.0000	0.0388	0.0000	0.0204
37C	0.0030	0.0000	0.0000	0.0000	0.0000
38A	0.0060	0.0001	0.0014	0.0000	0.0000
38B	0.0521	0.0000	0.0000	0.0000	0.0000
38C	0.0326	0.0000	0.0000	0.0000	0.0000
39A	0.1284	0.0000	0.0353	0.0002	0.0017
39B	0.0807	0.0000	0.0004	0.0028	0.0000
39C	0.0030	0.0000	0.0000	0.0000	0.0000
40A	0.0067	0.0006	0.0000	0.0000	0.0127

Sample	Annelida	Crustacea	Mollusca	Echinodermata	Miscellania
40B	0.0016	0.0007	0.0000	0.0000	0.0000
40C	0.0113	0.0000	0.0000	0.0000	0.0000
41A	0.0000	0.0000	0.0000	0.0000	0.0000
41B	0.0059	0.0000	0.0002	0.0000	0.0000
41C	0.0020	0.0002	0.0000	0.0000	0.0000
42A	0.0588	0.0000	0.0000	0.0000	0.0000
42B	0.0787	0.0006	0.0000	0.0000	0.0000
42C	0.0158	0.0000	0.0000	0.0000	0.0000
43A	0.0104	0.0000	0.0038	0.0110	0.0002
43B	0.2265	0.0000	0.0006	0.6094	0.0000
43C	0.0229	0.0000	0.0043	0.0658	0.0000
44A	0.0010	0.0006	0.0012	2.1444	0.0000
44B	0.0027	0.0004	0.0002	0.0042	0.0000
44C	0.0035	0.0005	0.0156	0.0000	0.0000
45A	0.0430	0.0000	0.0076	3.8626	0.0000
45B	0.0339	0.0000	0.0109	0.0321	0.0000
45C	0.0043	0.0000	0.2401	0.7412	0.0185
46A	0.0093	0.0128	0.3734	0.0000	0.0000
46B	0.1298	0.0109	0.0000	0.0000	0.0000
46C	0.0351	0.0077	0.0000	0.0000	0.0000
47A	0.0292	0.0013	0.0705	0.0000	0.0000
47B	0.0479	0.0038	0.0432	0.0000	0.0006
47C	0.0812	0.0016	0.0106	0.0000	0.0000
48A	0.0745	0.0187	0.0677	0.0004	0.0793
48B	0.2265	0.0297	0.1349	0.0019	0.2840
48C	0.1172	0.0262	0.0081	0.0007	0.0917
49A	0.0000	0.0000	0.0000	0.0000	0.0000
49B	0.0000	0.0000	0.0000	0.0000	0.0000
49C	0.0108	0.0063	0.0000	0.0000	0.2707
52A	0.1335	0.0097	0.0000	0.1770	6.6188
54A	0.0837	0.0000	0.0000	0.0000	0.0000
54B	0.1515	0.0000	0.0000	0.0000	0.0000
54C	0.0731	0.0000	0.0000	0.0000	0.0000
56A	0.0788	0.0020	0.0092	0.0000	0.0136
57A	0.3206	0.0174	0.0111	0.0018	0.0231
57B	0.3578	0.0011	0.0004	0.0026	0.3330
57C	0.1306	0.0035	0.0003	0.1603	0.0606
59A	0.0189	0.0017	0.0000	0.0000	0.0000
59B	0.0616	0.0000	0.0000	0.0000	0.0000
59C	0.1108	0.0020	0.0000	0.0000	0.0000
60A	0.0000	0.0000	0.0000	0.0000	0.0000
61A	0.0000	0.0000	0.0000	0.0000	0.0000
61B	0.0000	0.0000	0.0000	0.0000	0.7955

Sample	Annelida	Crustacea	Mollusca	Echinodermata	Miscellania
61C	0.0022	0.0000	0.0000	0.0000	0.0083
62A	0.0084	0.0000	0.0000	0.0000	0.0000
62B	0.0026	0.0005	0.0000	0.0000	0.0000
62C	0.0216	0.0000	0.0000	0.0000	0.0013
64A	0.0516	0.0072	0.0000	0.0000	0.0000

Appendix Table 16. Table summarising the biomass (g AFDW), by major taxonomic group, of macrofauna (>1mm) from sediments in the turbine array and cable route of the TOWF, sampled in October-November 2007. Data have been calculated from blotted wet weight using conversion factors as outlined in Eleftheriou & Basford (1989). The values are expressed as grams Ash Free Dry Weight (AFDW) per 0.1m² mini Hamon grab sample.

Sample	Annelida	Crustacea	Mollusca	Echinodermata	Miscellania
A01-A	0.0060	0.0000	0.0000	0.0000	0.0000
A01-B	0.0228	0.0066	0.0001	0.0000	0.0000
A01-C	0.0258	0.0000	0.0000	0.0000	0.0000
A02-A	0.0009	0.0000	0.0000	0.0001	0.0000
A02-B	0.0354	0.0000	0.0020	0.0000	0.0000
A03-A	0.0466	0.0066	0.0006	0.0080	0.0004
A04-A	0.0486	0.0444	0.0012	0.0053	0.0011
A05-A	0.2082	0.0042	0.0011	0.0116	0.4877
A05-B	0.0065	0.0110	0.0002	0.0005	0.6446
A05-C	0.0513	0.4385	0.2834	0.0140	0.0594
A06-A	0.0469	0.0398	0.0008	0.0006	0.0021
A06-B	0.0435	0.0000	0.0000	0.0204	0.0002
A07-A	0.3303	0.0000	2.0056	0.0003	2.0591
A07-B	0.4666	0.0000	1.7624	0.0048	1.5702
A07-C	0.7335	0.0256	3.2249	0.0016	1.0881
A08-A	0.6241	0.0000	0.3127	0.0028	0.2725
A08-B	0.1271	0.0000	0.0395	0.0026	1.1589
A08-C	0.2468	0.0000	0.0770	0.0004	0.3550
A10-A	0.1089	0.0000	0.0000	0.0000	0.0006
A10-B	0.0143	0.0000	0.0000	0.0000	0.0071
A10-C	0.0704	0.0000	0.0041	0.0000	0.0004
A11-A	0.0057	0.0088	0.0000	0.0022	0.0096
A11-B	0.0020	0.0000	0.0000	0.0000	0.0000
A11-C	0.0009	0.0000	0.0000	0.0007	0.0000
GT03-A	0.7209	2.7843	0.9511	0.3009	0.4659
GT03-B	1.7567	4.0413	0.4673	0.1139	0.1286
GT03-C	3.3962	2.5095	1.0645	0.1634	0.8812
GT24-A	1.5930	5.1987	0.1146	1.4662	0.0996
GT24-B	0.2304	1.7321	0.0073	0.0002	0.8469
GT24-C	0.5513	2.5931	0.0087	0.0075	0.4480

Appendix Table 17. Table summarising the key species that contributed to the similarity within pre- (2005 & 2007) and post-construction (2012) faunal data identified through multivariate analysis on Bray-Curtis similarity of square root transformed benthic abundance data recorded in the samples collected across TOWF and adjacent areas in August 2012. The dissimilarity between faunal groups is also shown. Similarity cut off shown at 75% and Dissimilarity cut-off shown at 50% to facilitate presentation.

Group 2005 & 2007						
Average similarity: 20.49						
Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%	
<i>Notomastus latericeus</i>	1.57	3.15	0.81	15.38	15.38	
NEMERTEA	0.61	1.97	1.03	9.6	24.98	
<i>Ophelia borealis</i>	0.87	1.72	0.57	8.4	33.37	
<i>Abra alba</i>	0.91	1.36	0.7	6.65	40.02	
<i>Spiophanes bombyx</i>	1.09	1.31	0.7	6.38	46.4	
<i>Nephtys hombergii</i>	0.51	1.25	0.7	6.1	52.5	
<i>Glycera (juv)</i>	0.52	0.91	0.57	4.43	56.93	
<i>Bathyporeia sarsi</i>	0.41	0.9	0.52	4.38	61.31	
<i>Goniada maculata</i>	0.45	0.75	0.5	3.69	65	
<i>Ophiura (juv)</i>	0.4	0.73	0.53	3.54	68.54	
<i>Caulleriella alata</i>	0.51	0.58	0.5	2.84	71.38	
<i>Nephtys (juv)</i>	0.34	0.51	0.38	2.48	73.85	
<i>Magelona mirabilis</i>	0.35	0.39	0.24	1.89	75.74	

Group 2012						
Average similarity: 21.66						
Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%	
<i>Spiophanes bombyx</i>	3.54	2.54	1.01	11.74	11.74	
<i>Abra alba</i>	1.99	1.12	0.58	5.17	16.91	
Mytilidae	1.76	1.1	0.65	5.07	21.99	
<i>Conopeum reticulum</i>	0.69	0.98	1.11	4.53	26.51	
<i>Nephtys</i>	0.81	0.82	0.76	3.79	30.3	
<i>Notomastus latericeus</i>	1.09	0.81	0.64	3.76	34.06	
<i>Electra monostachys</i>	0.49	0.78	0.7	3.61	37.67	
<i>Ophelia borealis</i>	0.51	0.72	0.43	3.32	40.98	
<i>Scalibregma inflatum</i>	0.95	0.71	0.7	3.26	44.25	
<i>Kurtiella bidentata</i>	1.71	0.7	0.49	3.21	47.46	
NEMERTEA	0.79	0.64	0.74	2.94	50.4	
<i>Abra</i>	1.11	0.62	0.66	2.84	53.24	
<i>Aspidelectra melolontha</i>	0.46	0.61	0.66	2.82	56.06	
<i>Lagis koreni</i>	1.11	0.54	0.65	2.5	58.57	
<i>Mediomastus fragilis</i>	0.99	0.45	0.58	2.1	60.66	
<i>Ampharete lindstroemi</i>	1.15	0.41	0.49	1.88	62.54	
<i>Owenia fusiformis</i>	1.12	0.4	0.38	1.86	64.4	
<i>Obelia</i>	0.51	0.39	0.69	1.8	66.2	
<i>Urothoe brevicornis</i>	0.41	0.36	0.23	1.67	67.86	
<i>Podarkeopsis capensis</i>	0.52	0.36	0.6	1.66	69.53	
<i>Ophiura albida</i>	0.78	0.33	0.47	1.51	71.04	
<i>Tellimya ferruginosa</i>	0.94	0.32	0.33	1.48	72.51	
<i>Chaetozone zetlandica</i>	0.61	0.31	0.55	1.43	73.94	
<i>Nucula nitidosa</i>	0.57	0.29	0.52	1.34	75.29	

Dissimilarity

Groups 2005 & 2007 & 2012

Average dissimilarity = 86.62

Species	Group 2005 & 2007		Group 2012		Contrib%	Cum.%
	Av.Abund	Av.Abund	Av.Diss	Diss/SD		
<i>Spiophanes bombyx</i>	1.09	3.54	3.82	1.07	4.41	4.41
Mytilidae	0	1.76	2.67	0.56	3.08	7.49
<i>Abra alba</i>	0.91	1.99	2.56	1.22	2.96	10.45
<i>Notomastus latericeus</i>	1.57	1.09	2.43	0.96	2.8	13.25
<i>Pisidia longicornis</i>	0.06	3.71	2.2	0.52	2.55	15.8
<i>Sabellaria spinulosa</i>	0.4	3.04	2.17	0.6	2.5	18.3
<i>Ophelia borealis</i>	0.87	0.51	1.74	0.81	2.01	20.31
<i>Kurtiella bidentata</i>	0	1.71	1.62	0.84	1.87	22.18
<i>Lagis koreni</i>	0.59	1.11	1.55	0.9	1.79	23.97
<i>Ampharete lindstroemi</i>	0.76	1.15	1.45	0.79	1.67	25.64
<i>Owenia fusiformis</i>	0.27	1.12	1.39	0.83	1.6	27.25
<i>Urothoe brevicornis</i>	0.23	0.41	1.31	0.63	1.51	28.76
<i>Abra</i>	0	1.11	1.22	1	1.41	30.17
<i>Tellimya ferruginosa</i>	0.24	0.94	1.22	0.76	1.41	31.58
<i>Nephtys</i>	0	0.81	1.17	1.14	1.35	32.93
<i>Echinocardium cordatum</i>	0.48	0.67	1.11	0.75	1.28	34.22
<i>Nephtys hombergii</i>	0.51	0.49	1.09	0.94	1.26	35.48
<i>Mediomastus fragilis</i>	0.28	0.99	1.09	1.11	1.26	36.74
<i>Scalibregma inflatum</i>	0.2	0.95	1.09	1.09	1.26	38
<i>Ophiura albida</i>	0.29	0.78	1.03	0.97	1.19	39.19
NEMERTEA	0.61	0.79	1.02	0.94	1.18	40.37
<i>Conopeum reticulum</i>	0.08	0.69	0.93	1.34	1.07	41.44
<i>Glycera (juv)</i>	0.52	0	0.89	0.74	1.03	42.46
<i>Electra monostachys</i>	0	0.49	0.88	1.05	1.02	43.48
<i>Caulleriella alata</i>	0.51	0.38	0.87	0.88	1.01	44.49
NEMATODA	0.21	0.58	0.87	0.66	1	45.49
<i>Goniada maculata</i>	0.45	0.48	0.87	0.87	1	46.49
<i>Bathyporeia sarsi</i>	0.41	0	0.83	0.7	0.96	47.45
<i>Lanice conchilega</i>	0.19	0.72	0.83	0.81	0.95	48.4
<i>Aspidelectra melolontha</i>	0.08	0.46	0.79	0.95	0.91	49.31
<i>Magelona mirabilis</i>	0.35	0	0.76	0.44	0.88	50.19





Appendix Table 18. The positions of the 2012 *Sabellaria spinulosa* ground-truth stations informed by the interpretation of high resolution side scan sonar data and the rationale behind selection. Navigational positions are recorded in UTM (WGS84) Zone 31 Northern.

Station	Longitude	Latitude	Area	Feature Identified	Rationale for sampling
S01	1.660660163	51.41855861	SE	Possible dense <i>Sabellaria</i> aggregations	Closely adjacent to area above where anomalous zone continues. Signature typical of
S02	1.66758016	51.41297734	SE	Possible <i>Sabellaria</i> aggregations in broad channel	Typical <i>Sabellaria</i> signature
S03	1.655653189	51.41909348	SE	Possible dense <i>Sabellaria</i> aggregations	Area of prominent <i>Sabellaria</i> signature
S04	1.651484688	51.41854799	SE	Possible <i>Sabellaria</i> aggregations in broad channel	Anomalous zone sampled above ends. Area of typical <i>Sabellaria</i> signature although
S05	1.642516154	51.42277086	SE	Possible <i>Sabellaria</i> boundary and sand ripples, near turbine station	Area of sand between area of moderate to high density <i>Sabellaria</i> - boundary establishment
S06	1.645504345	51.42065611	SE	Possible dense <i>Sabellaria</i> aggregations with turbine jack scars	Typical <i>Sabellaria</i> signature with raised texture - continues on from area above to establish extent
S07	1.655088992	51.41075137	SE	Anomalous channel - <i>Sabellaria</i> ?	Area of sand with a band of anomalous terrain
S08	1.649880412	51.41338724	SE	Anomalous channel - <i>Sabellaria</i> ?	Anomalous band continues
S09	1.661360734	51.43472732	E	Possible dense <i>Sabellaria</i> aggregations	Prominent ' <i>Sabellaria</i> ' signature
S10	1.657320247	51.43929675	E	Possible dense <i>Sabellaria</i> aggregations	Prominent ' <i>Sabellaria</i> ' signature begins
S11	1.662677079	51.43708226	E	Possible dense <i>Sabellaria</i> aggregations	Prominent ' <i>Sabellaria</i> ' signature continues
S12	1.665146698	51.43538787	E	Possible dense <i>Sabellaria</i> aggregations	Prominent ' <i>Sabellaria</i> ' signature begins
S13	1.666954994	51.43691458	E	Possible dense <i>Sabellaria</i> aggregations	Prominent ' <i>Sabellaria</i> ' signature begins
S14	1.662802404	51.4397784	E	Possible dense <i>Sabellaria</i> aggregations	Prominent ' <i>Sabellaria</i> ' signature continues
S15	1.648893446	51.4426177	E	Patchy <i>Sabellaria</i>	Small patch of moderate <i>Sabellaria</i>
S16	1.652802392	51.44389223	E	Possible area of moderate <i>Sabellaria</i>	Patchy <i>Sabellaria</i> signature near turbine station
S17	1.642702052	51.44943052	NE	Possible area of moderate <i>Sabellaria</i>	Patchy <i>Sabellaria</i> signature - boundary of moderate growth
S18	1.644516493	51.45154106	NE	Possible patch of moderate <i>Sabellaria</i>	Patchy <i>Sabellaria</i> signature - moderate growth
S19	1.599185273	51.43795925	W	Anomalous outcrop	Anomalous patch of terrain of pebbly outcrop
S20	1.597163193	51.4375163	W	Anomalous outcrop	Anomalous patch of terrain of pebbly outcrop
S21	1.58866737	51.44072115	NW	Possible <i>Sabellaria</i>	Typical <i>Sabellaria</i> signature with visible trawl scars
S22	1.588607587	51.44345822	NW	Possible <i>Sabellaria</i>	Low amplitude anomalous terrain near turbine station, signature typical of <i>Sabellaria</i>
S23	1.593380435	51.4449601	NW	Possible <i>Sabellaria</i>	Typical <i>Sabellaria</i> signature with visible trawl scars
S24	1.585002121	51.44770852	NW	Possible <i>Sabellaria</i>	Low amplitude anomalous, signature typical of <i>Sabellaria</i>
S25	1.57506978	51.44571048	NW	Anomalous outcrop	Anomalous patch of terrain of pebbly outcrop
S26	1.569462714	51.44549558	NW	Anomalous outcrop	Anomalous patch of terrain of pebbly outcrop
S27	1.617830887	51.42155889	SW	Possible <i>Sabellaria</i>	Low amplitude anomalous terrain near turbine station, signature typical of <i>Sabellaria</i>
S28	1.621342248	51.42262946	SW	Possible <i>Sabellaria</i>	Low amplitude anomalous terrain begins, signature typical of <i>Sabellaria</i>
S29	1.631031566	51.41478852	S	Patchy <i>Sabellaria</i>	Small patch of possible <i>Sabellaria</i>
S30	1.648691132	51.404409	S	Anomalous channel - <i>Sabellaria</i> ?	Anomalous band continues
HMa	1.679100524	51.43322961	E	No feature identified in 2012 SSS data	Historic mussel bed - 2007
HSa	1.630040075	51.41284589	S	No feature identified in 2012 SSS data	Dense historic <i>Sabellaria</i> region - 2007
HSb	1.66022794	51.43267268	E	No feature identified in 2012 SSS data	Dense historic <i>Sabellaria</i> region - 2007
HSc	1.665675713	51.44144944	E	No feature identified in 2012 SSS data	Dense historic <i>Sabellaria</i> region - 2007




Thanet Wind Farm

Sabellaria Assessment

Legend










-  Turbine Location
-  Cable Route
-  Side Scan Sonar Coverage
-  Thanet Offshore Wind Farm Boundary

Side Scan Sonar Station

-  Side Scan Sonar Station
-  Historic Dense *Sabellaria* Region
-  Historic Mussel Bed

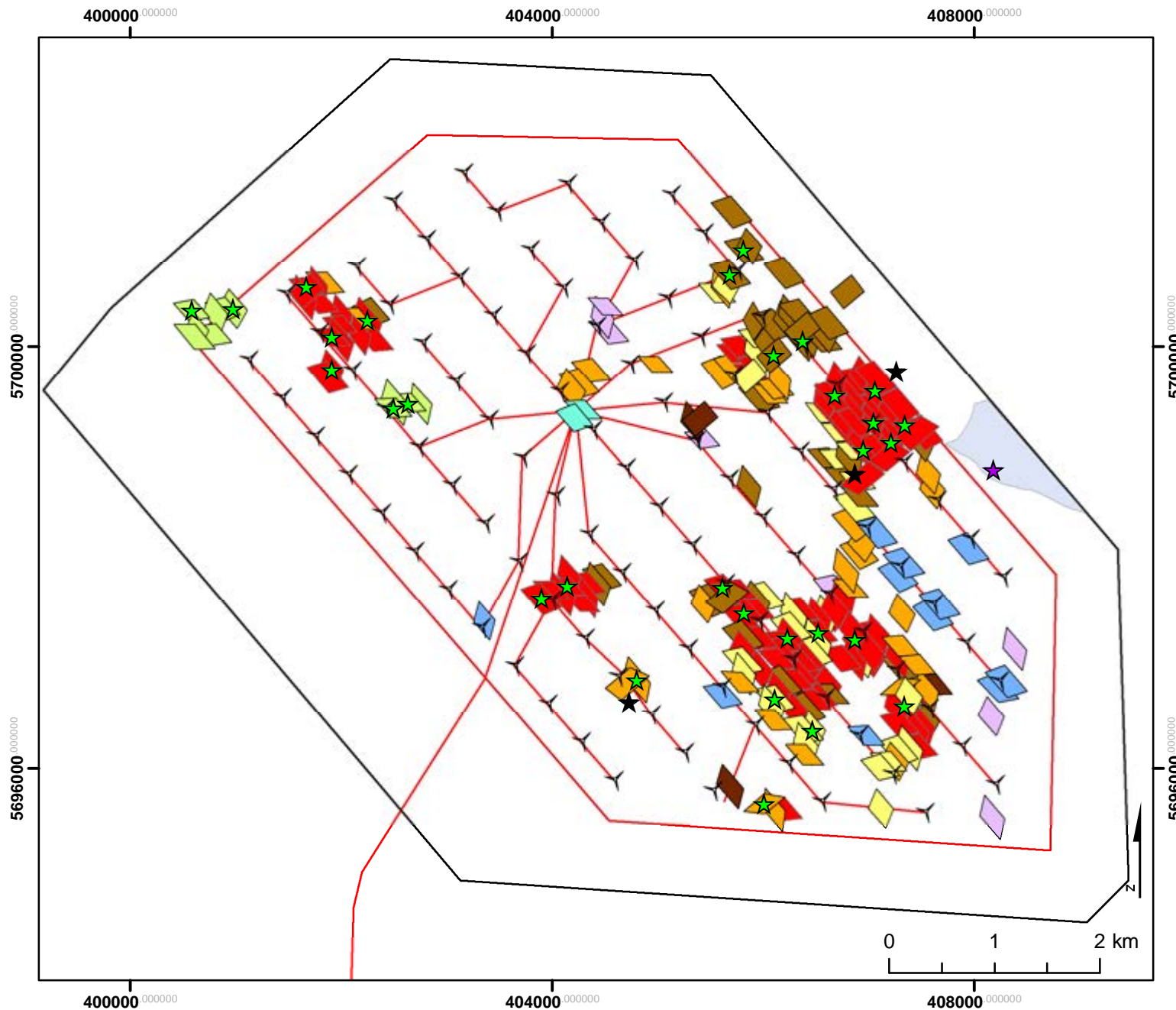
Side Scan Sonar Interpretation

Detailed description of each polygon in spreadsheet

-  Anomalous patch / pebbly outcrop
-  Anomalous band / channel
-  Patchy anomalous terrain
-  Isolated anomalous patchy terrain
-  Highly anomalous terrain
-  Examples of common terrain including sand, sand ripples and waves
-  Turbine jack scars
-  Fantastic image of cables
-  Wreck



Co-ordinate System: UTM31N



Project	Thanet Wind Farm
Date	27/06/12
Version	A
Comments	
Author	JP



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Appendix Table 20. The interpretation of seabed ground-truthing images collected as part of the 2012 *Sabellaria spinulosa* assessment across TOWF during post-construction monitoring, undertaken in August 2012.

Station	Image	Broad Classification	Description	Overall Site Classification	Equivalent 2005 & 2007 Classification
S01	A	Patchy <i>Sabellaria spinulosa</i> aggregation on fine sand	Patchy <i>Sabellaria spinulosa</i> aggregation (elevation score of 10 with 15% coverage) on fine Sand (S). Fauna identified includes: <i>Asterias</i> , <i>Ophiura</i> , & hydroids	Moderate patches of <i>Sabellaria spinulosa</i> . Medium to high elevation score. Low to medium percentage cover.	Moderate <i>Sabellaria</i> growth
	B	Patchy <i>Sabellaria spinulosa</i> aggregation on fine sand	Patchy <i>Sabellaria spinulosa</i> aggregation (elevation score of 10 with 15% coverage) on fine Sand (S). Fauna identified includes: <i>Asterias</i> , <i>Ophiura</i> & hydroids		
	C	Moderate to dense <i>Sabellaria spinulosa</i> aggregation on fine sand	Moderate to dense <i>Sabellaria spinulosa</i> aggregation (elevation score of 80 with 60% coverage) on fine Sand (S). Fauna identified includes: <i>Liocarcinus</i> , <i>Pandalus</i> & Sertulariidae		
	D	Patchy <i>Sabellaria spinulosa</i> aggregation on fine sand	Patchy <i>Sabellaria spinulosa</i> aggregation (elevation score of 5 with 10% coverage) on fine Sand (S). Fauna identified includes: <i>Ophiura</i> , Paguridae, <i>Nemertesia</i> & Sertulariidae		
	E	Dense <i>Sabellaria spinulosa</i> aggregation on fine sand	Dense <i>Sabellaria spinulosa</i> aggregation (elevation score of 90 with 50% coverage) on fine Sand (S). Fauna identified includes: <i>Flustra</i> , <i>Alcyonidium diaphanum</i> , <i>Asterias</i> , <i>Liocarcinus</i> , <i>Sabella pavonina</i> , <i>Aequipecten opercularis</i> & <i>Nemertesia</i>		
S02	A	Patchy <i>Sabellaria spinulosa</i> aggregation on fine sand	Patchy <i>Sabellaria spinulosa</i> aggregation (elevation score of 50 with 6% coverage) on fine Sand (S). Fauna identified includes: <i>Nemertesia</i> , <i>Galathea</i> , <i>Actiniaria</i> , Paguridae, <i>Pandalus</i> & <i>Cancer pagurus</i>	Moderate patches of <i>Sabellaria spinulosa</i> . Medium to high elevation score. Low percentage cover.	Moderate <i>Sabellaria</i> growth
	B	Patchy <i>Sabellaria spinulosa</i> aggregation on fine sand	Patchy <i>Sabellaria spinulosa</i> aggregation (elevation score of 80 with 10% coverage) on fine Sand (S). Fauna identified includes: <i>Ophiura</i> , <i>Pandalus</i> , hydroids & <i>Galathea</i>		
	C	Patchy <i>Sabellaria spinulosa</i> aggregation on fine sand	Patchy <i>Sabellaria spinulosa</i> aggregation (elevation score of 70 with 15% coverage) on fine Sand (S). Fauna identified includes: <i>Liocarcinus</i> , <i>Ophiura</i> , <i>Actiniaria</i> & <i>Alcyonidium diaphanum</i>		
	D	Isolated clump of <i>Sabellaria spinulosa</i> aggregation on fine sand	Isolated clump of <i>Sabellaria spinulosa</i> aggregation (elevation score of 50 with 3% coverage) on fine Sand (S). Fauna identified includes: <i>Ophiura</i>		
	E	Patchy <i>Sabellaria spinulosa</i> aggregation on fine sand	Patchy <i>Sabellaria spinulosa</i> aggregation (elevation score of 70 with 20% coverage) on fine Sand (S). Fauna identified includes: <i>Alcyonidium diaphanum</i> , <i>Galathea</i> , <i>Pandalus</i> , <i>Ophiura</i> , hydroids, <i>Actiniaria</i> & <i>Nemertesia</i>		

Station	Image	Broad Classification	Description	Overall Site Classification	Equivalent 2005 & 2007 Classification
S03	A	Dense <i>Sabellaria spinulosa</i> aggregation amongst broken tubes	Dense <i>Sabellaria spinulosa</i> aggregation amongst broken tubes (elevation score of 70 with 80% coverage). Fauna identified includes: <i>Necora puber</i> , Actiniaria, <i>Nemertesia</i> & <i>Asterias</i>	Dense patches of <i>Sabellaria spinulosa</i> amongst broken tubes, obvious signs of damage. Medium to high elevation score. Medium to high percentage cover.	Dense <i>Sabellaria</i> growth
	B	Clumps of moderate <i>Sabellaria spinulosa</i> aggregation amongst broken tubes	Clumps of moderate <i>Sabellaria spinulosa</i> aggregation amongst broken tubes (elevation score of 50 with 70% coverage), with obvious signs of damage. Fauna identified includes: hydroids, <i>Alcyonidium diaphanum</i> , Actiniaria, Paguridae & <i>Ebalia</i>		
	C	Clumps of moderate <i>Sabellaria spinulosa</i> aggregation amongst broken tubes	Clumps of moderate <i>Sabellaria spinulosa</i> aggregation amongst broken tubes (elevation score of 40 with 70% coverage), with obvious signs of damage. Fauna identified includes: <i>Alcyonidium diaphanum</i> , Paguridae, <i>Ophiura</i> , Actiniaria, & <i>Ebalia</i>		
	D	Dense <i>Sabellaria spinulosa</i> aggregation amongst broken tubes	Dense <i>Sabellaria spinulosa</i> aggregation amongst broken tubes (elevation score of 60 with 60% coverage), with obvious signs of damage. Fauna identified includes: <i>Asterias</i> , <i>Ophiura</i> & Sertulariidae		
	E	Dense <i>Sabellaria spinulosa</i> aggregation amongst broken tubes	Dense <i>Sabellaria spinulosa</i> aggregation amongst broken tubes (elevation score of 55 with 80% coverage). Fauna identified includes: <i>Asterias</i> , Buccinum & <i>Ophiura</i>		
S04	A	Mixed sediment with broken <i>Sabellaria spinulosa</i> tubes	Mixed gravelly Sand substrata with cobbles (gS + C) and broken <i>Sabellaria spinulosa</i> tubes. Fauna identified includes: hydroids, <i>Ophiura</i> , <i>Nemertesia</i> , <i>Hinia</i> & Sertulariidae	Moderate patches of <i>Sabellaria spinulosa</i> amongst broken tubes. Notable <i>Sabellaria</i> rubble.	Moderate <i>Sabellaria</i> growth
	B	Mixed sediment with small patch of <i>Sabellaria spinulosa</i> aggregation	Mixed gravelly Sand substrata and cobbles (gS + C) with a small patch of <i>Sabellaria spinulosa</i> aggregation. Fauna identified includes: <i>Alcyonidium diaphanum</i> , <i>Ophiura</i> & <i>Nemertesia</i>		
	C	Mixed sediment with clumps of <i>Sabellaria spinulosa</i> aggregation	Mixed gravelly Sand substrata and cobbles (gS + C) with clumps of broken <i>Sabellaria spinulosa</i> aggregation. Fauna identified includes: <i>Alcyonidium diaphanum</i> , <i>Ophiura</i> & Sertulariidae		
	D	Moderate <i>Sabellaria spinulosa</i> aggregation on gravelly Sand	Moderate <i>Sabellaria spinulosa</i> aggregation (elevation score of 50 with 70% coverage) on gravelly Sand (gS). Fauna identified includes: <i>Alcyonidium diaphanum</i> , <i>Ophiura</i> , Actiniaria, <i>Nemertesia</i> & Sertulariidae		
	E	Dense <i>Sabellaria spinulosa</i> aggregation amongst broken tubes	Dense <i>Sabellaria spinulosa</i> aggregation amongst broken tubes (elevation score of 70 with 70% coverage). Fauna identified includes: <i>Ophiura</i> , Actiniaria & Pandalus		

Station	Image	Broad Classification	Description	Overall Site Classification	Equivalent 2005 & 2007 Classification
S05	A	Dense patch of <i>Sabellaria spinulosa</i> aggregation on Sand	Dense patch of <i>Sabellaria spinulosa</i> aggregation (elevation score of 70 with 45% coverage) on Sand (S). Fauna identified includes: Paguridae, Sertulariidae, <i>Nemertesia</i> & <i>Pandalus</i>	Dense patches of <i>Sabellaria spinulosa</i> on Sand. High elevation score. Low to medium percentage cover.	Moderate <i>Sabellaria</i> growth
	B	Dense patch of <i>Sabellaria spinulosa</i> aggregation on Sand	Dense patch of <i>Sabellaria spinulosa</i> aggregation (elevation score of 80 with 30% coverage) on Sand (S). Fauna identified includes: Sertulariidae, <i>Asterias</i> , <i>Pagurus</i> , <i>Nemertesia</i> , <i>Aequipecten opercularis</i> , <i>Liocarcinus</i> , <i>Pandalus</i> & Actiniaria		
	C	Dense patch of <i>Sabellaria spinulosa</i> aggregation on Sand	Dense patch of <i>Sabellaria spinulosa</i> aggregation (elevation score of 80 with 35% coverage) on Sand (S). Fauna identified includes: <i>Liocarcinus</i> , Paguridae, <i>Pandalus</i> , <i>Ophiura</i> , Sertulariidae, <i>Nemertesia</i> & <i>Aequipecten opercularis</i>		
	D	Dense patch of <i>Sabellaria spinulosa</i> aggregation on Sand	Dense patch of <i>Sabellaria spinulosa</i> aggregation (elevation score of 60 with 10% coverage) on Sand (S). Fauna identified includes: Paguridae, <i>Pandalus</i> , <i>Ophiura</i> & <i>Carcinus</i>		
	E	Dense patches of <i>Sabellaria spinulosa</i> aggregation on Sand	Dense patches of <i>Sabellaria spinulosa</i> aggregation (elevation score of 70 with 30% coverage) on Sand (S). Fauna identified includes: <i>Pandalus</i> , Sertulariidae, <i>Ophiura</i> , <i>Nemertesia</i> & Actiniaria		
S06	A	Dense <i>Sabellaria spinulosa</i> aggregation on Sand	Dense <i>Sabellaria spinulosa</i> aggregation (elevation score of 75 with 70% coverage) on Sand (S). Fauna identified includes: Paguridae, <i>Pandalus</i> , <i>Aequipecten opercularis</i> , Actiniaria & Sertulariidae	Dense <i>Sabellaria spinulosa</i> growth. High elevation score. High percentage cover	Dense <i>Sabellaria</i> growth
	B	Dense <i>Sabellaria spinulosa</i> aggregation on Sand	Dense <i>Sabellaria spinulosa</i> aggregation (elevation score of 80 with 80% coverage) on Sand (S). Fauna identified includes: Paguridae, <i>Pandalus</i> , <i>Aequipecten opercularis</i> & Sertulariidae		
	C	Dense <i>Sabellaria spinulosa</i> aggregation on Sand	Dense <i>Sabellaria spinulosa</i> aggregation (elevation score of 80 with 70% coverage) on Sand (S). Fauna identified includes: Paguridae, <i>Pandalus</i> & <i>Nemertesia</i>		
	D	Dense <i>Sabellaria spinulosa</i> aggregation on Sand	Dense <i>Sabellaria spinulosa</i> aggregation (elevation score of 80 with 90% coverage) on Sand (S). Fauna identified includes: <i>Pandalus</i> & <i>Aequipecten opercularis</i>		
	E	Dense <i>Sabellaria spinulosa</i> aggregation on Sand	Dense <i>Sabellaria spinulosa</i> aggregation (elevation score of 80 with 60% coverage) on Sand (S). Fauna identified includes: Sertulariidae, Paguridae, Actiniaria & <i>Nemertesia</i>		

Station	Image	Broad Classification	Description	Overall Site Classification	Equivalent 2005 & 2007 Classification
S07	A	Mixed coarse substrata	Mixed substrata comprising gravelly Sand (sG). Fauna identified includes: Hydroids, Sertulariidae, <i>Turritella</i> ?, encrusting bryozoans & Actiniaria	No <i>Sabellaria spinulosa</i> . sandy Gravel with occasional cobbles.	No <i>Sabellaria</i>
	B	Mixed coarse substrata	Mixed substrata comprising gravelly Sand (sG). Sertulariidae identified		
	C	Mixed coarse substrata	Mixed substrata comprising gravelly Sand (sG). Fauna identified includes: Hydroids, Sertulariidae & <i>Pomatoceros</i>		
	D	Mixed coarse substrata	Mixed substrata comprising gravelly Sand (sG). Fauna identified includes: <i>Ophiura</i> , hydroids, Sertulariidae & Paguridae		
	E	Mixed coarse substrata	Mixed substrata comprising gravelly Sand (sG). Fauna identified includes: Sertulariidae, Actiniaria & <i>Urticina</i>		
S08	A	Mixed gravelly Sand substrata	Mixed gravelly Sand (gS) substrata, with broken shell fragments. Fauna identified includes: Hydroids, Sertulariidae, <i>Turritella?</i> , encrusting bryozoans & Actiniaria	Mixed sandy substrata with some slight evidence of <i>Sabellaria spinulosa</i> .	<i>Sabellaria</i> accretions
	B	Small clump of <i>Sabellaria spinulosa</i> on gravelly Sand	Some very broken up old <i>Sabellaria spinulosa</i> tubes with one small intact clump, on gravelly Sand (gS) with chalk. Fauna identified includes: Sertulariidae		
	C	Mixed sandy Gravel substrata with broken tubes of <i>Sabellaria spinulosa</i>	Mixed sandy Gravel (sG) with chalk and broken tubes of <i>Sabellaria spinulosa</i> . Fauna identified includes: Hydroids, Sertulariidae & <i>Pomatoceros</i>		
	D	Mixed sandy Gravel substrata with broken tubes of <i>Sabellaria spinulosa</i>	Mixed sandy Gravel (sG) with chalk, cobble and broken tubes of <i>Sabellaria spinulosa</i> . Fauna identified includes: <i>Ophiura</i> , hydroids, Sertulariidae & Paguridae		
	E	Mixed gravelly Sand substrata with broken tubes of <i>Sabellaria spinulosa</i>	Mixed gravelly Sand (gS) substrata, with broken tubes of <i>Sabellaria spinulosa</i> . Fauna identified includes: Sertulariidae, Actiniaria & <i>Urticina</i>		

Station	Image	Broad Classification	Description	Overall Site Classification	Equivalent 2005 & 2007 Classification
S09	A	Dense <i>Sabellaria spinulosa</i> aggregation	Dense <i>Sabellaria spinulosa</i> aggregation (elevation score of 60 with 90% coverage) on Sand (S). Fauna identified includes: <i>Alcyonidium diaphanum</i> , <i>Pandalus</i> , Sertulariidae, Actiniaria & <i>Nemertesia</i>	Dense <i>Sabellaria spinulosa</i> growth. Medium to high elevation score. High percentage cover	Dense <i>Sabellaria</i> growth
	B	Dense <i>Sabellaria spinulosa</i> aggregation	Dense <i>Sabellaria spinulosa</i> aggregation (elevation score of 60 with 90% coverage) on Sand (S). Fauna identified includes: <i>Alcyonidium diaphanum</i> , <i>Liocarcinus</i> , <i>Aequipecten opercularis</i> , <i>Ophiura</i> & Actiniaria		
	C	Dense <i>Sabellaria spinulosa</i> aggregation	Dense <i>Sabellaria spinulosa</i> aggregation (elevation score of 65 with 90% coverage) on Sand (S). Fauna identified includes: <i>Pandalus</i> , Paguridae, <i>Aequipecten opercularis</i> , Actiniaria & <i>Liocarcinus</i>		
	D	Dense <i>Sabellaria spinulosa</i> aggregation	Dense <i>Sabellaria spinulosa</i> aggregation (elevation score of 70 with 80% coverage) on Sand (S). Fauna identified includes: Paguridae, Actiniaria, <i>Pandalus</i> , <i>Galathea</i> , <i>Aequipecten opercularis</i> & <i>Nemertesia</i>		
	E	Dense <i>Sabellaria spinulosa</i> aggregation	Dense <i>Sabellaria spinulosa</i> aggregation (elevation score of 60 with 90% coverage) on Sand (S). Fauna identified includes: <i>Liocarcinus?</i> Actiniaria, Paguridae, <i>Aequipecten opercularis</i> , <i>Nemertesia</i> & <i>Ophiura</i>		
S10	A	Dense <i>Sabellaria spinulosa</i> aggregation amongst broken tubes	Dense <i>Sabellaria spinulosa</i> aggregation amongst broken tubes (elevation score of 70 with 95% coverage). Fauna identified includes: <i>Buccinum</i> , <i>Asterias</i> , Actiniaria, <i>Pagurus</i> & <i>Nemertesia</i>	Dense <i>Sabellaria spinulosa</i> . Medium to high elevation score. High percentage cover. Notable <i>Sabellaria</i> rubble.	Dense <i>Sabellaria</i> growth
	B	Dense <i>Sabellaria spinulosa</i> aggregation	Dense <i>Sabellaria spinulosa</i> aggregation (elevation score of 75 with 95% coverage) on Sand (S). Fauna identified includes: Sertulariidae & Actiniaria		
	C	Dense <i>Sabellaria spinulosa</i> aggregation amongst broken tubes and rubble	Dense <i>Sabellaria spinulosa</i> aggregation amongst broken tubes and rubble (elevation score of 65 with 95% coverage). Fauna identified includes: <i>Nemertesia</i> , <i>Aequipecten opercularis</i> & Sertulariidae		
	D	Dense <i>Sabellaria spinulosa</i> aggregation amongst broken tubes and rubble	Dense <i>Sabellaria spinulosa</i> aggregation amongst broken tubes and rubble (elevation score of 65 with 90% coverage). Fauna identified includes: Sertulariidae, Spider crab, Actiniaria, Sea squirt?, <i>Nemertesia</i> , <i>Pandalus</i> & Paguridae		
	E	Clumps of <i>Sabellaria spinulosa</i> amongst rubble	Clumps of <i>Sabellaria spinulosa</i> amongst rubble (elevation score of 30 with 75% coverage). Fauna identified includes: <i>Pagurus</i> , Sertulariidae, Actiniaria, Sea squirt & <i>Nemertesia</i>		

Station	Image	Broad Classification	Description	Overall Site Classification	Equivalent 2005 & 2007 Classification
S11	A	Dense <i>Sabellaria spinulosa</i> aggregation	Dense <i>Sabellaria spinulosa</i> aggregation (elevation score of 70 with 95% coverage) on Sand (S). Fauna identified includes: Actiniaria, <i>Nemertesia</i> & <i>Liocarcinus</i> ?	Dense <i>Sabellaria spinulosa</i> . Medium to high elevation score. High percentage cover. Notable <i>Sabellaria</i> rubble.	Dense <i>Sabellaria</i> growth
	B	Dense <i>Sabellaria spinulosa</i> aggregation	Dense <i>Sabellaria spinulosa</i> aggregation (elevation score of 70 with 95% coverage) on Sand (S). Fauna identified includes: <i>Asterias</i> , Sertulariidae, <i>Nemertesia</i> & Actiniaria		
	C	Dense <i>Sabellaria spinulosa</i> aggregation	Dense <i>Sabellaria spinulosa</i> aggregation (elevation score of 70 with 95% coverage) on Sand (S). Fauna identified includes: <i>Asterias</i> , <i>Pagurus</i> , Sertulariidae, <i>Aequipecten opercularis</i> & <i>Ebalia</i>		
	D	Clumps of <i>Sabellaria spinulosa</i> amongst rubble	Clumps of <i>Sabellaria spinulosa</i> amongst broken up tubes and rubble. Fauna identified includes: <i>Pagurus</i> , <i>Galathea?</i> & <i>Nemertesia</i>		
	E	Clumps of <i>Sabellaria spinulosa</i> amongst rubble	Clumps of <i>Sabellaria spinulosa</i> amongst broken up tubes and rubble. Fauna identified includes: <i>Pagurus</i> , <i>Pandalus</i> , Actiniaria & <i>Ophiura</i>		
S12	A	Dense <i>Sabellaria spinulosa</i> aggregation	Dense <i>Sabellaria spinulosa</i> aggregation (elevation score of 70 with 80% coverage) on Sand (S). Fauna identified includes: <i>Asterias</i> & Actiniaria	Dense <i>Sabellaria spinulosa</i> growth. Medium to high elevation score. High percentage cover	Dense <i>Sabellaria</i> growth
	B	Dense <i>Sabellaria spinulosa</i> aggregation	Dense <i>Sabellaria spinulosa</i> aggregation (elevation score of 70 with 80% coverage) on Sand (S). Fauna identified includes: Actiniaria, <i>Pandalus</i> , Paguridae, Sertulariidae, <i>Aequipecten opercularis</i> , <i>Liocarcinus</i>		
	C	Dense <i>Sabellaria spinulosa</i> aggregation	Dense <i>Sabellaria spinulosa</i> aggregation (elevation score of 70 with 80% coverage) on Sand (S). Fauna identified includes: <i>Asterias</i> , Sertulariidae, <i>Nemertesia</i> , Actiniaria, <i>Pandalus</i> & <i>Ebalia</i>		
	D	Dense <i>Sabellaria spinulosa</i> aggregation	Dense <i>Sabellaria spinulosa</i> aggregation (elevation score of 70 with 80% coverage) on Sand (S). Fauna identified includes: <i>Asterias</i> , Paguridae, <i>Aequipecten opercularis</i> & <i>Pandalus</i>		
	E	Dense <i>Sabellaria spinulosa</i> aggregation	Dense <i>Sabellaria spinulosa</i> aggregation (elevation score of 70 with 90% coverage) on Sand (S). Fauna identified includes: Paguridae, <i>Nemertesia</i> , <i>Pandalus</i> & Actiniaria		

Station	Image	Broad Classification	Description	Overall Site Classification	Equivalent 2005 & 2007 Classification
S13	A	Dense <i>Sabellaria spinulosa</i> aggregation	Dense <i>Sabellaria spinulosa</i> aggregation (elevation score of 70 with 90% coverage) on Sand (S). Fauna identified includes: <i>Asterias</i> , Paguridae, Fish - blenny? <i>Necora puber</i> ? Actiniaria & <i>Nemertesia</i>	Dense <i>Sabellaria spinulosa</i> growth. Medium to high elevation score. High percentage cover	Dense <i>Sabellaria</i> growth
	B	Dense <i>Sabellaria spinulosa</i> aggregation	Dense <i>Sabellaria spinulosa</i> aggregation (elevation score of 70 with 90% coverage) on Sand (S). Fauna identified includes: <i>Asterias</i> , <i>Liocarcinus</i> , Paguridae, Sertulariidae, Actiniaria, <i>Ophiura</i> & <i>Pandalus</i>		
	C	Dense <i>Sabellaria spinulosa</i> aggregation	Dense <i>Sabellaria spinulosa</i> aggregation (elevation score of 80 with 75% coverage) on Sand (S). Fauna identified includes: Sertulariidae, <i>Ophiura</i> , <i>Galathea</i> ? <i>Liocarcinus</i> ? <i>Pandalus</i> , Paguridae, Actiniaria & <i>Nemertesia</i>		
	D	Dense <i>Sabellaria spinulosa</i> aggregation	Dense <i>Sabellaria spinulosa</i> aggregation (elevation score of 70 with 90% coverage) on Sand (S). Fauna identified includes: <i>Asterias</i> , Paguridae, <i>Ophiura</i> & <i>Nemertesia</i>		
	E	Dense <i>Sabellaria spinulosa</i> aggregation	Dense <i>Sabellaria spinulosa</i> aggregation (elevation score of 80 with 70% coverage) on Sand (S). Fauna identified includes: Paguridae, <i>Nemertesia</i> , <i>Pandalus</i> & Actiniaria		
S14	A	Sandy substrate	Sandy substrate (S). Fauna identified includes: Actiniaria & <i>Ophiura</i>	Moderate <i>Sabellaria spinulosa</i> aggregation. Low to high elevation score. Low percentage cover.	Moderate <i>Sabellaria</i> growth
	B	Small clumps of <i>Sabellaria spinulosa</i> on sand	Small clumps of <i>Sabellaria spinulosa</i> (elevation score of 10 with 10% coverage) on Sand (S). Fauna identified includes: <i>Pagurus</i> & <i>Nemertesia</i>		
	C	Patchy <i>Sabellaria spinulosa</i> aggregation on sand	<i>Sabellaria spinulosa</i> aggregation (elevation score of 50 with 10% coverage) on Sand (S)		
	D	Patchy <i>Sabellaria spinulosa</i> aggregation on sand	Patchy <i>Sabellaria spinulosa</i> aggregation (elevation score of 20 with 10% coverage) on Sand (S). Fauna identified includes: <i>Pagurus</i> , Sertulariidae & <i>Ophiura</i>		
	E	Dense patch of <i>Sabellaria spinulosa</i> aggregation	Dense patch of <i>Sabellaria spinulosa</i> aggregation amongst broken tubes and rubble (elevation score of 75 with 50% coverage) on Sand (S). Fauna identified includes: <i>Pagurus</i> , Sertulariidae, <i>Nemertesia</i> & <i>Pandalus</i>		

Station	Image	Broad Classification	Description	Overall Site Classification	Equivalent 2005 & 2007 Classification
S15	A	Moderate patches of <i>Sabellaria spinulosa</i> on Sand	Moderate patches of <i>Sabellaria spinulosa</i> aggregation (elevation score of 50 with 20% coverage) on Sand (S). Fauna identified includes: <i>Alcyonidium diaphanum</i> , Paguridae, Sertulariidae & Actiniaria	Moderate <i>Sabellaria spinulosa</i> growth on predominantly sandy substrate. Medium to high elevation score. Low percentage cover.	Moderate <i>Sabellaria</i> growth
	B	Moderate patches of <i>Sabellaria spinulosa</i> on gravelly Sand	Moderate patches of <i>Sabellaria spinulosa</i> aggregation (elevation score of 50 with 20% coverage) on gravelly Sand (gS). Fauna identified includes: Paguridae, Sertulariidae, <i>Pandalus</i> & <i>Nemertesia</i>		
	C	Moderate <i>Sabellaria spinulosa</i> aggregation on gravelly Sand	Moderate <i>Sabellaria spinulosa</i> aggregation (elevation score of 75 with 20% coverage) on gravelly Sand (gS). Fauna identified includes: Sertulariidae, <i>Pandalus</i> , <i>Alcyonidium diaphanum</i> & <i>Liocarcinus</i>		
	D	Patchy <i>Sabellaria spinulosa</i> aggregation on gravelly Sand	Patchy <i>Sabellaria spinulosa</i> aggregation (elevation score of 60 with 10% coverage) on gravelly Sand (gS). Fauna identified includes: Sertulariidae, <i>Alcyonidium diaphanum</i> & <i>Aequipecten opercularis</i>		
	E	Patchy <i>Sabellaria spinulosa</i> aggregation on gravelly Sand	Patchy <i>Sabellaria spinulosa</i> aggregation (elevation score of 75 with 20% coverage) on gravelly Sand (gS). Fauna identified includes: <i>Pagurus</i> , Sertulariidae, <i>Nemertesia</i> & <i>Pandalus</i>		
S16	A	<i>Sabellaria spinulosa</i> aggregation on Sand and Cobble	<i>Sabellaria spinulosa</i> aggregation (elevation score of 75 with 30% coverage) on Sand and Cobble (S+C). Fauna identified includes: Sertulariidae, Actiniaria & <i>Alcyonidium diaphanum</i>	Moderate <i>Sabellaria spinulosa</i> growth on cobbly substrate. Medium to high elevation score. Low to medium percentage cover.	Moderate <i>Sabellaria</i> growth
	B	<i>Sabellaria spinulosa</i> aggregation on Sand and Cobble	<i>Sabellaria spinulosa</i> aggregation (elevation score of 40 with 5% coverage) on Sand and Cobble (S+C). Fauna identified includes: <i>Alcyonidium diaphanum</i> , <i>Pomatoceros</i> , Sertulariidae & Actiniaria		
	C	Dense <i>Sabellaria spinulosa</i> aggregation on gravelly Sand and Cobble	Dense <i>Sabellaria spinulosa</i> aggregation (elevation score of 80 with 50% coverage) on gravelly Sand and Cobble (gS + C). Fauna identified includes: Paguridae, Sertulariidae & <i>Nemertesia</i>		
	D	<i>Sabellaria spinulosa</i> aggregation amongst rubble	<i>Sabellaria spinulosa</i> aggregation amongst rubble (elevation score of 80 with 30% coverage) on sandy Gravel (sG). Fauna identified includes: <i>Alcyonidium diaphanum</i> , <i>Pandalus</i> & <i>Nemertesia</i>		
	E	Patchy <i>Sabellaria spinulosa</i> aggregation on gravelly Sand	Patchy <i>Sabellaria spinulosa</i> aggregation (elevation score of 40 with 10% coverage) on gravelly Sand (gS). Fauna identified includes: Actiniaria, Sertulariidae, Paguridae & <i>Alcyonidium diaphanum</i>		

Station	Image	Broad Classification	Description	Overall Site Classification	Equivalent 2005 & 2007 Classification
S17	A	<i>Sabellaria spinulosa</i> accretions on fine Sand	<i>Sabellaria spinulosa</i> accretions (elevation score of 50 with 10% coverage) on fine Sand (S). Fauna identified includes: Sertulariidae, <i>Nemertesia</i> , Paguridae, <i>Carcinus?</i> & <i>Lagis?</i>	<i>Sabellaria spinulosa</i> accretions on a fine sandy substrate.	<i>Sabellaria</i> accretions
	B	<i>Sabellaria spinulosa</i> accretions on fine Sand	<i>Sabellaria spinulosa</i> accretions (elevation score of 50 with 40% coverage) on fine Sand (S). Fauna identified includes: Sertulariidae, <i>Pandalus</i> , Paguridae & <i>Nemertesia</i>		
	C	Fine Sand substrate	Fine Sand substrate (S). Fauna identified includes: <i>Ophiura</i>		
	D	Patchy <i>Sabellaria spinulosa</i> on fine Sand	Patchy of <i>Sabellaria spinulosa</i> (elevation score of 30 with 10% coverage) on fine Sand (S). Fauna identified includes: Sertulariidae, Paguridae & <i>Liocarcinus</i>		
	E	Fine Sand substrate	Fine Sand substrate (S). Fauna identified includes: <i>Ophiura</i> & Sertulariidae		
S18	A	Sandy substrate	Sandy substrate (S). Fauna identified includes: <i>Ophiura</i>	<i>Sabellaria spinulosa</i> accretions on predominantly sandy substrate.	<i>Sabellaria</i> accretions
	B	Sandy substrate with a clump of <i>Sabellaria spinulosa</i>	Sandy substrate (S) with a clump of <i>Sabellaria spinulosa</i> . Fauna identified includes: <i>Ophiura</i>		
	C	Low relief, patchy <i>Sabellaria spinulosa</i> accretion	Low relief, patchy <i>Sabellaria spinulosa</i> accretion (elevation score of 20 with 20% coverage) on sandy (S) substrate. Fauna identified includes: <i>Ophiura</i> & <i>Nemertesia</i>		
	D	Mixed substrata	Mixed substrata comprising gravelly Sand (gS). Fauna identified includes: <i>Ophiura</i> , Paguridae & Sertulariidae		
	E	Small clumps of <i>Sabellaria spinulosa</i> on gravelly Sand	Small clumps of <i>Sabellaria spinulosa</i> (elevation score of 10 with 10% coverage) on gravelly Sand (gS). Fauna identified includes: <i>Ophiura</i> , Paguridae & <i>Nemertesia</i>		
S19	A	Mixed substrata	Mixed substrata comprising cobbley Sand (cS).	Mixed substrata. No <i>Sabellaria</i>	No <i>Sabellaria</i>
	B	Mixed substrata	Mixed substrata comprising cobbley Sand (cS). Fauna identified includes: Sertulariidae, Actiniaria & <i>Buccinum</i>		
	C	Large boulder	Large Boulder (B). Fauna identified: Actiniaria & gastropoda		
	D	Sandy substrate	Sandy substrate (S) with shelly fragments		
	E	Sandy substrate	Sandy substrate (S) with shelly fragments. Fauna identified: Sertulariidae & Actiniaria		

Station	Image	Broad Classification	Description	Overall Site Classification	Equivalent 2005 & 2007 Classification
S20	A	Large boulder	Large Boulder (B). Fauna identified: Sertulariidae, <i>Actinothoe sphyrodeta</i> & <i>Alcyonidium diaphanum</i>	Mixed substrata. No <i>Sabellaria</i>	No <i>Sabellaria</i>
	B	Mixed substrata	Mixed substrata comprising sandy Gravel, Cobbles and Boulder (sG, C + B). Fauna identified includes: Sertulariidae, <i>Actinothoe sphyrodeta</i> , <i>Alcyonidium diaphanum</i> & Paguridae		
	C	Mixed substrata	Mixed substrata comprising sandy Gravel and Cobble (sG + C). Fauna identified includes: <i>Alcyonidium diaphanum</i> & Sertulariidae		
	D	Mixed substrata	Mixed substrata comprising Sandy gravel, Cobbles and Boulder (sG, C + B). Fauna identified includes: Sertulariidae, <i>Alcyonidium diaphanum</i>		
	E	Mixed substrata	Mixed substrata comprising Sandy gravel and Cobbles (sG + C). Fauna identified includes: <i>Actinothoe sphyrodeta</i> , <i>Flustra</i> , <i>Alcyonidium diaphanum</i> , Actiniaria & Sertulariidae		
S21	A	Moderate patches of <i>Sabellaria spinulosa</i> amongst broken tubes and sand	Moderate patches of <i>Sabellaria spinulosa</i> (elevation score of 50 with 60% coverage) amongst broken tubes and Sand (S). Fauna identified includes: <i>Asterias</i> , <i>Hyas</i> , <i>Carcinus</i> , Sertulariidae & Actiniaria	Moderate <i>Sabellaria spinulosa</i> growth on predominantly sandy substrate.	Moderate <i>Sabellaria</i> growth
	B	Mixed substrata with <i>Sabellaria spinulosa</i> rubble	Mixed substrata (sG) with <i>Sabellaria spinulosa</i> rubble. Fauna identified includes: <i>Ophiura</i> , <i>Hyas</i> & hydroids		
	C	Moderate patches of <i>Sabellaria spinulosa</i> amongst broken tubes and sand	Moderate patches of <i>Sabellaria spinulosa</i> (elevation score of 60 with 60% coverage) amongst broken tubes and Sand (S). Fauna identified includes: Paguridae, <i>Hyas</i> , Sertulariidae & Nemertesia		
	D	Moderate patches of <i>Sabellaria spinulosa</i> amongst broken tubes and sand	Moderate patches of <i>Sabellaria spinulosa</i> (elevation score of 45 with 30% coverage) amongst broken tubes and Sand (S). Fauna identified includes: Paguridae, <i>Asterias</i> , <i>Hyas</i> & <i>Ophiura</i>		
	E	Moderate patches of <i>Sabellaria spinulosa</i> amongst broken tubes and sand	Moderate patches of <i>Sabellaria spinulosa</i> (elevation score of 45 with 40% coverage) amongst broken tubes and Sand (S). Fauna identified includes: Paguridae, <i>Hyas</i> , <i>Ophiura</i> , Sertulariidae & Actiniaria		

Station	Image	Broad Classification	Description	Overall Site Classification	Equivalent 2005 & 2007 Classification
S22	A	Patchy <i>Sabellaria spinulosa</i> aggregation on gravelly sand	Moderate patches of <i>Sabellaria spinulosa</i> (elevation score of 20 with 60% coverage) amongst broken tubes and gravelly Sand (gS). Fauna identified includes: Paguridae, <i>Ophiura</i> , Sertulariidae, Actiniaria & <i>Nemertesia</i>	Moderate <i>Sabellaria spinulosa</i> growth. Low to medium elevation score. Low to medium percentage cover. Notable <i>Sabellaria</i> rubble.	Moderate <i>Sabellaria</i> growth
	B	Moderate patches of <i>Sabellaria spinulosa</i> on Sand	Moderate patches of <i>Sabellaria spinulosa</i> (elevation score of 40 with 50% coverage) amongst broken tubes and Sand (S). Fauna identified includes: Paguridae, <i>Ophiura</i> , Sertulariidae & <i>Nemertesia</i>		
	C	Patchy <i>Sabellaria spinulosa</i> aggregation on gravelly Sand	Moderate patches of <i>Sabellaria spinulosa</i> (elevation score of 20 with 40% coverage) amongst broken tubes and gravelly Sand (gS). Fauna identified includes: Paguridae, <i>Ophiura</i> , Actiniaria, Sertulariidae & <i>Nemertesia</i>		
	D	Moderate patch of <i>Sabellaria spinulosa</i> on Sand	Moderate patches of <i>Sabellaria spinulosa</i> (elevation score of 50 with 30% coverage) amongst broken tubes and Sand (S). Fauna identified includes: Paguridae, <i>Ophiura</i> , Sertulariidae & <i>Nemertesia</i>		
	E	<i>Sabellaria spinulosa</i> rubble on sand	<i>Sabellaria spinulosa</i> rubble on Sand (S). Fauna identified includes: <i>Ophiura</i>		
S23	A	Sandy substrate with a small amount of <i>Sabellaria spinulosa</i> rubble	Sandy substrate (S) with a small amount of <i>Sabellaria spinulosa</i> rubble and broken shell.	Sandy substrate with a very low percentage of <i>Sabellaria</i> rubble.	No <i>Sabellaria</i>
	B	Sandy substrate with a small amount of <i>Sabellaria spinulosa</i> rubble	Sandy substrate (S) with a small amount of <i>Sabellaria spinulosa</i> rubble and broken shell. Fauna identified includes: <i>Lagis koreni</i>		
	C	Sandy substrate with a small amount of <i>Sabellaria spinulosa</i> rubble	Sandy substrate (S) with a small amount of <i>Sabellaria spinulosa</i> rubble and broken shell. Fauna identified includes: <i>Ophiura</i>		
	D	Sandy substrate with a small amount of <i>Sabellaria spinulosa</i> rubble	Sandy substrate (S) with a small amount of <i>Sabellaria spinulosa</i> rubble and broken shell. Fauna identified includes: <i>Ophiura</i> , Actiniaria & <i>Nemertesia</i>		
	E	Sandy substrate with a small amount of <i>Sabellaria spinulosa</i> rubble	Sandy substrate (S) with a small amount of <i>Sabellaria spinulosa</i> rubble and broken shell. Fauna identified includes: <i>Ophiura</i>		

Station	Image	Broad Classification	Description	Overall Site Classification	Equivalent 2005 & 2007 Classification
S24	A	Mixed shelly substrata	Mixed substrata comprising sandy Gravel (sG) and broken shell. Fauna identified includes: Paguridae & <i>Ophiura</i>	Mixed shelly substrata	No <i>Sabellaria</i>
	B	Mixed shelly substrata	Mixed substrata comprising sandy Gravel (sG) and broken shell. Fauna identified includes: <i>Alcyonidium diaphanum</i> , <i>Lagis koreni</i> , Paguridae & <i>Ophiura</i>		
	C	Mixed shelly substrata	Mixed substrata comprising sandy Gravel (sG) and broken shell. Fauna identified includes: Sertulariidae, <i>Alcyonidium diaphanum</i> & <i>Ophiura</i>		
	D	Mixed shelly substrata	Mixed substrata comprising sandy Gravel (sG) and broken shell. Fauna identified includes: <i>Ophiura</i> , Paguridae & <i>Alcyonidium diaphanum</i>		
	E	Mixed shelly substrata	Mixed substrata comprising sandy Gravel (sG), <i>Sabellaria spinulosa</i> rubble and broken shell. Fauna identified includes: <i>Alcyonidium diaphanum</i> , Sertulariidae & <i>Ophiura</i>		
S25	A	Mixed shelly substrata	Mixed substrata comprising sandy Gravel (sG) and broken shell. Fauna identified includes: <i>Alcyonidium diaphanum</i> , <i>Ophiura</i> , <i>Ensis</i> & Sertulariidae	Mixed shelly substrata with patchy <i>Sabellaria spinulosa</i> aggregation.	<i>Sabellaria</i> accretions
	B	Mixed shelly substrata	Mixed substrata comprising sandy Gravel (sG) and broken shell. Fauna identified includes: <i>Ensis</i> ? <i>Lagis koreni</i> , <i>Alcyonidium diaphanum</i> & <i>Ophiura</i>		
	C	Mixed shelly substrata	Mixed substrata comprising sandy Gravel (sG) and broken shell. Fauna identified includes: <i>Lagis koreni</i> , Sertulariidae & Actiniaria		
	D	Patchy <i>Sabellaria spinulosa</i> aggregation on mixed shelly substrata	Low relief patches of <i>Sabellaria spinulosa</i> (elevation score of 6 with 10% coverage) amongst mixed substrata comprising sandy Gravel (sG) and broken shell. Fauna identified includes: Sertulariidae, <i>Ophiura</i> & <i>Nemertesia</i>		
	E	Mixed shelly substrata	Mixed substrata comprising Gravel and Cobbles (sG+C) and broken shell. Fauna identified includes: Sertulariidae, <i>Actiniaria</i> , <i>Lagis</i> ? <i>Alcyonidium diaphanum</i> & <i>Ensis</i>		
S26	A	Mixed shelly substrata	Mixed substrata comprising gravelly Sand (gS) and broken shell. Fauna identified includes: <i>Ophiura</i>	Mixed shelly substrata.	No <i>Sabellaria</i>
	B	Mixed shelly substrata	Mixed substrata comprising gravelly Sand (gS) and broken shell. Fauna identified includes: <i>Asterias</i> & <i>Ophiura</i>		
	C	Mixed shelly substrata	Mixed substrata comprising gravelly Sand (gS) and broken shell. Fauna identified includes: Actiniaria, <i>Alcyonidium diaphanum</i> & <i>Ophiura</i>		
	D	Mixed shelly substrata	Mixed substrata comprising gravelly Sand (gS) and broken shell. Fauna identified includes: Paguridae, <i>Alcyonidium diaphanum</i> & Actiniaria		
	E	Mixed shelly substrata	Mixed substrata comprising gravelly Sand (gS) and broken shell. Fauna identified includes: <i>Asterias</i> & Paguridae		

Station	Image	Broad Classification	Description	Overall Site Classification	Equivalent 2005 & 2007 Classification
S27	A	Mixed substrata with clumps of <i>Sabellaria spinulosa</i> amongst broken tubes	Mixed gravelly Sand (gS) substrata with clumps of <i>Sabellaria spinulosa</i> (elevation score of 5 with 20% coverage) amongst broken tubes. Fauna identified includes: Paguridae, <i>Nemertesia</i> , <i>Ophiura</i> , <i>Ebalia</i> & Actiniaria	Moderate to dense patches of <i>Sabellaria spinulosa</i> on mixed sediments with cobbles. Low to high elevation scores. Low to medium percentage cover.	Moderate <i>Sabellaria</i> growth
	B	A dense patch of <i>Sabellaria spinulosa</i> aggregation on mixed substrata	A dense patch of <i>Sabellaria spinulosa</i> (elevation score of 80 with 50% coverage) on gravelly Sand (gS). Fauna identified includes: <i>Nemertesia</i> , <i>Asterias</i> , hydroids, <i>Ophiura</i> , Sertulariidae		
	C	Small clumps of <i>Sabellaria spinulosa</i> on sand	Small clumps of <i>Sabellaria spinulosa</i> (elevation score of 2 with 5% coverage) on Sand (S). Fauna identified includes: Paguridae, <i>Nemertesia</i> , <i>Ophiura</i> , hydroids & <i>Asterias</i>		
	D	Dense patches of <i>Sabellaria spinulosa</i> aggregation on sand	Dense patches of <i>Sabellaria spinulosa</i> (elevation score of 80 with 30% coverage) on sand. Fauna identified includes: Paguridae, <i>Nemertesia</i> , <i>Asterias</i> , <i>Pandalus</i> , Sertulariidae & Actiniaria		
	E	A dense patch of <i>Sabellaria spinulosa</i> aggregation on sand with cobble	A dense patch of <i>Sabellaria spinulosa</i> aggregation (elevation score of 80 with 20% coverage) on sand with cobble. Fauna identified includes: Paguridae, <i>Nemertesia</i> , <i>Asterias</i> , hydroids, <i>Pandalus</i> & Sertulariidae		
S28	A	Small clumps of <i>Sabellaria spinulosa</i> on sand	Small clumps of <i>Sabellaria spinulosa</i> (elevation score of 30 with 10% coverage) on Sand (S). Fauna identified includes: <i>Alcyonidium diaphanum</i> , <i>Ophiura</i> , <i>Nemertesia</i> , Actiniaria & Paguridae	Low to moderately elevated <i>Sabellaria spinulosa</i> aggregation on sandy substrate. Low percentage cover.	Moderate <i>Sabellaria</i> growth
	B	Moderate patches of <i>Sabellaria spinulosa</i> on sand	Moderate patches of <i>Sabellaria spinulosa</i> (elevation score of 60 with 10% coverage) on Sand (S). Fauna identified includes: <i>Asterias</i> , <i>Nemertesia</i> , Actiniaria, Paguridae & hydroids		
	C	Moderate patches of <i>Sabellaria spinulosa</i> on sand	Moderate patches of <i>Sabellaria spinulosa</i> (elevation score of 60 with 15% coverage) on Sand (S). Fauna identified includes: <i>Ophiura</i> , <i>Nemertesia</i> , Sertulariidae, Paguridae & <i>Pandalus</i>		
	D	Moderate patches of <i>Sabellaria spinulosa</i> amongst broken tubes and sand	Moderate patches of <i>Sabellaria spinulosa</i> (elevation score of 30 with 10% coverage) amongst broken tubes and Sand (S). Fauna identified includes: <i>Asterias</i> , hydroids, <i>Pandalus</i> , <i>Ensis</i> & <i>Nemertesia</i>		
	E	Moderate patches of <i>Sabellaria spinulosa</i> on sand	Moderate patches of <i>Sabellaria spinulosa</i> (elevation score of 50 with 20% coverage) on Sand (S). Fauna identified includes: <i>Asterias</i> , hydroids, <i>Pandalus</i> , <i>Ensis</i> & <i>Nemertesia</i>		

Station	Image	Broad Classification	Description	Overall Site Classification	Equivalent 2005 & 2007 Classification
S29	A	Mixed substrata	Mixed substrata comprising gravelly Sand and Cobble (gS + C). Fauna identified includes: <i>Ophiura</i>	No <i>Sabellaria</i> . Mixed sediments	No <i>Sabellaria</i>
	B	Mixed substrata	Mixed substrata comprising gravelly Sand and Cobble (gS + C). Fauna identified includes: <i>Ophiura</i> , Paguridae, Actiniaria & <i>Echinus</i>		
	C	Mixed substrata	Mixed substrata comprising gravelly Sand and Cobble (gS + C). Fauna identified includes: Sertulariidae, Paguridae & Actiniaria		
	D	Mixed substrata	Mixed substrata comprising Sand and Cobble (S + C). Fauna identified includes: Sertulariidae, Paguridae & <i>Ophiura</i>		
	E	Mixed substrata	Mixed substrata comprising Sand and Cobble (S + C). Fauna identified includes: Sertulariidae & Actiniaria		
S30	A	Mixed substrata	Mixed substrata comprising gravelly Sand (gS). Fauna identified includes: <i>Ophiura</i> , hydroids, Paguridae, Actiniaria & <i>Psammechinus</i>	Mixed substrata. No <i>Sabellaria</i>	No <i>Sabellaria</i>
	B	Mixed substrata	Mixed substrata comprising gravelly Sand (gS). Fauna identified includes: <i>Flustra</i> , <i>Ophiura</i> , hydroids & Sertulariidae		
	C	Mixed substrata	Mixed substrata comprising gravelly Sand (gS). Fauna identified includes: <i>Ophiura</i> , hydroids, Sertulariidae, <i>Psammechinus</i> & Paguridae		
	D	Mixed substrata	Mixed substrata comprising gravelly Sand (gS). Fauna identified includes: <i>Ophiura</i> , hydroids, <i>Psammechinus</i> & <i>Alcyonidium diaphanum</i>		
	E	Mixed substrata	Mixed substrata comprising gravelly Sand & Cobble (gS & C). Fauna identified includes: <i>Ophiura</i> , hydroids, <i>Psammechinus</i> , Sertulariidae & <i>Spatangus</i> ?		
HMa	A	Boulder	Boulder with encrusting epifauna. Fauna identified includes: <i>Asterias</i> , encrusting fauna, Sertulariidae & Actiniaria	Large Boulder with encrusting fauna.	No <i>Sabellaria</i>
	B	Boulder	Boulder with encrusting epifauna. Fauna identified includes: Actiniaria & hydroids		
	C	Boulder	Boulder with encrusting epifauna. Fauna identified includes: <i>Asterias</i> & Sertulariidae		
	D	Mixed substrata	Mixed substrata comprising sandy Gravel (sG) with broken shell fragments		
	E	Boulder	Boulder with encrusting epifauna. Fauna identified includes: Sertulariidae, <i>Asterias</i> & Actiniaria		

Station	Image	Broad Classification	Description	Overall Site Classification	Equivalent 2005 & 2007 Classification
HSa	A	Sandy substrate with a small amount of <i>Sabellaria spinulosa</i> rubble	Sandy substrate (S) with a small amount of <i>Sabellaria spinulosa</i> rubble. Fauna identified includes: <i>Pomatoceros</i> & Sertulariidae	<i>Sabellaria spinulosa</i> rubble on mixed sediments.	<i>Sabellaria</i> accretions
	B	Mixed substrate with <i>Sabellaria spinulosa</i> rubble	Mixed substrata comprising gravelly Sand (gS) with <i>Sabellaria spinulosa</i> rubble. Fauna identified includes: <i>Buccinum</i> & Actiniaria		
	C	Sandy substrate with a small amount of <i>Sabellaria spinulosa</i> rubble	Sandy substrate (S) with a small amount of <i>Sabellaria spinulosa</i> rubble. Fauna identified includes: Actiniaria		
	D	Sandy substrate with a small amount of <i>Sabellaria spinulosa</i> rubble	Sandy substrate (S) with a small amount of <i>Sabellaria spinulosa</i> rubble		
	E	Mixed substrata with <i>Sabellaria spinulosa</i> rubble	Mixed substrata comprising gravelly Sand (gS) with <i>Sabellaria spinulosa</i> rubble. Fauna identified includes: Actiniaria		
HSb	A	Dense <i>Sabellaria spinulosa</i> aggregation on mixed sediments	A dense patch of <i>Sabellaria spinulosa</i> aggregation (elevation score of 85 with 40% coverage) on mixed substrata comprising gravelly Sand (gS). Fauna identified includes: Sertulariidae, Squid, Dragonet, <i>Pandalus</i> , Sea scorpion, <i>Nemertesia</i> & <i>Aequipecten opercularis</i>	Dense <i>Sabellaria spinulosa</i> growth. High elevation score. Medium percentage cover	Dense <i>Sabellaria</i> growth
	B	Moderate patches of <i>Sabellaria spinulosa</i> on sand	Moderate patches of <i>Sabellaria spinulosa</i> aggregation (elevation score of 70 with 60% coverage) on Sand (S). Fauna identified includes: Ophiura, <i>Pandalus</i> , <i>Nemertesia</i> , Sertulariidae & Paguridae		
	C	Dense <i>Sabellaria spinulosa</i> aggregation on sand	Dense <i>Sabellaria spinulosa</i> aggregation (elevation score of 70 with 60% coverage) on Sand (S). Fauna identified includes: Alcyonidium diaphanum, Paguridae, Ophiura, <i>Pandalus</i> & <i>Aequipecten opercularis</i>		
	D	Dense patch of <i>Sabellaria spinulosa</i> aggregation on mixed sediments	A dense patch of <i>Sabellaria spinulosa</i> aggregation (elevation score of 85 with 15% coverage) on mixed substrata comprising gravelly Sand (gS). Fauna identified includes: <i>Liocarcinus</i> , Ophiura, <i>Pandalus</i> , <i>Aequipecten opercularis</i> & <i>Nemertesia</i>		
	E	Dense patches of <i>Sabellaria spinulosa</i> aggregation on sand	Dense patches of <i>Sabellaria spinulosa</i> aggregation (elevation score of 70 with 20% coverage) on Sand (S). Fauna identified includes: Ophiura, <i>Nemertesia</i> & <i>Pandalus</i>		

Station	Image	Broad Classification	Description	Overall Site Classification	Equivalent 2005 & 2007 Classification
HSc	A	A moderate patch of <i>Sabellaria spinulosa</i> aggregation on sand	A moderate patch of <i>Sabellaria spinulosa</i> aggregation (elevation score of 50 with 10% coverage) on Sand (S). Fauna identified includes: <i>Nemertesia</i> , <i>Asterias</i> , hydroids, <i>Ophiura</i> & Sertulariidae	Dense <i>Sabellaria spinulosa</i> growth on sandy substrate. High elevation score. low to high percentage cover.	Dense <i>Sabellaria</i> growth
	B	Dense <i>Sabellaria spinulosa</i> aggregation on sand	Dense <i>Sabellaria spinulosa</i> aggregation (elevation score of 85 with 70% coverage) on Sand (S). Fauna identified includes: Sertulariidae, <i>Pandalus</i> & <i>Nemertesia</i>		
	C	Dense <i>Sabellaria spinulosa</i> aggregation on sand	Dense <i>Sabellaria spinulosa</i> aggregation (elevation score of 95 with 70% coverage) on Sand (S). Fauna identified includes: <i>Pandalus</i> , Paguridae, <i>Aequipecten opercularis</i> & <i>Nemertesia</i>		
	D	A dense patch of <i>Sabellaria spinulosa</i> aggregation on sand	A dense patch of <i>Sabellaria spinulosa</i> aggregation (elevation score of 65 with 10% coverage) on Sand (S). Fauna identified includes: <i>Ophiura</i> , <i>Aequipecten opercularis</i> , <i>Nemertesia</i> & Actiniaria		
	E	Dense <i>Sabellaria spinulosa</i> aggregation on sand	Dense <i>Sabellaria spinulosa</i> aggregation (elevation score of 80 with 40% coverage) on Sand (S). Fauna identified includes: Sertulariidae, <i>Nemertesia</i> & <i>Pandalus</i>		
15	A	Sandy substrate	Sandy substrate (S). Fauna identified: <i>Aequipecten opercularis</i>	<i>Sabellaria spinulosa</i> accretions on predominantly sandy substrate. Low elevation score. Low percentage cover.	<i>Sabellaria</i> accretions
	B	Patchy <i>Sabellaria spinulosa</i> aggregation on Sand	Patchy <i>Sabellaria spinulosa</i> aggregation with rubble (elevation score of 20 with 25% coverage) on Sand (S)		
	C	Small patch of <i>Sabellaria spinulosa</i> aggregation on Sand	Small patch of <i>Sabellaria spinulosa</i> aggregation (elevation score of 20 with 25% coverage) on Sand (S). Fauna identified: <i>Aequipecten opercularis</i> , Paguridae & <i>Pandalus</i>		
	D	Patchy <i>Sabellaria spinulosa</i> aggregation on Sand	Patchy <i>Sabellaria spinulosa</i> aggregation (elevation score of 20 with 10% coverage) on Sand (S). Fauna identified: Paguridae & <i>Pandalus</i>		
	E	Patchy <i>Sabellaria spinulosa</i> aggregation on Sand	Patchy <i>Sabellaria spinulosa</i> aggregation (elevation score of 50 with 30% coverage) on Sand (S). Fauna identified: <i>Aequipecten opercularis</i>		
10	A	Sandy substrate	Sandy substrate (S)	<i>Sabellaria spinulosa</i> accretions on sandy substrate. Low elevation score. Low percentage cover.	<i>Sabellaria</i> accretions
	B	Patchy <i>Sabellaria spinulosa</i> aggregation on Sand	Patchy <i>Sabellaria spinulosa</i> aggregation (elevation score of 25 with 15% coverage) on Sand (S). Fauna identified: Paguridae		
	C	Patchy <i>Sabellaria spinulosa</i> aggregation on Sand	Patchy <i>Sabellaria spinulosa</i> aggregation (elevation score of 20 with 10% coverage) on Sand (S). Fauna identified: <i>Carcinus</i> , <i>Aequipecten opercularis</i>		
	D	Patchy <i>Sabellaria spinulosa</i> aggregation on Sand	Patchy <i>Sabellaria spinulosa</i> aggregation (elevation score of 40 with 40% coverage) on Sand (S). Fauna identified: Sertulariidae		
	E	Sandy substrate	Sandy substrate (S) with small <i>Sabellaria spinulosa</i> clump.		

Station	Image	Broad Classification	Description	Overall Site Classification	Equivalent 2005 & 2007 Classification
22	A	Patchy <i>Sabellaria spinulosa</i> aggregation on sandy Gravel	Patchy <i>Sabellaria spinulosa</i> aggregation (elevation score of 50 with 50% coverage) on sandy Gravel (sG).	<i>Sabellaria spinulosa</i> accretions on mixed substrata. Notable <i>Sabellaria spinulosa</i> rubble.	<i>Sabellaria</i> accretions
	B	Mixed substrata with <i>Sabellaria spinulosa</i> rubble	Mixed substrata comprised of sandy Gravel (sG) and chalk with <i>Sabellaria spinulosa</i> rubble. Fauna identified: <i>Asterias</i> & <i>Ophiura</i>		
	C	Mixed substrata with <i>Sabellaria spinulosa</i> rubble	Mixed substrata comprised of sandy Gravel (sG) and chalk with <i>Sabellaria spinulosa</i> rubble. Fauna identified: Actiniaria & <i>Ophiura</i>		
	D	Mixed substrata with <i>Sabellaria spinulosa</i> rubble	Mixed substrata comprised of sandy Gravel (sG) and chalk with <i>Sabellaria spinulosa</i> rubble. Fauna identified: <i>Asterias</i>		
	E	Patchy <i>Sabellaria spinulosa</i> aggregation on sandy Gravel	Patchy <i>Sabellaria spinulosa</i> aggregation (elevation score of 60 with 40% coverage) on sandy Gravel (sG). Fauna identified: Actiniaria, <i>Aequipecten opercularis</i> & Sertulariidae		

Sabellaria Assessment – Method Statement

One

The Thanet *Sabellaria* density assessment is based on two datasets; one an interpretation of side scan sonar (SSS) coverage across the area, the other a selection of ground truth locations where *Sabellaria* density is known.

Two

Figure 1 shows areas of SSS coverage, drawn as polygons. Each of these polygons is assigned a score (table 1), based on interpretation of the SSS imagery. However, in locations where grab samples are coincident with SSS coverage (figure 2), it is the grab sample from which a density score is derived.

<u>Score</u>	<u>Assessment</u>
0	No <i>Sabellaria</i> Present
1	<i>Sabellaria</i> Accretions
2	Moderate <i>Sabellaria</i> Growth / Patchy Reef
3	Dense <i>Sabellaria</i> Growth / Reef

Table 1: *Sabellaria* assessment scores and justification.

Three

Having assigned scores to all SSS polygons (figure 3), a 50m x 50m grid is layered over the entire Thanet Wind Farm area (figure 4). The grid is used to extract the confidence scores assigned to the SSS polygons. As the SSS polygons overlap, two scores may be present within one grid square. A spatial join, set to extract the lower of the two *Sabellaria* density scores, is used to overcome this problem,. This ensures that *Sabellaria* density is not over-predicted, **although density may be slightly underestimated.**

Four

Having appended the density scores to the grid, an intersect process is then run to append the same scores to a 50m² point grid (figure 5). This grid is subsequently interpolated to create a raster output across the entire Thanet Wind Farm area, illustrating the density and extent of the *Sabellaria* reef present (figure 6).

Assumptions and Limitations

Each SSS polygon is approximately 150m by 200m. Although interpretation of the SSS imagery is conducted by an expert, in some cases, grab samples reveal more or less *Sabellaria* than the interpretation of acoustic data might suggest. In such cases, the entire SSS polygon is assigned the score relevant to the grab sample, **not** the SSS interpretation. There is inevitably some inaccuracy here, as seabed images only capture ~ 0.5m². They are however deemed to be the most accurate record of what is present at that point on the seabed.

The final assessment output (figure 6) is based on an Inverse Distance Weighted (IDW) interpolation technique. IDW interpolation works on the assumption that things found close together are likely to be more similar than those found far apart (ESRI, 2007). Thus, in order to predict *Sabellaria* density at locations with no recorded data, the IDW process takes density scores from those records nearest to the location. The influence of those measured data is greater the closer they are to an unmeasured location. With increasing distance, their influence decreases, hence the name inverse distance weighted. This is deemed the most relevant interpolation technique to use, though interpolated values are not guaranteed to be entirely accurate. Figure 7 shows the interpolated assessment overlain with recorded density values providing a clearer indication of the success of the process in relation to those recorded data.

References

ESRI (2007) How Inverse Distance Weighted (IDW) Interpolation Works, ESRI, 7th August 2007, URL: [http://webhelp.esri.com/arcgisdesktop/9.2/index.cfm?TopicName=How_Inverse_Distance_Weighted_\(IDW\)_interpolation_works](http://webhelp.esri.com/arcgisdesktop/9.2/index.cfm?TopicName=How_Inverse_Distance_Weighted_(IDW)_interpolation_works), Accessed 29th November 2012.

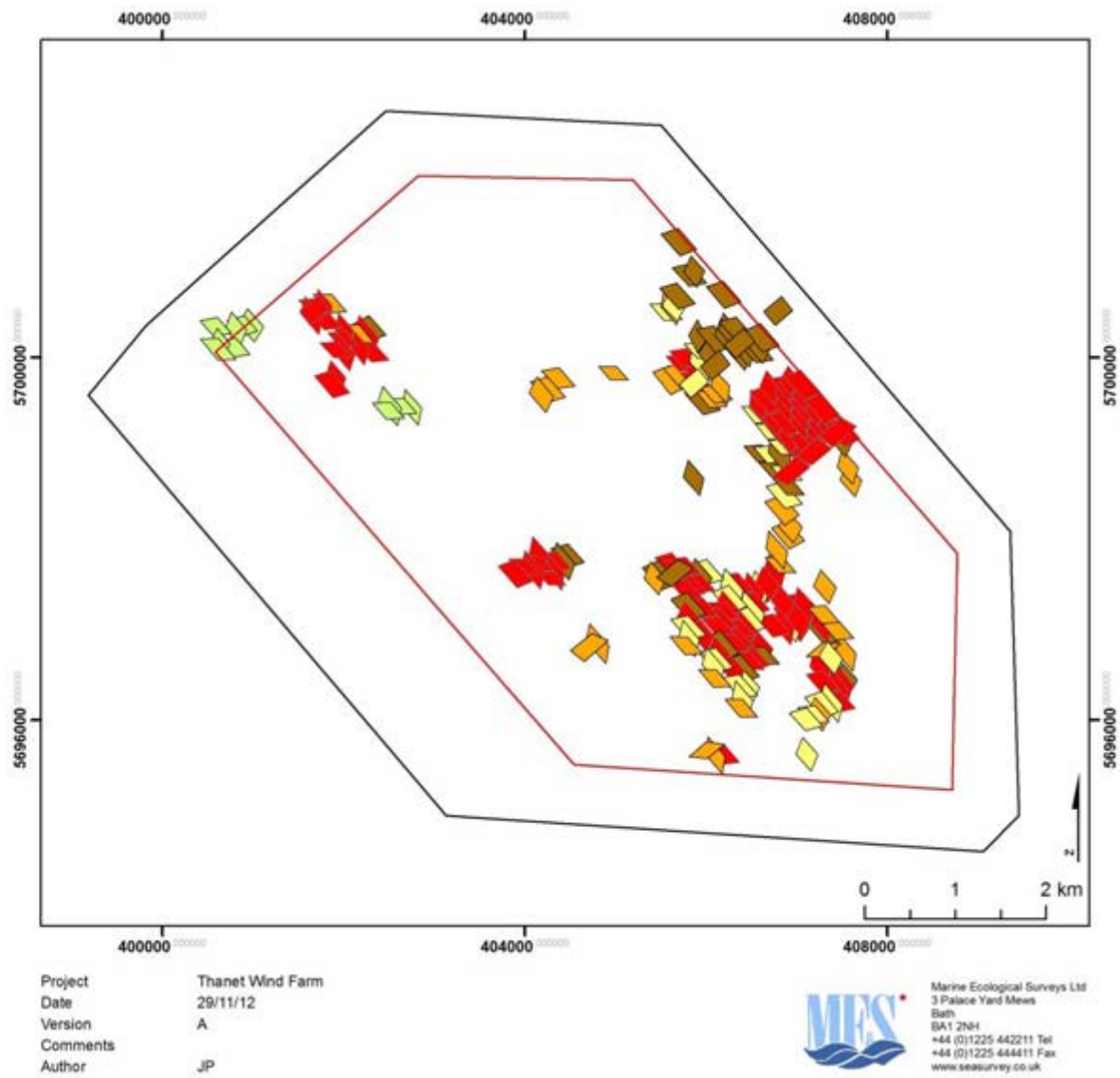
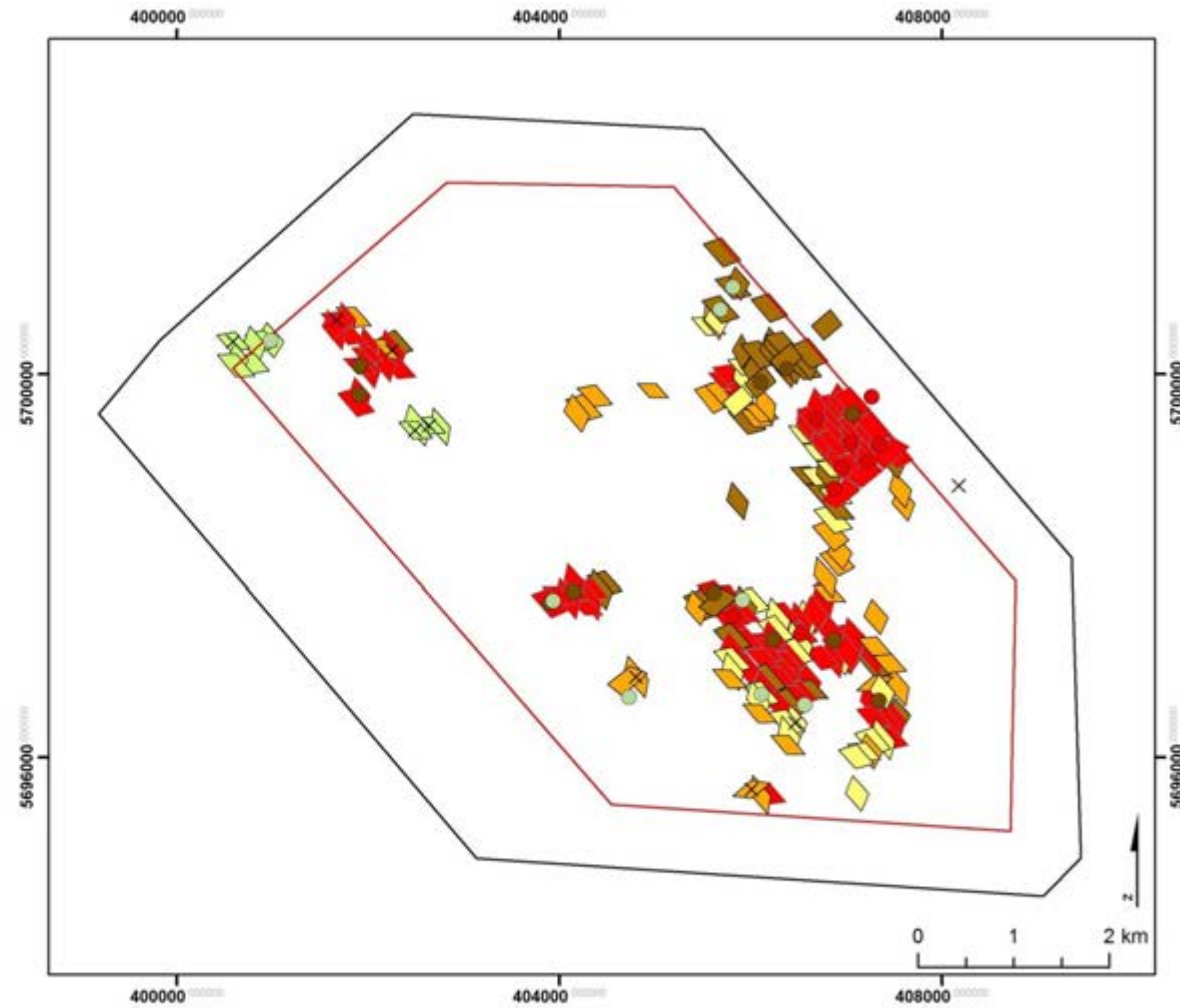


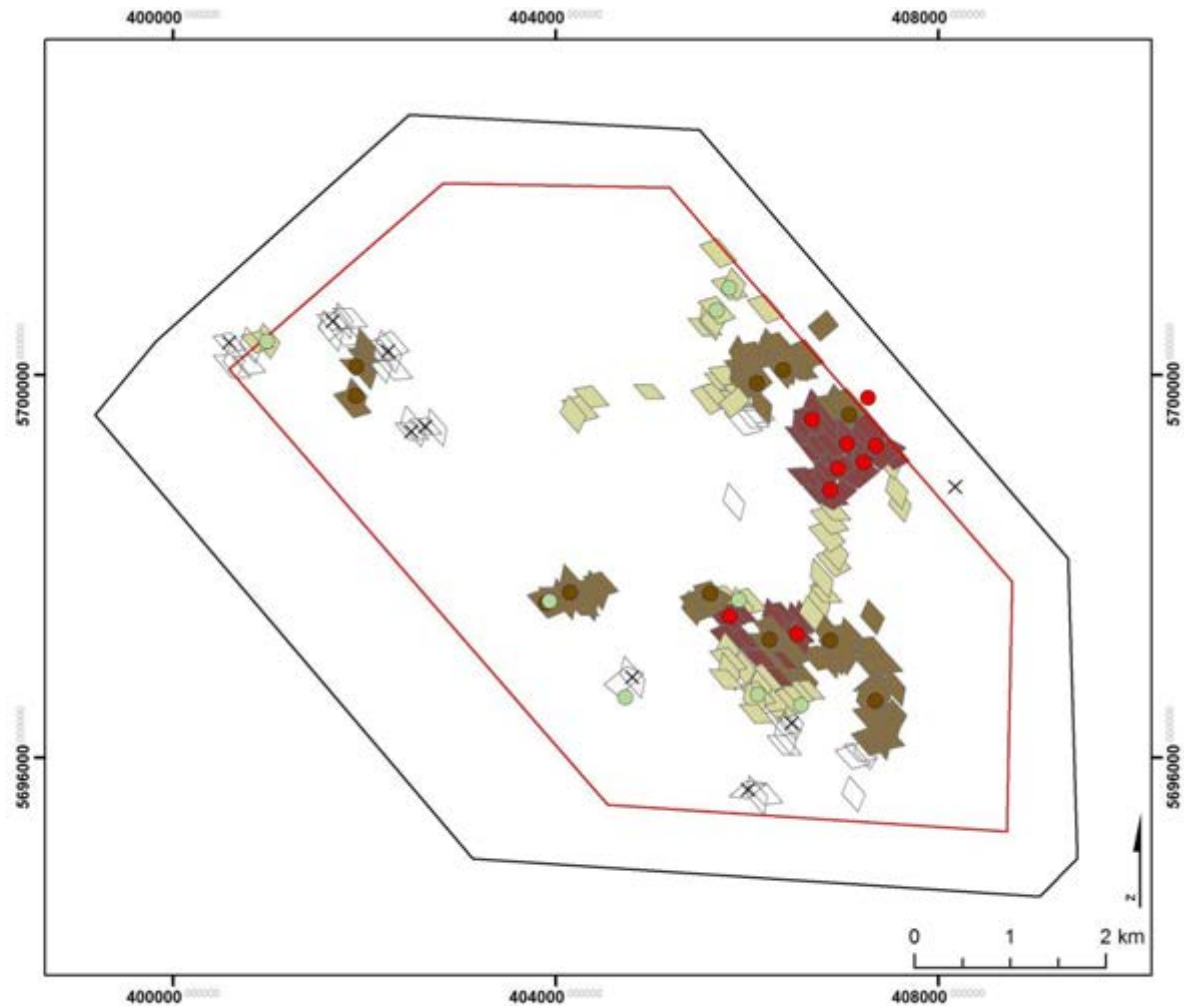
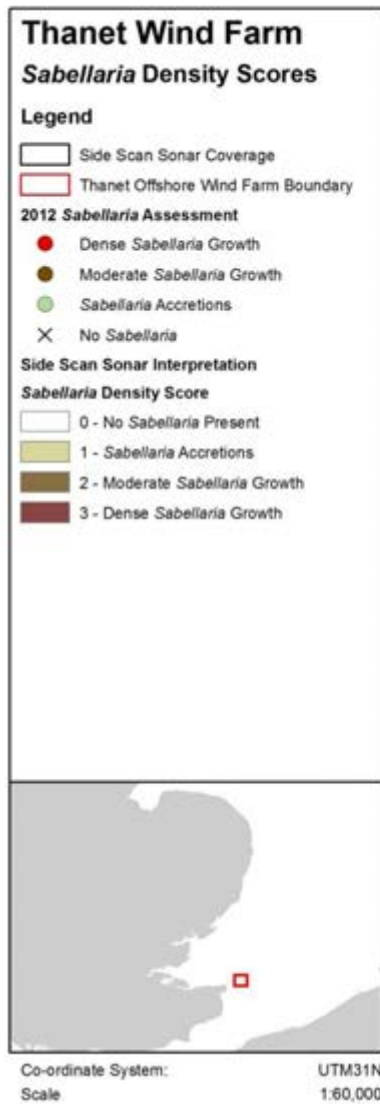
Figure 1: SSS coverage, coloured by interpretation. 'Highly anomalous terrain' represents dense *Sabellaria* growth, with the remaining interpretation suggesting areas of patchy growth.



Project Thanet Wind Farm
 Date 29/11/12
 Version A
 Comments
 Author JP

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Figure 2: Grab samples overlain on SSS coverage polygons. There is some conflict here, but grab samples are taken as the definitive indicators of Sabellaria density, as density at these locations is known.



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Figure 3: Scores assigned to SSS polygons, with corresponding grab samples. The scores go on to form the basis of the density assessment.

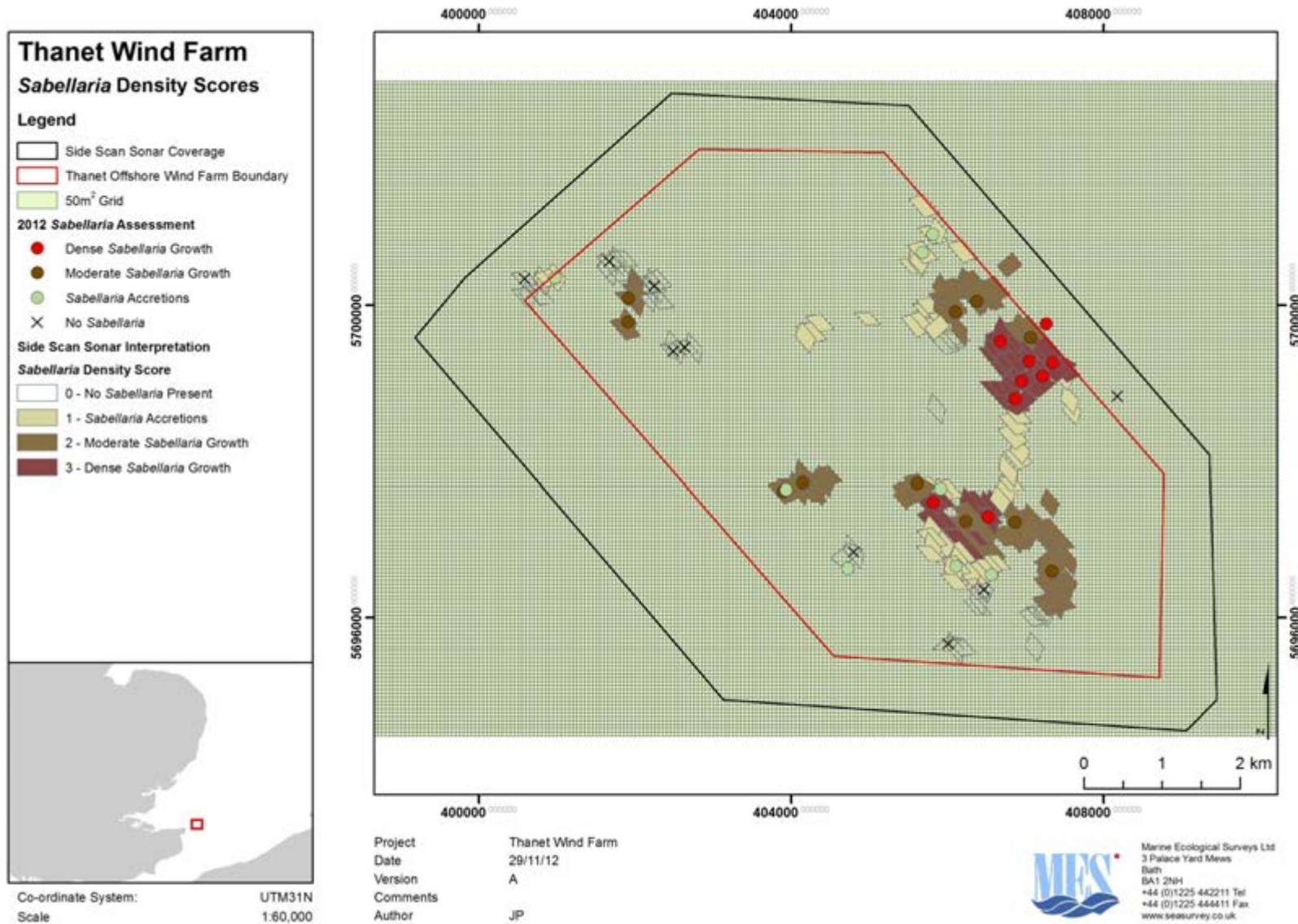


Figure 4: The 50m² grid allows for the minimum density scores to be extracted via a spatial join in ArcGIS.

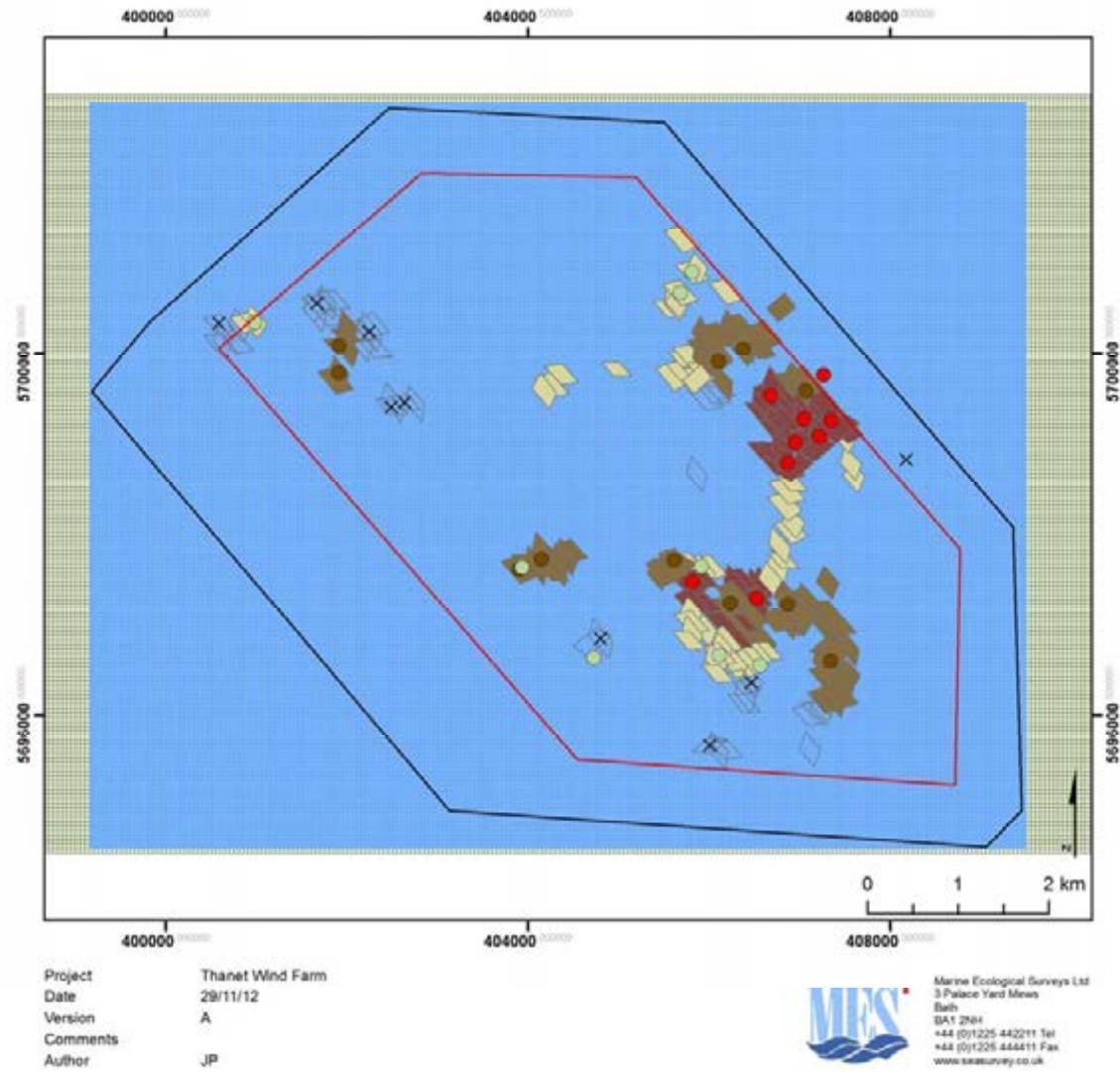


Figure 5: The 50m² point grid covers the extent of the Thanet Wind Farm and is used to extract density scores from the square grid below, before being interpolated into the final density assessment.

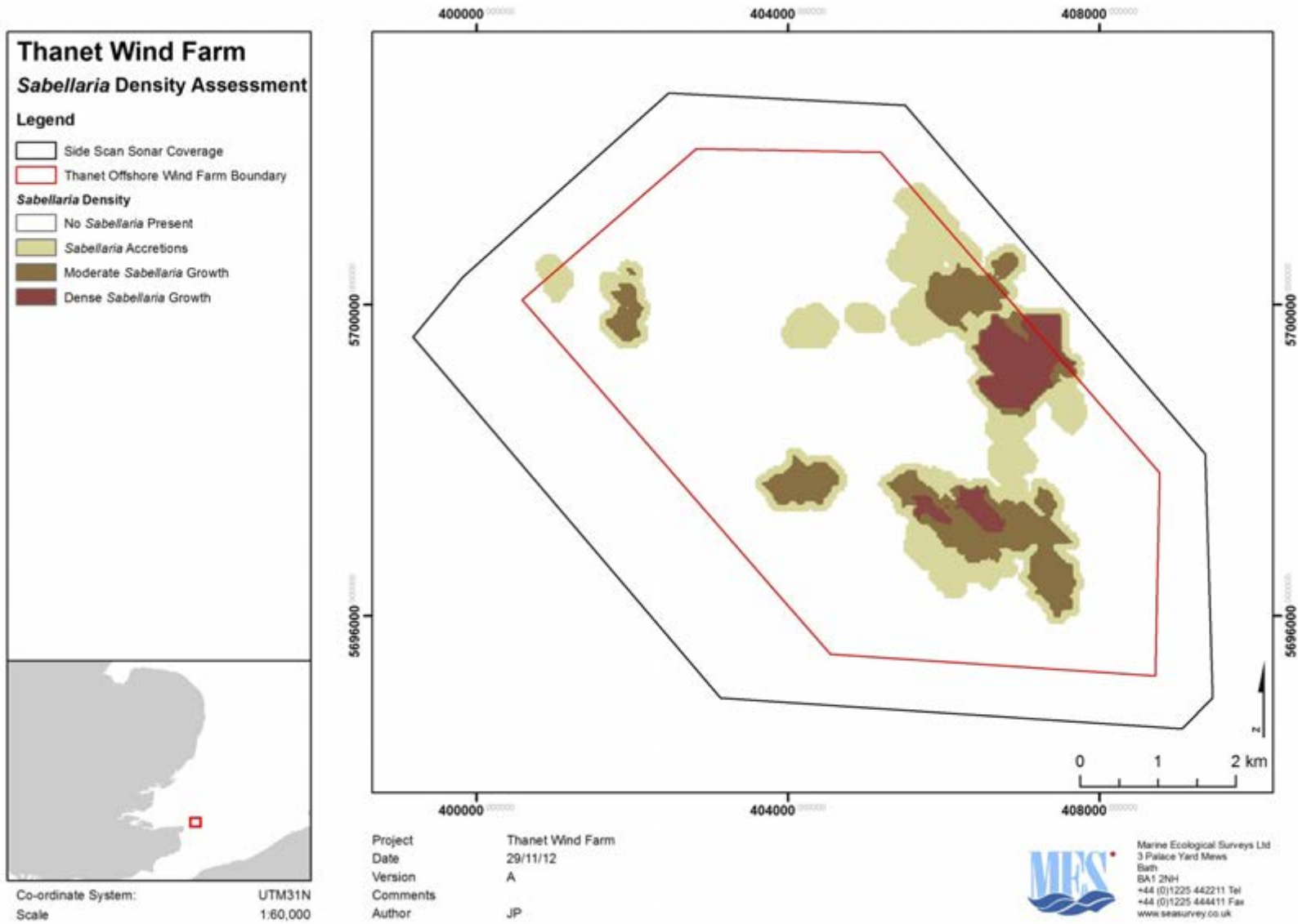
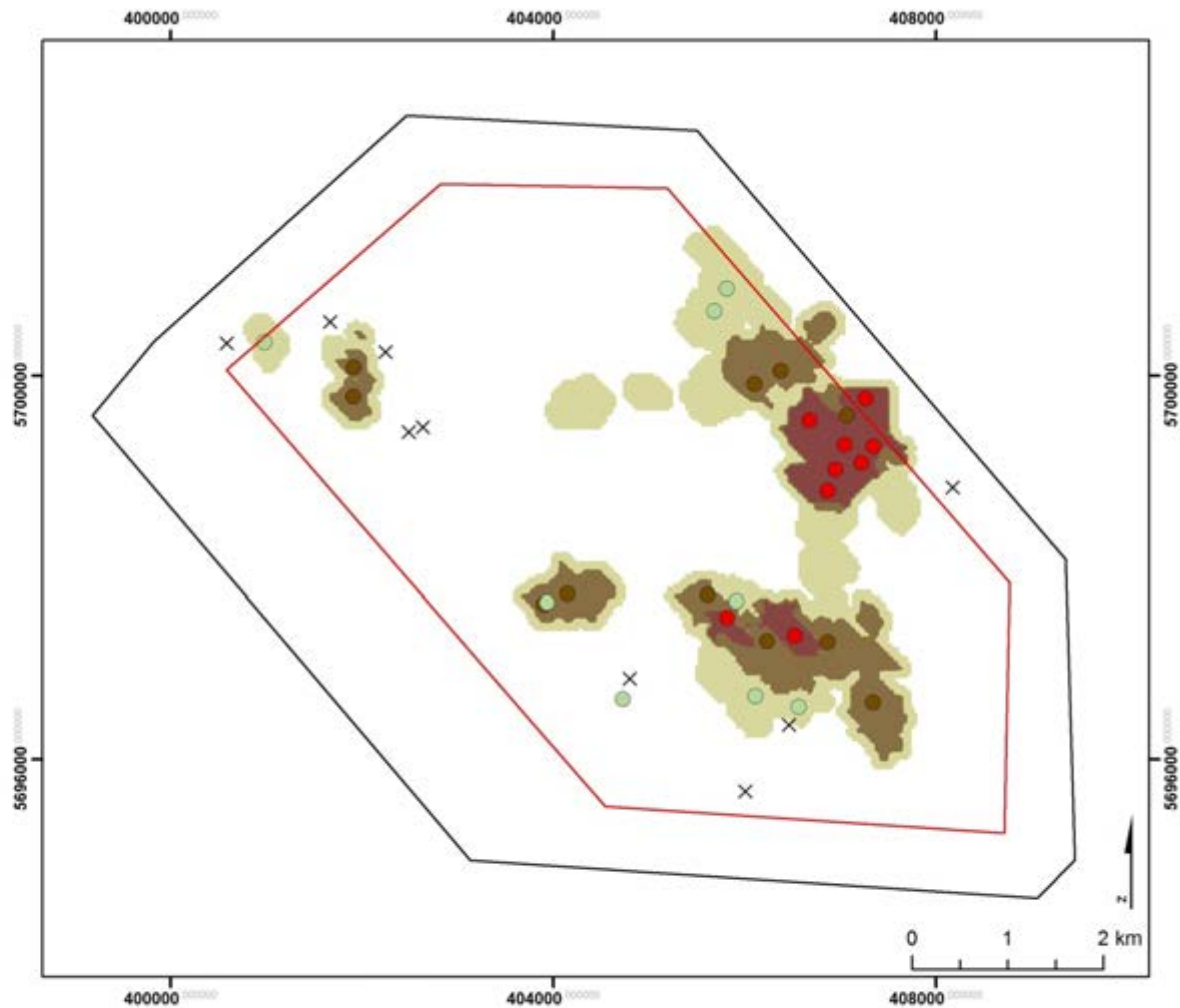
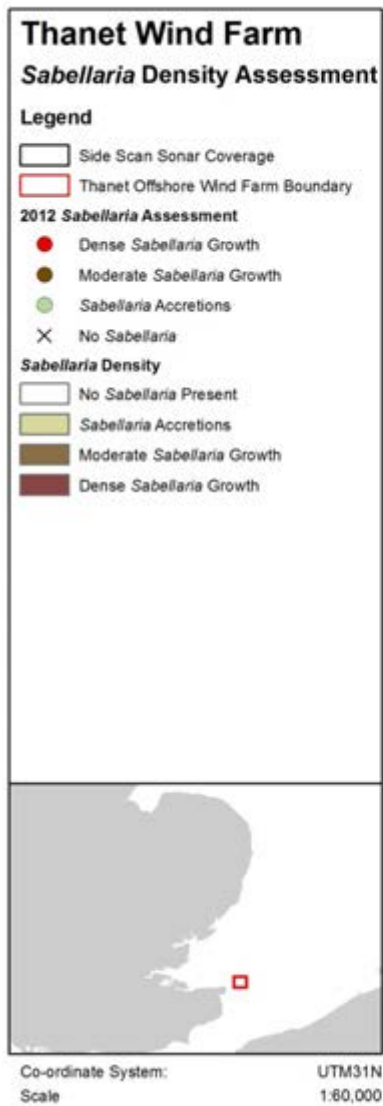


Figure 6: The final *Sabellaria* Density Assessment output, showing the densest *Sabellaria* reef to the east of the area.



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Figure 7: The Sabellaria Density Assessment accurately fits the distribution of density scores provided by grab data.



TOW 2012 2a



TOW 2012 2b



TOW 2012 2c



TOW 2012 6a



TOW 2012 6b



TOW 2012 6c



TOW 2012 8a



TOW 2012 8b



TOW 2012 8c



TOW 2012 9a



TOW 2012 10



TOW 2012 13a



TOW 2012 13b



TOW 2012 13c



TOW 2012 15a



TOW 2012 16a



TOW 2012 16b



TOW 2012 16c



TOW 2012 17a



TOW 2012 18a



TOW 2012 19a



TOW 2012 22a



TOW 2012 24a



TOW 2012 24b



TOW 2012 24c



TOW 2012 25a



TOW 2012 26a



TOW 2012 26b



TOW 2012 26c



TOW 2012 27a



TOW 2012 27b



TOW 2012 27c



TOW 2012 31a



TOW 2012 34a



TOW 2012 34b



TOW 2012 34c



TOW 2012 45a



TOW 2012 45b



TOW 2012 45c



TOW 2012 50a



TOW 2012 50b



TOW 2012 50c



TOW 2012 A6a



TOW 2012 A7a



TOW 2012 A7b



TOW 2012 A7c



TOW 2012 A8a



TOW 2012 A8b



TOW 2012 A8c



TOW 2012 A10a



TOW 2012 A10b



TOW 2012 A10c



TOW 2012 A11a



TOW 2012 A11b



TOW 2012 A11c



TOW 2012 E01a



TOW 2012 E01b



TOW 2012 E01c



TOW 2012 E02a



TOW 2012 E02b



TOW 2012 E02c



TOWF 09 a



TOWF 09 b



TOWF 09 c



TOWF 09 d



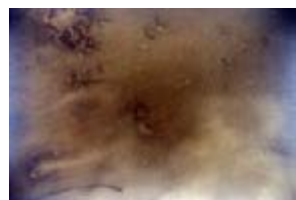
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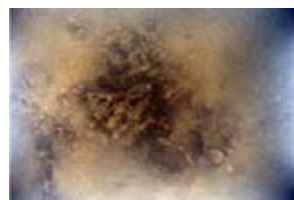
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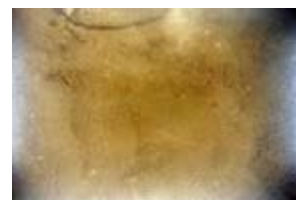
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TOWF 10 c



TOWF 10 d



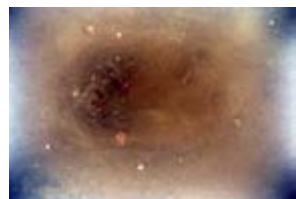
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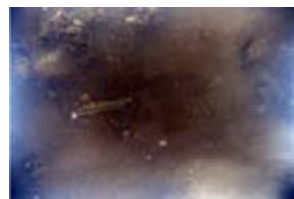
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TOWF 15 b



TOWF 15 c



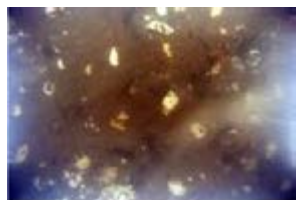
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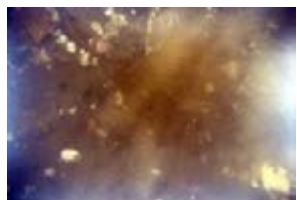
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TOWF 16 a



TOWF 16 b



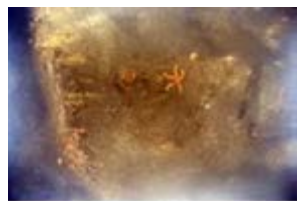
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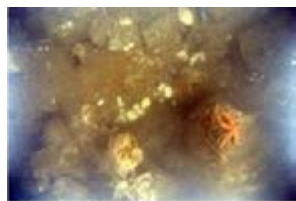
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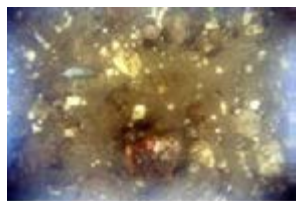
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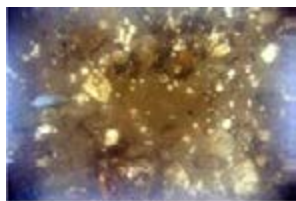
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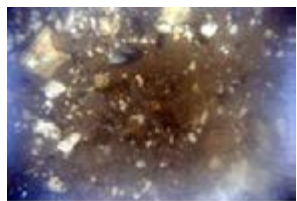
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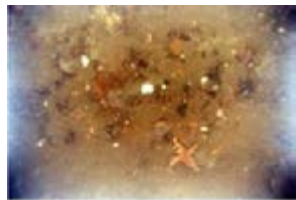
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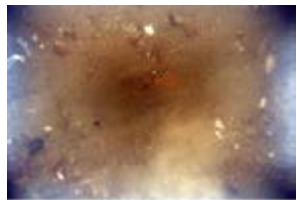
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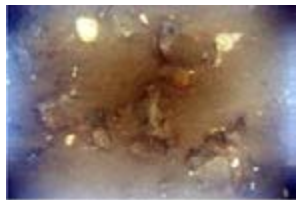
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TOWF 18 b



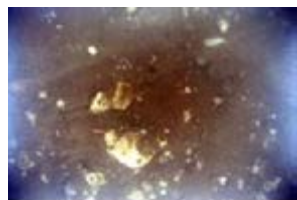
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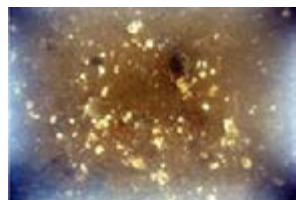
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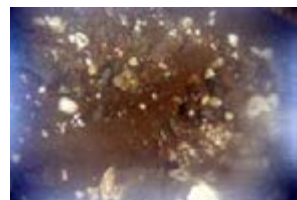
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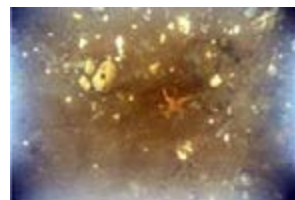
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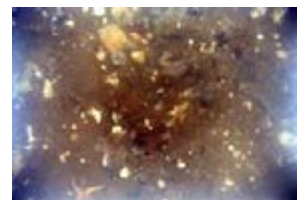
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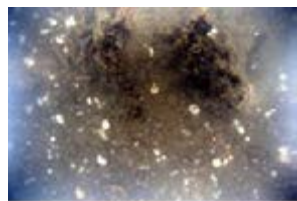
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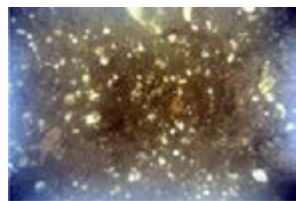
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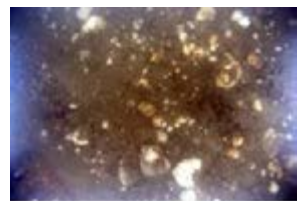
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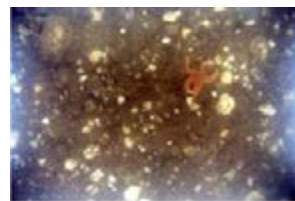
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TOWF 22 b



TOWF 22 c



TOWF 22 d



TOWF 22 e



TOWF 25 a



TOWF 25 b



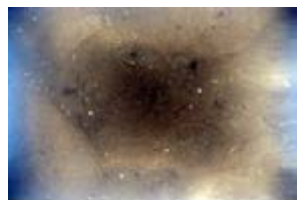
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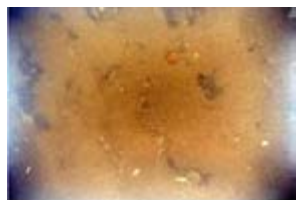
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TOWF 27 a



TOWF 27 b



TOWF 27 c



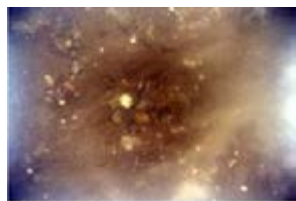
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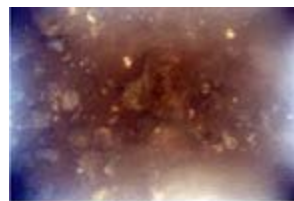
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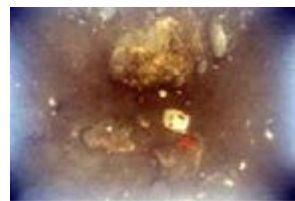
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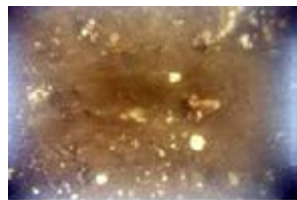
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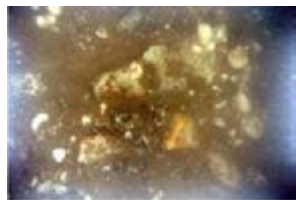
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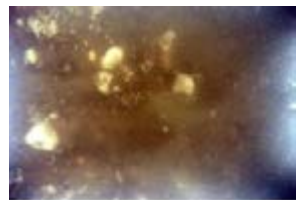
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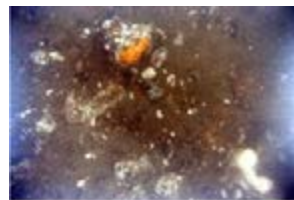
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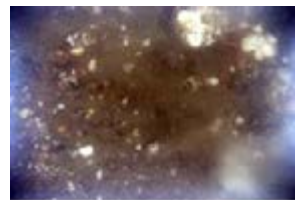
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TOWF B09 a



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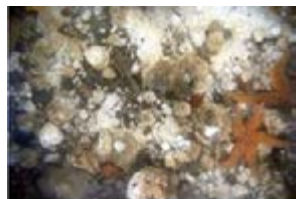
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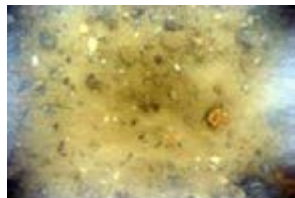
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TOWF E01 a



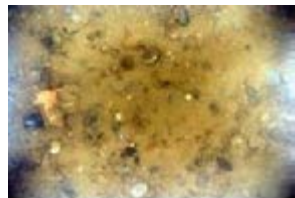
TOWF E01 b



TOWF E01 c



TOWF E01 d



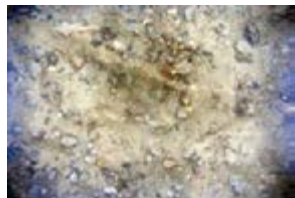
TOWF E01 e



TOWF E02 a



TOWF E02 b



TOWF E02 c



TOWF E02 d



TOWF E02 e



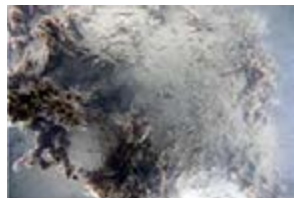
TOWF S01 a



TOWF S01 b



TOWF S01 c



TOWF S01 d



TOWF S01 e



TOWF S02 a



TOWF S02 b



TOWF S02 c



TOWF S02 d



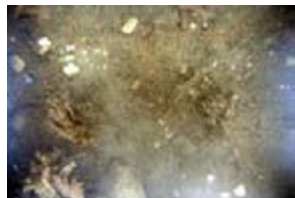
TOWF S02 e



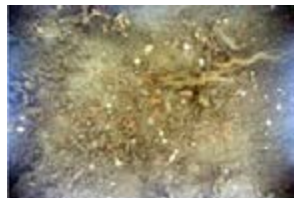
TOWF S03 a



TOWF S03 b



TOWF S03 c



TOWF S03 d



TOWF S03 e



TOWF S04 a



TOWF S04 b



TOWF S04 c



TOWF S04 d



TOWF S04 e



TOWF S05 a



TOWF S05 b



TOWF S05 c



TOWF S05 d



TOWF S05 e



TOWF S06 a



TOWF S06 b



TOWF S06 c



TOWF S06 d



TOWF S06 e



TOWF S07 a



TOWF S07 b



TOWF S07 c



TOWF S07 d



TOWF S07 e



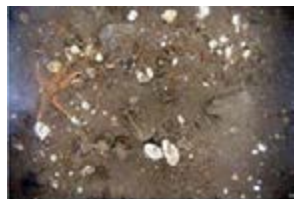
TOWF S08 a



TOWF S08 b



TOWF S08 c



TOWF S08 d



TOWF S08 e



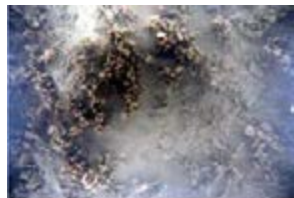
TOWF S09 a



TOWF S09 b



TOWF S09 c



TOWF S09 d



TOWF S09 e



TOWF S10 a



TOWF S10 b



TOWF S10 c



TOWF S10 d



TOWF S10 e



TOWF S11 a



TOWF S11 b



TOWF S11 c



TOWF S11 d



TOWF S11 e



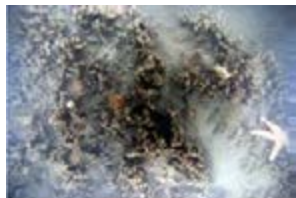
TOWF S12 a



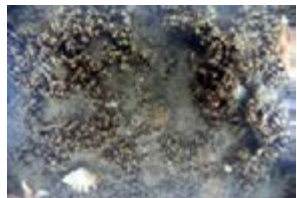
TOWF S12 b



TOWF S12 c



TOWF S12 d



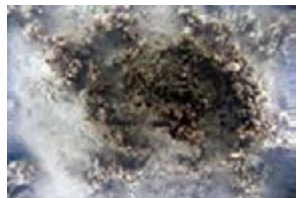
TOWF S12 e



TOWF S13 a



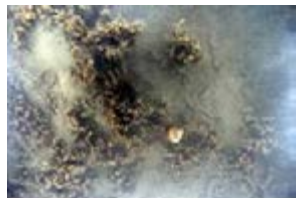
TOWF S13 b



TOWF S13 c



TOWF S13 d



TOWF S13 e



TOWF S14 a



TOWF S14 b



TOWF S14 c



TOWF S14 d



TOWF S14 e



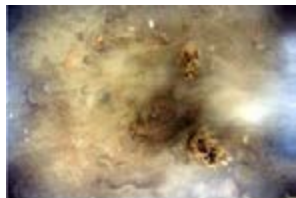
TOWF S15 a



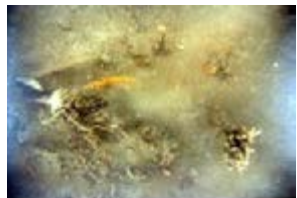
TOWF S15 b



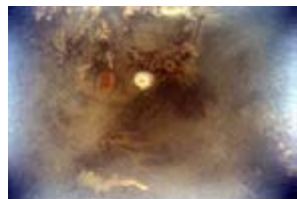
TOWF S15 c



TOWF S15 d



TOWF S15 e



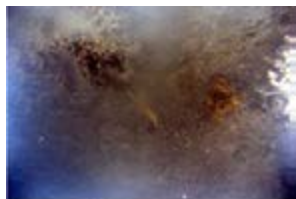
TOWF S16 a



TOWF S16 b



TOWF S16 c



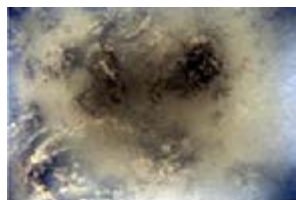
TOWF S16 d



TOWF S16 e



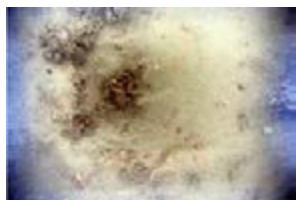
TOWF S17 a



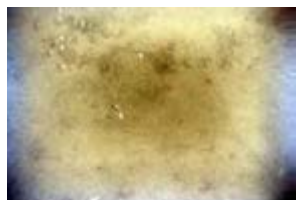
TOWF S17 b



TOWF S17 c



TOWF S17 d



TOWF S17 e



TOWF S18 a



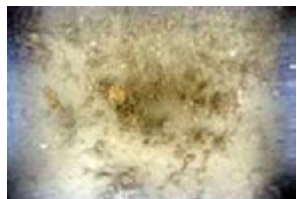
TOWF S18 b



TOWF S18 c



TOWF S18 d



TOWF S18 e



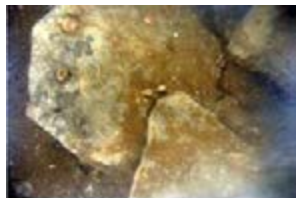
TOWF S19 a



TOWF S19 b



TOWF S19 c



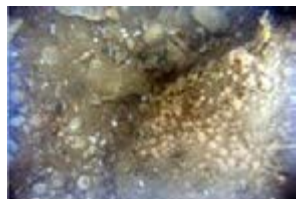
TOWF S19 d



TOWF S19 e



TOWF S20 a



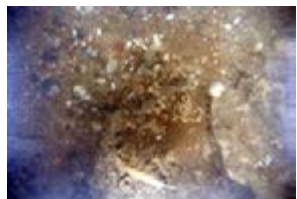
TOWF S20 b



TOWF S20 c



TOWF S20 d



TOWF S20 e



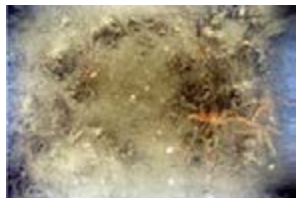
TOWF S21 a



TOWF S21 b



TOWF S21 c



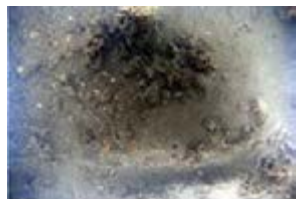
TOWF S21 d



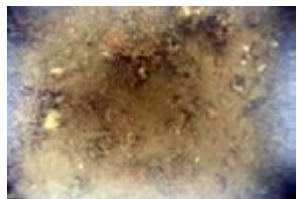
TOWF S21 e



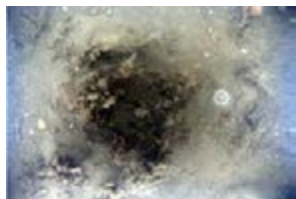
TOWF S22 a



TOWF S22 b



TOWF S22 c



TOWF S22 d



TOWF S22 e



TOWF S23 a



TOWF S23 b



TOWF S23 c



TOWF S23 d



TOWF S23 e



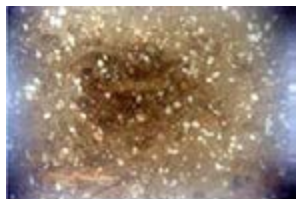
TOWF S24 a



TOWF S24 b



TOWF S24 c



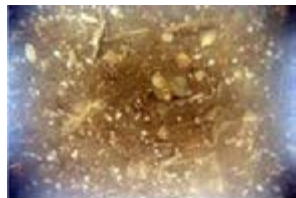
TOWF S24 d



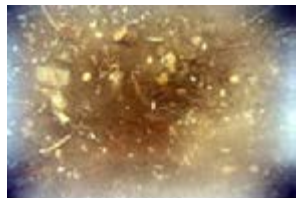
TOWF S24 e



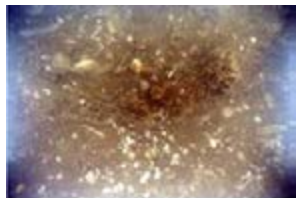
TOWF S25 a



TOWF S25 b



TOWF S25 c



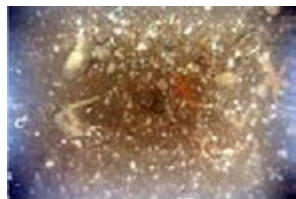
TOWF S25 d



TOWF S25 e



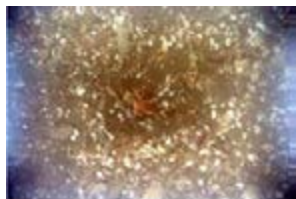
TOWF S26 a



TOWF S26 b



TOWF S26 c



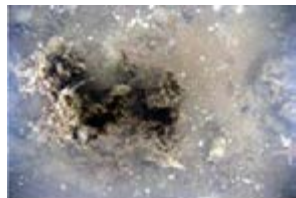
TOWF S26 d



TOWF S26 e



TOWF S27 a



TOWF S27 b



TOWF S27 c



TOWF S27 d



TOWF S27 e



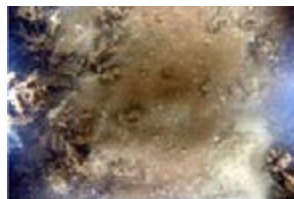
TOWF S28 a



TOWF S28 b



TOWF S28 c



TOWF S28 d



TOWF S28 e



TOWF S29 a



TOWF S29 b



TOWF S29 c



TOWF S29 d



TOWF S29 e



TOWF S30 a



TOWF S30 b



TOWF S30 c



TOWF S30 d



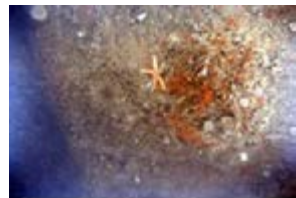
TOWF S30 e



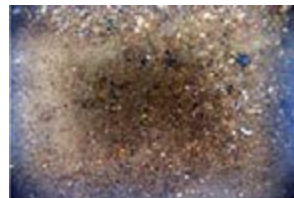
TOWF HMa a



TOWF HMa b



TOWF HMa c



TOWF HMa d



TOWF HMa e



TOWF HSa a



TOWF HSa b



TOWF HSa c



TOWF HSa d



TOWF HSa e



TOWF HSb a



TOWF HSb b



TOWF HSb c



TOWF HSb d



TOWF HSb e



TOWF HSc a



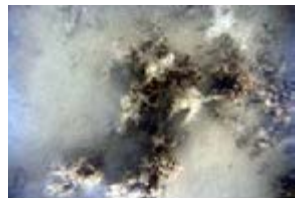
TOWF HSc b



TOWF HSc c



TOWF HSc d



TOWF HSc e



