



Supplementary Environmental Information

Impact of Berthing Pocket Construction

Explanatory Note EX 10.6

June 2012
Revision: 0
Able UK Ltd

	<p align="center">ABLE MARINE ENERGY PARK IMPACT OF BERTHING POCKET CONSTRUCTION</p>	<p align="center">JUNE 2012</p>
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APPROVAL & REVISION REGISTER

	NAME	SIGNATURE	DATE
Originator:	J. Dawes		20/06/2012
Checked by:	R. Cram		26/06/2012
Approved by:	R. Cram		27/06/2012

REVISION	COMMENTS	DATE
A		27/06/2012

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APPENDICES

Drawing: AME – 06093 A: Proposed Berthing Pocket

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1 DESCRIPTION OF CONSTRUCTION WORKS

- 1.1 Able Humber Ports Limited (Able) are in the process of seeking a Development Consent Order to create Able Marine Energy Park (AMEP) on the south bank of the River Humber, approximately 1km downstream of the C.Ro Port Killingholme (CPK)¹ and immediately upstream of the South Killingholme Oil Jetty.
- 1.2 A 1,279m long quay will be constructed as part of AMEP. The quay frontage will be designed for the berthing of jack-up off-shore wind vessels. As such a 60m wide berthing pocket will be engineered to provide a suitable foundation for the legs of the vessels. The berthing pocket will be maintained at -11mCD.
- 1.3 Site investigations show that the material present at and below -11mCD will not provide a suitable foundation for repeated use by jack-up vessels. As such an initial over-dredge to bedrock will be required. The excavated material will be deposited in two different locations dependent upon its composition:
 - Erodible material (sand, gravel and silt) – licenced dredge deposit grounds within the Humber Estuary.
 - Non-erodible material (clays, cobbles etc) – licenced dredge deposit grounds within the Humber Estuary or to be used as fill material on the existing terrestrial areas of the AMEP site.
- 1.4 Once the overlying surficial deposits have been excavated the pocket will be backfilled with rock to -11 mCD which will be dressed with marine aggregate (won from a licenced site). A cross-section of the proposed works is presented in Drawing AME – 06093 A.

2 MAINTENANCE WORKS

- 2.1 To maintain the berthing pocket at -11mCD between 98,000m³ and 858,000m³ of material will need to be removed each year. It should be noted that 858,000m³ is the equivalent of 11m of sediment being deposited within the berthing pocket and is worst credible (it would mean the entire berthing pocket being dredged virtually every month). It is an unlikely scenario as deposition of sediment will find an equilibrium level with the rest of the estuary and, depending on that level, the sediment may not need to be constantly removed. Other quays on this section of river are understood to be dredged once or twice annually.

3 BASELINE

- 3.1 In May 2010 The Institute of Estuarine and Coastal Studies (IECS) at the University of Hull undertook a survey of marine invertebrates along the Killingholme Marshes foreshore. That survey is reported in Annex 10.1 of

¹ Formerly Humber Sea Terminal (HST)

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the ES for AMEP, and interpreted further in Report EX10.6 of the Supplementary Environmental Information.

- 3.2 The baseline study concluded that the invertebrates assemblage within the subtidal is impoverished, *"the impoverishment presumably reflecting both the physical rigors of the location...and/or also as a result of maintenance dredging activity"* (IECS 2012)². The report further states that at present the subtidal study area is *"subject to maintenance dredging and it is likely that this activity will affect both the sediment characteristics and associated invertebrate assemblage"* (IECS 2012).

4 IMPACTS

- 4.1 Subtidal invertebrates are found within the top 15cm of estuary sediment. The capital dredge will remove all the benthos within the area of the berthing pocket. It is estimated that, in the absence of maintenance dredging, it might take up to 3 years for the invertebrates to fully recolonize the area (paragraph 10.6.5 of the Environmental Statement).
- 4.2 There is approximately 16,800ha (IECS 2008) of subtidal habitat within the Humber Estuary. The area of subtidal habitat affected by construction of the AMEP quay and berthing pocket is 0.13% of total Humber Estuary subtidal habitat (c. 21ha). Construction of the berthing pocket accounts for 0.04%.
- 4.3 The subtidal biotope, present within the proposed AMEP berthing pocket, is defined as an impoverished SS.SMU.SMuVS.CapTubi (IECS 2012). Table 1 below, taken from Harbasins Report: Habitat Status of the Humber Estuary, UK (IECS 2012) shows that SS.SMu physiotope comprises 5,756ha (or 17%) of the total estuary habitat types.
- 4.4 The area of the proposed berthing pocket currently accounts for 0.04% of the SS.SMu physiotope however, once constructed the physiotope will become SS.SCS. This represents a very small change in the balance of habitat types within the estuary.
- 4.5 This section of the estuary is, in any event, naturally dynamic as evidenced in HR Wallingford's recent review of the changes to the sub-tidal morphology between HIT and HST (EX8.9 Supplementary Environmental Information) which records that:

"The subtidal morphology of this Reach of the Humber Estuary is dynamic, showing up to 6m of vertical changes in the vicinity of Foul Holme Spit."

² Biotopes of the Intertidal and Subtidal Sediments around the AMEP Site; IECS 2012

Table 1: Extent of EUNIS 3 habitat types within the Humber Estuary (excluding tributaries)

EUNIS 3 Code	Description	Area (ha)	Area (m ²)	% of total estuarine area
IR.LIR	Low energy infralittoral rock	14	136,717	0.04
LR.LLR	Low energy littoral rock	3	34,184	0.01
LS.LBR	Littoral biogenic reefs	137	1,367,065	0.41
LS.LMu	Littoral mud	3,090	30,896,033	9.17
LS.LMx	Littoral mixed sediments	735	7,347,559	2.18
LS.LSa	Littoral sand	8,855	88,546,114	26.28
Saltmarsh	Saltmarsh	540	5,400,181	1.60
SS.SCS	Sublittoral coarse sediment (unstable cobbles and pebbles, gravels and coarse sands)	742	7,415,672	2.20
SS.SMp	Sublittoral macrophyte-dominated communities on sediments	17	170,835	0.05
SS.SMu	Sublittoral cohesive mud and sandy mud communities	5,756	57,554,530	17.08
SS.SMx	Sublittoral mixed sediment	1,244	12,439,330	3.69
SS.SSa	Sublittoral sands and muddy sands	12,566	125,664,190	37.29
Total		33,697	336,972,409	100

Source: Harbasins Report: Habitat Status of the Humber Estuary, UK (IECS 2008)

5 **IN-COMBINATION**

- 5.1 The following projects both have a direct impact on the subtidal habitats within the estuary. Whilst it is unclear whether they share the same biotopes found within AMEP's boundary both developments indicate that current populations are impoverished and naturally stressed by current maintenance dredging.

Green Port Hull

- 5.2 Section 12.102 – 12.103 of the ABP Green Port Hull (GPH) Environmental Statement discusses the impacts of dredging on the subtidal habitat. It states:

"Capital dredging for the new berths can be expected to result in a 30-70 % reduction of species diversity, a 40-95 % reduction in the number of individuals and a similar reduction in the biomass of benthic communities in the dredged area (Newell et al., 1998) The subtidal habitat in this location has, however, been described as being generally impoverished in terms of the benthic communities that are present. In addition, the change of this 5.2 ha of subtidal area represents a very small proportion of the subtidal extent of the Estuary as a whole (0.031 %). The existing subtidal habitat in the berths would be subject to ongoing natural physical changes and as such host highly mobile opportunistic species that are adapted to the stressed environment. The impact on benthic communities would be expected to be temporary with the likelihood of recolonisation occurring within a period of weeks to months. The temporary change in subtidal habitat resulting from the capital dredging is therefore considered to be of minor adverse effect"

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- 5.3 The capital dredge phase of GPH will have a similar impact as AMEP on the subtidal invertebrate community and habitats. However the ES suggests maintenance dredging will not be undertaken as frequently.

Mitigation

- 5.3.1 Monitoring of the long term effects will require sampling over 9 sites (3 stations on 3 transects) before construction and for up to 5 years after completion:

"12.171 As per the EMMP (ABPmer, 2004), nine sites will be sampled (three stations on three transects) to determine the long term effect on intertidal invertebrate assemblage. Benthic samples will be collected in triplicate and analysed for species composition, abundance and biomass together with an assessment of sediment particle size, organic content, shear stress and elevation. All sites will be monitored annually starting in the year before construction and continuing for a period up to five years following completion of the works to assess any potential effects on the area from the construction of the terminal. Any longer-term monitoring requirements will be determined by the ESC at the end of the monitoring period." Green Port Hull ES November 2011

Immingham Oil Terminal Channel Deepening

- 5.4 Dredging associated with the construction of the Immingham Oil Terminal is estimated to affect 1.9% of the subtidal habitats within the Estuary. A further 3.4% will be impacted by the disposal of dredge arisings.

"Benthic communities are principally of low diversity in naturally stressed areas such as those found in the highly dynamic conditions of the Humber lower estuary (see sections 9.2.4 of the EIS). Such communities tend to be more tolerant of anthropogenic induced stress associated with dredging and recovery could be within 12 months of dredging (see section 9.3.3 of the EIS)." IOT Appropriate Assessment (2010)

Mitigation

- 5.5 Monitoring of the proposed dredge area will be incorporated into the Estuary's Environmental Monitoring and Management Plan (EMMP)

"At the majority of the sites where dredging or disposal would be carried out for this project a relatively rapid recovery of the seabed is expected based on the conditions at the site and the predicted changes to accretion/erosion and sediment dispersion patterns. However, to verify the impacts at these sites and add to the body of evidence that exists of the effects of dredge and disposal, it is recommended that some benthic survey work that is being done as part of the ongoing EMMP monitoring programme, (which includes surveys of birds and benthos at the IOH development sites as well as the disposal grounds and the compensation site) is adapted to include selected dredge and disposal sites as well as appropriate control locations." IOT Environmental Statement

- *The Licence Holder must produce a detailed monitoring plan (including reporting) which must be supplied to and approved by the Licensing*

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Authority and Cefas prior to any dredging activity; IOT Appropriate Assessment (2010)

Hull Riverside Bulk Terminal

5.6 Construction of the proposed Hull Riverside Bulk Terminal jetty will cause direct loss of approximately 120m² (0.0012ha) of subtidal habitat or approximately 0.0000005% of the total subtidal habitat found within the Humber Estuary. This is considered to have no significant effect. Capital dredging will result in the removal of 290ha of subtidal habitat. At the jetty and its approach, this dredging will cause a slight change to the substratum from a thin layer of fine sandy silt to a thicker (and deeper) layer of sandier material covered by soft silt.

5.7 Impact of the construction and capital dredge are described below:

"12.98 To understand the nature of the ecological impacts arising from the development, it is recognised that the Humber Estuary is highly dynamic and the characteristic spring/neap erosion/deposition cycles can cause elevation changes of 100 mm per week in some parts of the Estuary. These cycles and high sediment movements play an important part in dictating the species assemblages of benthic invertebrates within subtidal habitats. The areas in which the proposed deepening will take place are already subject to this regular disturbance (especially across Halton Middle) so that the invertebrate communities they support (as described above) have low abundances and are dominated by opportunistic species that respond rapidly to disturbance. In particular it is evident that Polydora cornuta, which has profoundly dominated two of the benthic samples taken, is a highly mobile opportunistic species that is known to occur in good numbers in 'stressed' environments. These dynamic conditions mean that while the benthos will be temporarily sterile after dredging there will be rapid re-colonisation (within weeks/ months) of the deepened areas by movement of mobile species and by invertebrates that are carried into the site by bedload sediment transport (The Environmental Partnership (TEP) 2005, Newell, Seiderer and Hitchcock, 1998). Re-population can also occur to some extent through the settlement of larvae (dependent on the time of year)." HRBT ES February 2010

Mitigation

5.8 Mitigation proposed for the loss of subtidal habitat caused by required dredging:

"Impacts will be monitored as part of the Humber Estuary Environmental Management and Monitoring Plan." HRBT ES February 2010

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6 CONCLUSIONS

- 6.1 Construction of the AMEP berthing pocket will cause a change from the current subtidal habitat (SS.SMu) to SS.SCS. As such there will continue to be a benthic community despite the change in habitat. The morphology of the Estuary is extremely dynamic and even with maintenance dredging every 6 – 12 months; the area of the berthing pocket will find a new equilibrium and provide a habitat for benthos.

