Able Marine Energy Park: Evaluation of revised compensatory habitat creation package

For

Mr Stephen Kirkwood

By

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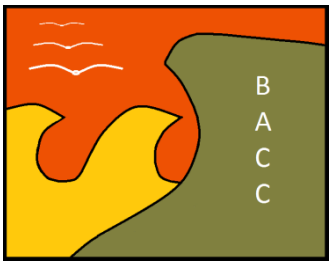

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Contract title: **Evaluation of revised compensatory habitat creation package**

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6. Executive summary

1.1. The documentation examined remains incomplete. In particular the Environmental Management and Monitoring Plan (EMMP) is clearly labelled 'draft'. In addition, the legal agreement is also still in draft. This means that a comprehensive evaluation of proposals is not possible.

1.2. The documentation provided effectively represents a new application and demands detailed scrutiny for the Inquiry process to be properly informed. This presents impossibly short timescales, especially for non-statutory participants with limited means. As such, this contributes to the perception that the process has been adjusted to accommodate the applicant's failure to present a complete package in the first instance.

1.3. If the offsetting measures were not properly developed in time for submission of the application, are there other problems that are relevant? Establishing this is a task of far greater magnitude than is possible for a private participant in the inquiry process to fund.

1.4. This analysis has therefore focussed on the package of offsetting measures and monitoring that is proposed. It has not paid attention to the sequential issues that should be followed in relation to Articles 6(3) and 6(4), especially those concerning the questions of 'alternatives' and 'Imperative Reasons of Over-Riding Public Interest' (IROPI) which demand a wider spectrum of competence than can be provided by BACC.

1.5. Part of the reason for not focussing on alternatives and IROPI is that both can be interpreted in a variety of politically governed decisions, and therefore a continuous loop of argument can arise. However, there is clearly an alternative at ABP's Quay 2005 (Green Port Hull), which has already been the subject of a Habitats Regulations Assessment and offsetting measures have been established.

1.6. This analysis is based on the assumption that the tests of 'alternatives' and IROPI will be resolved to the satisfaction of the relevant Secretary of State. It therefore follows that if both tests are met then a combination of mitigation and compensation will be referred to when the development proposal is submitted to the European Commission for agreement.

1.7. The compensatory measures have been presented as a package that will maintain the contribution to site functionality provided by the North Killingholme mudflats. However, this package differs from an open mudflat in several ways. Most importantly, it is recognised that the pivotal component, a Regulated Tidal Exchange, will not be maintained in optimal condition without significant adjustments to mudflat depths.

1.8. The process of developing and maintaining the four Regulated Tidal Exchange pools appears to be extremely complex and is highly theoretical. To the best of my knowledge this has not been tried before and therefore it involves considerable uncertainty and risk.

1.9. Where active intervention is required to reduce mudflat heights within the Regulated Tidal Exchange, it follows that a period of ecological re-adjustment will be necessary in its aftermath. This means that the compensation site is likely to go through periods when it is sub-optimal and is therefore failing to provide the necessary functionality.

1.10. An important additional consideration must be the practicalities of removing large quantities of sediment from the RTE basins. What will be the impacts of disposal using the various mechanisms proposed, and can it be guaranteed that consent will be given to undertake such works? In addition, the management involves a permanent commitment to costs that are dependent upon the viability of the port.

1.11. Construction of the compensation package is scheduled to coincide with the development of the AMEP project and associated loss of the North Killingholme foreshore. It therefore follows that there will be a period of several years when there will be a complete or partial loss of functionality affecting an internationally important population of Black-tailed Godwit (*Limosa limosa islandica*).

1.12. Evidence from Cardiff Bay suggests that birds with high levels of site fidelity are extremely vulnerable to habitat loss. Any development that takes place before the appropriate offsetting has been established and shown to work, must therefore involve a high level of risk to the flock in question. In the case of North Killingholme, the flock constitutes potentially as many as 66% of the population of Black-tailed Godwits that utilise the Humber Estuary. Both the Humber population and the North Killingholme flock are of international importance in their own right.

1.13. It therefore follows that considerable levels of uncertainty and risk are involved. This would appear to be inconsistent with the rulings of the ECJ in relation to cockle harvesting on the Waddensee [ECJ Case C-127/02]. It is therefore argued that the Competent Authorities would be taking significant risks in granting consent for Able Marine Energy Park without substantial changes to the timetables for habitat creation and foreshore loss.

1.14. Bearing in mind the International significance of the North Killingholme Black-tailed Godwit population, it is argued that the levels of monitoring proposed are inadequate. Detailed studies of Black-tailed Godwit responses to loss of the North Killingholme foreshore should be incorporated into the package to make sure that the contentions about provision of requisite functionality have been met.

1.15. The various elements of uncertainty and risk mean that these development proposals still have the potential to negatively affect the coherence of the Natura 2000 network. It would therefore be extremely unwise to allow the project to proceed.

2. Background

Relevant documents

2.1. This report has been compiled in response to additional information submitted by Able UK and made available to interested parties in the second half of October 2012. The additional literature is extensive, comprising a total of 33 files including separate cover pages and contents sections. In addition, attention has been paid to the 'Statement of Common Ground'. Reports analysed are listed in Table 1 which illustrates the magnitude of the revisions and new information presented at a very late stage in the Inquiry process.

2.2. This level of additional information provided at such a late stage in the process is highly unusual. It appears that at least some of the information remains in draft and that there are elements of the package that may undergo further revision. Two documents in particular fall into this category: the Environmental Management and Monitoring Plan (EMMP) is clearly labelled 'draft', whilst it refers to information in a 'Statement of Common Ground' that does not appear to bear the signatures of the relevant parties. In addition, a 'draft' legal agreement is presented. This implies that there substantive differences of opinion remain between Able UK and Natural England and the Marine Management Organisation.

2.3. It is noteworthy that the RSPB is not included in either the Statement of Common Ground or the legal agreement. This represents a departure from previously established best practice in which the developer sought agreement with the RSPB as a key participant in the process and the leading non-governmental champion for wildlife in the UK.

EX 28.3	Final Compensation Proposals	Page length
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	Total pages	**422**

Table 1. AMEP documents used in this analysis

2.4. Analysis in this report is therefore constrained in two ways. Firstly, it remains impossible to be certain whether the documentation actually represents its final form; and, secondly, the volume of information that needs to be analysed is on a scale that exceeds the resources available to independent objectors.

2.5. Consequently, this report focuses on critical high level issues and does not attempt to dissect the minutiae of the case.

Legal context

2.6. Articles 6(3) and 6(4) of the Habitats Directive are fundamental to the process of assessment. It may be helpful to offer the following reminder of the process based on Regulations 61, 62 & 66 of the Conservation of Habitats & Species Regulations 2010.

2.7. The tests are applied sequentially to ensure that only those proposals that genuinely require the locality involved are considered. They do so in a manner that is designed to make sure that the coherence of the Natura 2000 network is maintained. The tests are:

2.7.1. Will there be a 'likely significant effect'? This is a coarse filter that in some ways can be likened to a screening process (Morris, 2008[1]).

2.7.2. If a 'likely significant effect' is predicted, then the proposal must be subject to an 'appropriate assessment'. This assessment needs to be appropriate to the issues concerned and is dependent upon information supplied by the applicant. The applicant may submit a shadow 'appropriate assessment' as has been the case with the AMEP proposals, but the final judgment rests with the Competent Authority. In this case it will rest with the Secretary of State for Transport.

2.7.3. If it cannot be concluded that there will not be an adverse affect[2] then the Competent Authority must be certain that there are no alternatives. This is a complex process and is potentially a political judgement. Consequently the argument about alternatives needs to be addressed by the Competent Authority in a manner that is robust and can withstand challenges as a reasoned argument. It is noteworthy, however, that a competitor (ABP's Quay 2005 now re-named Green Port Hull) to the AMEP process has already proceeded through the tests of the Habitats Directive and has measures in place to address its (much smaller) adverse affects.

2.7.4. If there are no alternatives, the project may be consented provided it does not affect priority habitats or species (where more rigorous tests apply). If it is consented it must be accompanied by a package of compensation measures that maintain the coherence of Natura 2000.

[1] Morris, R., 2008. Understanding the Habitats Directive: Appropriate Assessment - What is it and what is 'appropriate'? *In Practice*, December 2008: pp 21-23.
[2] Note deliberate double negative which is the application of the precautionary principle.

2.8. The documentation provided in Report EX28.3 (Final Compensation Proposals) assumes that the issue of alternatives will be resolved in favour of the applicant. The applicant is therefore following the established procedure of offering a package of offsetting measures as part of the overall project consent. However, a key difference exists in that previous major port development applications have been accompanied by a finalised package (with the single exception of Dibden Bay).

2.9. It is, however, important to recognise that unlike previous applications, the issue of functionality is far more focussed because this proposal involves a location that is of international significance in its own right for the Iceland race of the Black-tailed Godwit (*Limosa limosa islandica*). To my best knowledge no previous port development has had quite such profound implications and consequently past practice should not be taken as an absolute guide to delivering functionality.

2.10. It is noteworthy that previous attempts by the applicant to define functionality in a broader context than the issue of Black-tailed Godwit have been rebutted by the RSPB. I concur with the RSPB analysis.

2.11. If compensatory measures are required, European Commission Guidance states that applicants are expected to have completed the compensatory measures **before** any loss occurs[3],[4]. In practice, this approach has not been followed in the UK, but key cases pre-dated this guidance and involved losses of a different nature. They also largely preceded publication of the key lesson from the Cardiff Bay Barrage. In this case, post-development monitoring showed that waders with high levels of site fidelity do not simply adjust by occupying other mudflats (Burton *et al*., 2006[5]).

[3] Guidelines on the implementation of the Birds and Habitats Directives in estuaries and coastal zones with particular attention to port development and dredging. European Commission 2011. http://ec.europa.eu/transport/modes/maritime/doc/guidance_doc.pdf

[4] This author was a member of the Expert Group that developed the guidance.

[5] Burton, N.H.K., Rehfisch, M.M., Clark, N.A. & Dodd, S.G. 2006. Impacts of sudden winter habitat loss on the body condition and survival of Redshank *Tringa totanus*. Journal of Applied Ecology 43: 464-473. (also see http://jncc.defra.gov.uk/PDF/pub07_waterbirds_part6.1.5.pdf)

3. The proposed compensatory measures

3.1. There are several components to the necessary compensatory measures. These may be summarised as:

3.1.1. Offset loss of inter-tidal habitat (Special Area of Conservation)

3.1.2. Offset loss of sub-tidal habitat (Special Area of Conservation)

3.1.3. Offset loss of inter-tidal feeding and roosting facility for migratory waterbirds (Special Protection Area)

3.1.4. Ensure that coherence of Natura 2000 is maintained, including maintenance of populations of Annex 1 birds at Favourable Conservation Status.

3.2. These various concerns mean that there is a need to refer to the Conservation Objectives set for the relevant European marine sites and for the Ramsar interest, which is accorded the same treatment via the Conservation of Habitats and Species Regulations (2010) as a matter of long-established Government policy. The Conservation Objectives are provided in Natural England's advice supplied under Regulation 35 of the Conservation of Habitats and Species Regulations (2010).

3.3. It is important to recognise that the Conservation Objectives were written in a manner that was designed to accommodate natural change and population fluctuations. The Non-technical Summary (EX28.3 part 1) usefully summarises agreement with the statutory conservation advisers (Natural England and the Marine Management Organisation) on the measures needed to secure the Conservation Objectives. These are set out in box 1 below.

1.3.1. The reclamation of the estuary gives rise to a need for compensatory habitat to be created in accordance with the requirements of the EC Habitats Directive. It has been agreed with the Regulators that compensation must be put in place to recreate 94.6 ha of habitat (73.4 ha of intertidal mudflat, and 21.2 ha of sub-tidal (estuary)) for the SAC, and 101.5 ha for the SPA, and the compensation must replace the functional losses of those habitats which provide a food larder for birds that are features of the SPA. These areas are based on ratios agreed with NE for the SAC intertidal1 habitat (2:1 basis) and estuarine habitat, which includes sub-tidal areas and saltmarsh (1:1 basis).

1.3.2. The principal functional requirement is to support displaced populations of nine bird species where a likely significant adverse effect has been predicted (see *Part 2* of this report), with particular reference to the black-tailed godwit given the high proportion (66 per cent) of the Humber population that may be affected. In order to achieve this, the

compensation package provides the features listed below.

- A new intertidal habitat with a substrate of suitable mud (*ie* with a high proportion of silt) to a minimum depth of 100 mm.
- Mud capable of supporting principal shorebird prey species such as *Macoma balthica, Hediste diversicolor, Corophium volutator* and *Hydrobia ulvae.*
- Prey items in sufficient densities to support displaced shorebird populations.
- Sustainable mudflat that is subject to regular tidal inundation (and does not dry excessively during neap tide cycles), and provides a patchwork of shallow standing pools and exposed areas of mud during ebb periods.
- A safe high tide roost site in close proximity to the intertidal site, which mimics the roost close to the NKM foreshore and allows birds to exploit foraging resources on the new intertidal habitat as well as existing mudflat nearby.
- Supplementary foraging habitat for black-tailed godwits in the form of wet grassland.

4. Assessment of the compensatory measures

Choice of ratios

4.1. It is unclear why a ratio of 2:1 has been established as a scientifically defined baseline. Historic agreements with Associated British Ports, the Bristol Port Company, the Port of Felixstowe and P&O (now Dubai Ports World) relating to Immingham Outer Harbour, Bristol Containerport, Bathside Bay and London Gateway respectively, were all developed on a case-by-case basis. Most arrived at levels of compensation in the order of 2:1 but this was based on the local circumstances and the assessed levels of risk. Such ratios are not an established practice elsewhere in Europe and higher levels have been used (e.g. Wilhelm Kaissen Container Terminal at Bremmerhaven where a 3:1 ratio was used).

4.2. Crucially, unlike previous UK examples of port development involving inter-tidal habitat loss, the AMEP project involves displacement of a population of an Annex II waterbird (Black-tailed Godwit) that occurs in internationally important numbers on a single mudflat. This species is the subject of detailed plans to address concerns about its conservation status[6]. This sets the AMEP project apart from past practice for two reasons:

4.2.1. It is an exceptionally large flock of a single species (over 2600 birds) and therefore the levels of uncertainty and risk are arguably much greater than has been previously encountered in the UK.

4.2.2. Black-tailed Godwit appears to maintain an exceptionally high level of site fidelity and consequently the levels of risk associated with its displacement are greater than previously assessed.

4.3. The emphasis on Black-tailed Godwit means that whilst much of the general debate will relate to loss of habitat that is arguably consistent with past practice, much higher levels of certainty about the effectiveness of measures must be secured. This means that use of what might be inferred as past precedent cannot be applied with confidence.

Long-term management

4.4. Successful implementation of the compensatory Regulated Tidal Exchange (RTE) is highly dependent upon a complex management process. The design and operating processes

[6] European Commission, 2007. Management Plan for Black-Tailed Godwit (*Limosa Limosa*) 2007 –2009. Technical Report - 019 – 2007. Office for Official Publications of the European Communities, Luxembourg. http://ec.europa.eu/environment/nature/conservation/wildbirds/hunting/docs/black_tailed_godwit.pdf
Jensen, F.P., Arnaud Béchet, A. & Wymenga, E., 2008. International Single Species Action Plan for the Conservation of the Black-tailed Godwit *Limosa l. limosa & L. l. islandica*. AEWA Technical Series No. 37. 51pp. http://www.unep-aewa.org/publications/ssap/bt_godwit/black-tailed_godwit_internet.pdf

take account of the gradual build-up of fine sediment and recognise that without management the RTE would eventually silt up (as predicted in my previous analysis dated 30 August 2012)).

4.5. It is impossible to be sure that the predicted outcomes for sedimentation and mudflat evolution will be met. However, given the complexity of the proposals it is also impossible to say that they will not – that would require independent modelling and analysis that cannot be undertaken by BACC or an independent objector because of the time, technical expertise and cost involved.

4.6. It is clear from the proposals that management will be necessary and that RTE pools would require extensive invasive management on an indeterminate cyclical basis. As all of the RTE pools will be established at the same time, it is highly possible that pool maintenance will coincide and that a significant part of the site will undergo a decline in functionality at the same time. It is also possible that mobilisation costs for equipment required to dredge and remove sediments will mean that maintenance of all pools will have to take place at the same time.

4.7. In addition, considerable volumes of sediment re-mobilisation are involved. It is unclear how this will be disposed of, and where it will go to? Sediment flushed from the pools may lead to build-ups immediately outside the compensation site. Dredged sediment will require disposal somewhere, but it remains to be seen whether it can be deposited offshore or whether terrestrial disposal will be necessary. In addition, there can be no certainty that dredged sediment will meet necessary thresholds for contaminants (although it might be expected meet current thresholds).

4.8. Thus, although the proposals for management appear to have been developed to a high level of resolution, the technical solutions to long-term management problems are complex. Complexity attracts risk and uncertainty. For example, an operation to remove very substantial volumes of dredged sediment will require mobilisation of a variety of equipment, potentially impacting on adjacent areas within the Natura 2000 sites. This will also involve considerable expense and the permanent commitment of the operator of the port to meet this requirement.

4.9. Development of a project that involves long-term financial commitments also carries risks that costs will become an issue at a later stage. This has already happened at Great Yarmouth Outer Harbour where the consent involved a commitment that the port would actively manage sediment transport around the port. Unfortunately the port has not been a success and this long-term management commitment is now a significant financial liability with permanent residual costs.

Risk

4.10. The key aspect of the debate therefore focuses on the levels of risk arising from the proposals and the degree to which the Competent Authorities can be confident that

compensatory measures will work. The solution is highly dependent upon technology and long-term financial commitments.

4.11. If the measures fail, or if they are not sufficiently functional before the Black-tailed Godwit population is displaced, then the project will have led to a deleterious impact on the conservation status of Black-tailed Godwit. In which case, a recovery plan will be required including additional measures to secure the population at pre-AMEP levels.

4.12. The conclusions of studies of Redshank at Cardiff Bay (Burton *et al*. 2006 – footnote 5 page 6) are therefore extremely relevant to issues of timing and certainty. Unfortunately, this study is the only example of such detailed analysis of the impact of habitat loss on a particular species of wading bird. However a basic model can be established from a broader spectrum of experience.

4.13. Habitat loss has been ongoing for millennia but until recently very little attention has been paid to its impacts on migratory waterfowl. In the past it has simply been assumed that displaced birds would disperse and use other areas of suitable habitat. Such assumptions cannot be substantiated and it is counter-intuitive to assume that a reduction in foraging capacity would not have a bearing on species' survival. Two obvious possibilities arise:

4.13.1. Birds disperse to less optimal habitat and use greater proportions of time seeking food to maintain body condition. Birds will both maintain condition and survive in optimal condition; or they will lose condition and survival rates and breeding success will diminish.

4.13.2. Birds disperse and compete with others for resources on optimal feeding areas. Birds will either maintain condition because there is adequate food to accommodate more concentrated numbers, or they will lose condition and survival rates and breeding success will diminish.

4.14. These basic hypotheses raise a series of important questions:

4.14.1. Should the population of a particular species on a particular estuary be treated as a single unit or should it be considered as a series of more or less distinct flocks?

4.14.2. If birds are displaced, do they behave as a single unit (flock) and compete as a unit with other units; or do they operate at the level of the isolated individual?

4.14.3. If birds operate at an individual level can they integrate into other flocks?

4.14.4. Is integration into a new flock the key to ongoing survival and breeding success?

4.14.5. Are flocks composed of birds from a particular breeding area and therefore is survival of the flock the key to both individual and population scale survival and breeding success?

4.15. The above analysis is hardly exhaustive but it draws attention to the issues that need to be considered when determining the impact of a particular development on populations of migratory waterbirds. These complexities do not appear to be particularly well understood, and the literature is poorly populated with studies of the impact of habitat loss on migratory waterfowl. Two species appear to have been examined in some detail: Redshank (*Tringa tetanus*) and Oystercatcher (*Haematopus ostralegus*). In addition, conclusions about habitat loss can be drawn from the significant declines in populations of species such as Great Knot (*Calidris tenuirostris*) on the Australasian Flyway as a consequence of habitat loss in the Yellow Sea and elsewhere in China/Korea. In all three examples decreases in populations have resulted.

4.16. Modelling and analysis for the proposed Severn Tidal Barrage has suggested that food resources for some species might be improved by creation of certain more food-rich habitats that allow greater densities of birds to occupy smaller areas of mudflat. However, this remains theoretical and as far as I am aware there are few obvious examples to draw upon.

4.17. One possibility is the use of Regulated Tidal Exchange to create shallow lagoons favoured by some species. Such lagoons do develop as 'bird spectacles' and can support very large numbers of waterbirds. Locations such as Goosemoor on the Exe Estuary and at Teesmouth within the Tees Estuary are within estuaries with comparatively low levels of suspended sediment and the problems of sediment build-up are therefore comparatively much lower[7]. In both cases, the composition of the assemblage is immaterial whereas the critical issue in this case is to accommodate a single species in exceptional numbers!

4.18. Development of compensatory measures for the loss of the North Killingholme foreshore is therefore a great deal more complex and involves many more uncertainties. Consequently, whilst the package of measures proposed by Able UK could conceivably deliver the necessary functionality to support Black-tailed Godwit, the following questions remain:

4.18.1. At what point will the mud within the Regulated Tidal Exchange (RTE) become sufficiently populated with prey items to support Black-tailed Godwit (BTG)?

4.18.2. If the RTE does become functionally effective, will BTG use it in sufficient numbers to maintain the overall Humber population and the North Killingholme flock in particular?

[7] Note – suspended sediment levels are very variable over a given timescale, but the Humber is already acknowledged to be exceptionally high and unlike other estuaries in the UK, apart from perhaps the Severn.

4.18.3. What will happen to the sediment levels within the RTE? The new documentation provided by Able UK suggests that sedimentation rates will be in the order of 30mm per year (around 1 inch) but this has yet to be proven. Previous modelling of sedimentation rates in managed realignment have been shown to be unreliable and there is no reason to believe that the current models represent the precise outcome.

4.18.4. Once sedimentation has reached a given level and removal of mud commences, how long will the mud be in sub-optimal condition for the necessary prey items and therefore its contribution to supporting BTG?

4.18.5. If the package of measures fails to maintain BTG populations visiting the Humber Estuary what has happened to displaced birds? In which case, what is the impact the conservation status of the Icelandic race of BTG?

4.18.6. If the compensatory measures fail to work, what provisions are there for remedial action and who is legally and financially liable: Able UK as the developer who might be argued to have made reasonable efforts to address the issue; or the Secretary of State who accepted the risk and concluded that it should be accepted as a necessary part of the process?

4.18.7. And, finally, how will the risks associated with the requirement to manage the RTE in perpetuity be implemented if AMEP fails to meet its commercial objectives?

4.19. It is therefore important to bear in mind that if the levels of risk are higher than previously encountered, then the assumptions made about ratios are inconsistent with the need to establish assurance that the functionality of the Natura 2000 assets will be maintained.

Certainty

4.20. The package of compensatory measures must provide sufficient assurance to the Competent Authority that functional coherence will be maintained throughout the development proposal. In this respect the debate can be dissected according to the following issues:

4.20.1. **Q.** Will the compensation package be fully functional **before** the North Killingholme foreshore is developed?

A. No – construction of the compensation package will commence at the same time as the development of the AMEP site. The wet grassland may have partially developed, but there can be no certainty that the birds will use it, or that levels of invertebrates within the soil will be sufficient to act as a food source. This is further complicated because although the roosting lagoon is

expected to be completed around the same time it may require a period of adjustment before it is attractive to BTG.

4.20.2. **Q.** What confidence can be placed on BTG from North Killingholme occupying newly created habitat rather than dispersing to compete with other flocks?

A. None – this is a matter of assumption or conjecture. Sufficient time needs to elapse so that newly created habitat has developed the necessary invertebrate fauna. Furthermore, experience at managed realignment sites on the Humber suggests that only limited numbers of birds will use newly created sites.

4.20.3. **Q.** What confidence can be placed on the RTE maintaining mudflat in suitable (optimal) condition for prey items of BTG?

A. None – we know that the lagoons will gain elevation through sedimentation and as a consequence the proposals include provisions for ongoing management of sediment levels. This must mean that sediment within the lagoons will fluctuate between optimal and sub-optimal condition although the absolute proportions of time cannot be certain (see Figure 1).

4.20.4. **Q.** Are there adequate provisions for monitoring the impacts of loss of North Killingholme foreshore on the Humber Estuary Black-tailed Godwit population?

A. Bearing in mind the points raised under sections 4.13 to 4.15 there is arguably a deficiency because the proposed package is highly experimental with no precedent. This means that there is a need to design a monitoring package that provides sufficient understanding of the processes affecting the BTG flock so that the actual reasons for failure of the compensatory measures can be established should this prove to be the outcome. A monitoring project similar to that undertaken for Cardiff Bay seems to be appropriate given the international importance of this flock. It would require delays in the commencement of the foreshore loss but this would allow greater time for the compensation sites to become fully functional.

4.20.5. **Q.** Will the design parameters for the mudflats within the RTE be met? [i.e. '*Sustainable mudflat that is subject to regular tidal inundation (and does not dry excessively during neap tide cycles), and provides a patchwork of shallow standing pools and exposed areas of mud during ebb periods.*']

A. This is extremely doubtful because patchworks of standing pools will create conditions that favour sedimentation. Settling suspended sediment inevitably leads to the lowest points being filled faster than the high points and so over time any standing pools will level out and form a continuous mudflat. This is amply demonstrated from numerous managed realignment sites and from the process of warping. The design criteria will therefore fail and will only be maintained by regular intervention which must involve pushing the system away from optimal condition for the required in-fauna.

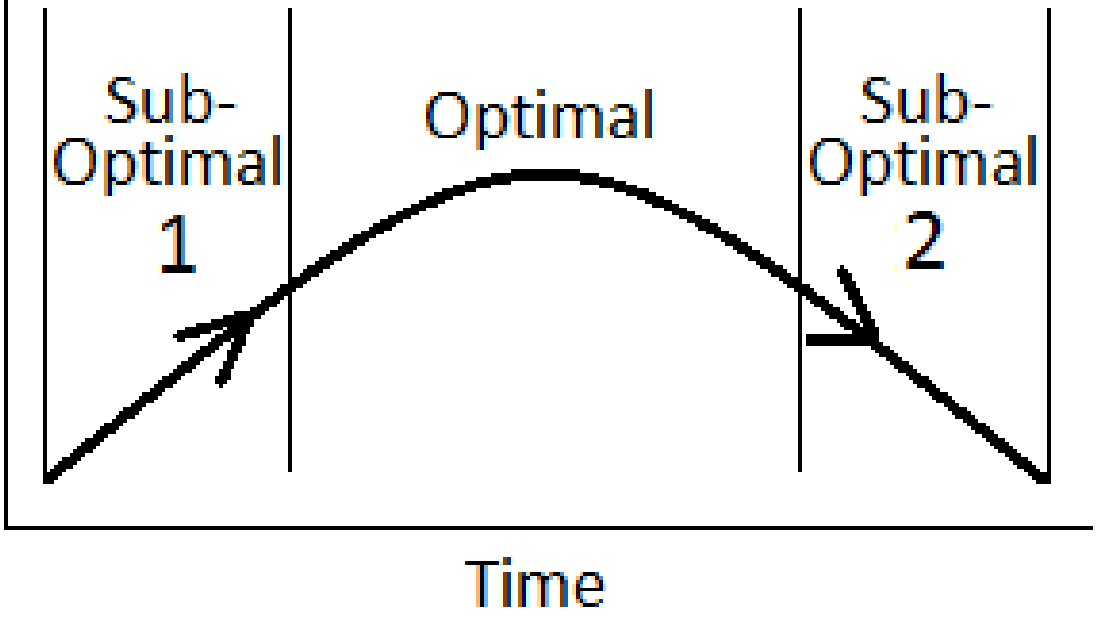

Figure 1. Representation of the cycle of mudflat evolution within the Regulated Tidal Exchange lagoons. Sub-optimal 1 represents the recovery period following sediment removal. Sub-optiomal 2 represents the process of sediment build-up before removal and readjustment of the conditions within the lagoon. Absolute timescales are uncertain.

Functionality

4.21. Bearing in mind the points made in paragraphs 4.20.1 to 4.20.5 there are considerable grounds for unease about the nature of the compensation package and its contribution to maintaining functionality:

4.21.1. The proposed compensation involves replacing a linear mudflat approximately 40 ha in area and 2km in extent. The compensation is composed of a Regulated Tidal Exchange comprising 4 separate cells of approximately 18 ha each but not forming an open linear mudflat.

4.21.2. The package is highly dependent upon the provision of a lagoonal area to accommodate a roost, and an area of wet grassland that it is assumed will provide supplementary feeding habitat for Black-tailed Godwit. There can be no certainty that the invertebrate fauna of the wet grassland will reach sufficient densities in the short time allowed, and even less certainty that the BTG will use the site.

4.21.3. The Regulated Tidal Exchange incorporates design parameters that clearly cannot be maintained without significant levels of intervention. This intervention means that the habitat will be sub-optimal for part of the time at least. Absolute values cannot be placed on the duration of optimal as opposed to sub-optimal habitat.

5. Compliance with the Habitats Directive

5.1. If the AMEP proposals are consented, they **must** offer a package of measures that give the Competent Authorities certainty that the coherence of Natura 2000 will be maintained. At the moment, that case has not been established. There are numerous reasons for concern, both in terms of the processes followed prior to and during the Inquiry, as well as many of the technicalities.

5.2. If it is determined that there are no alternatives to AMEP, then the compensation package must be robust, offering confidence that the Humber Estuary Black-tailed Godwit population will be maintained at the same or higher numbers than have occurred previously. If the development coincides with a decline in Godwit numbers then there must be sufficient data to refute assertions that AMEP is responsible for the change.

5.3. This means that all aspects of the compensation, mitigation and monitoring package must give sufficient certainty to meet the standards established by the ECJ into cockle harvesting on the Waddensee [ECJ Case C-127/02]. Consent can only be granted if there is certainty that there will not be an adverse affect on the coherence of Natura 2000.

5.4. Continual revision and change to the compensation package during the consent process is not helpful. Each revision is in response to weaknesses highlighted at a previous stage. This is effectively the third iteration of a compensation package to be assessed in the past four months! This process now means that parts of the package of measures are dependent upon separate consents and consequently the process is highly disjointed. Consent for the port can only be granted if there is certainty that the compensatory measures will happen in a manner that will secure functional coherence of Natura 2000.

5.5. Although the package presented at this iteration has clearly taken account of previous concerns about the technical feasibility of accommodating Black-tailed Godwits, it contains new uncertainties. The long-term sustainability of the Regulated Tidal Exchange is questionable in two respects. Firstly the undulating topography that is described cannot realistically be maintained without regular intervention. Secondly the basins will undergo periods developing optimal habitat followed by a shift towards sub-optimal conditions requiring management intervention. Finally, the entire process is dependent upon permanent commitments to finance the management of the Regulated Tidal Exchange. Those occasions when extensive sediment removal is necessary will be very expensive.

5.6. The coincidence of habitat creation and habitat loss represents the biggest weakness of the proposals. No manner of offsetting can resolve the fact that replacement habitat will be under development at the same time as the mudflats are lost and consequently there will be a period of indeterminate length when the Humber Estuary fails to be in Favourable Condition because a major mudflat supporting an internationally important flock will have been destroyed before it has been established that the new habitat meets its design and ecological functionality criteria.

5.7. The big risk that arises as a consequence is that the Black-tailed Godwits will start to respond from the onset of habitat loss. If that happens, the population of BTG will have suffered losses and the Icelandic race will have been pushed to unfavourable conservation status by the time compensatory habitat reaches optimal condition. Establishing certainty therefore involves a combination of a significant adjustment in the timing of habitat loss and habitat creation, coupled with a rigorous examination of the response of the Godwits to habitat loss to make sure that predictions about the viability of measures are correct.

5.8. The proposals as currently proposed include elements that are clearly incomplete and others that require separate consents. Consequently the measures cannot be fully scrutinised and therefore there can be no confidence in any aspect of the proposals satisfying the tests of the Habitats Directive.